SIEMENS

Catalog
IC 12

Edition
2023

Electrical Components for the Railway Industry

siemens.com/railway-components

Related catalogs

Industrial Controls IC 10
SIRIUS

PDF (E86060-K1010-A101-B3-7600)

SIMATIC ST 70
Products for
Totally Integrated Automation

PDF (E86060-K4670-A101-B9-7600)

Low-Voltage Power Distribution and Electrical Installation Technology LV 10
SENTRON • SIVACON • ALPHA
Protection, Switching, Measuring and Monitoring Devices, Switchboards and Distribution Systems

PDF (E86060-K8280-A101-B5-7600)

SITOP KT 10.1
SITOP
Power Supply

E86060-D4001-A510-E0

SITRAIN
Digital Industry Academy

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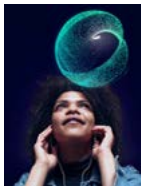

Miscellaneous

Industry Mall
Information and Ordering Platform
on the Internet:

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Siemens TIA Selection Tool
for the selection, configuration and ordering of TIA products and devices

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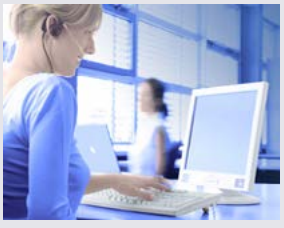
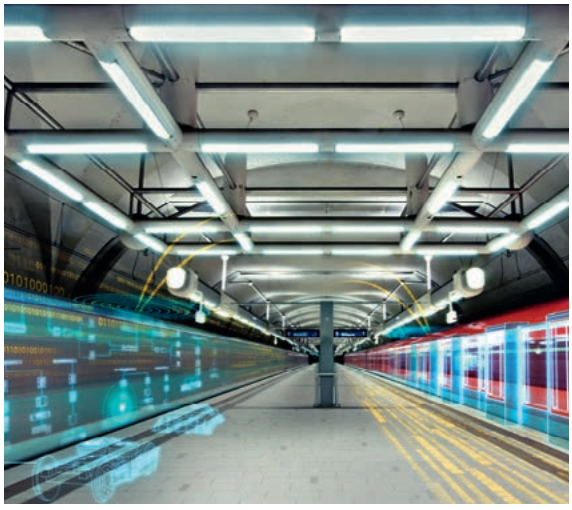


Electrical Components for the Railway Industry

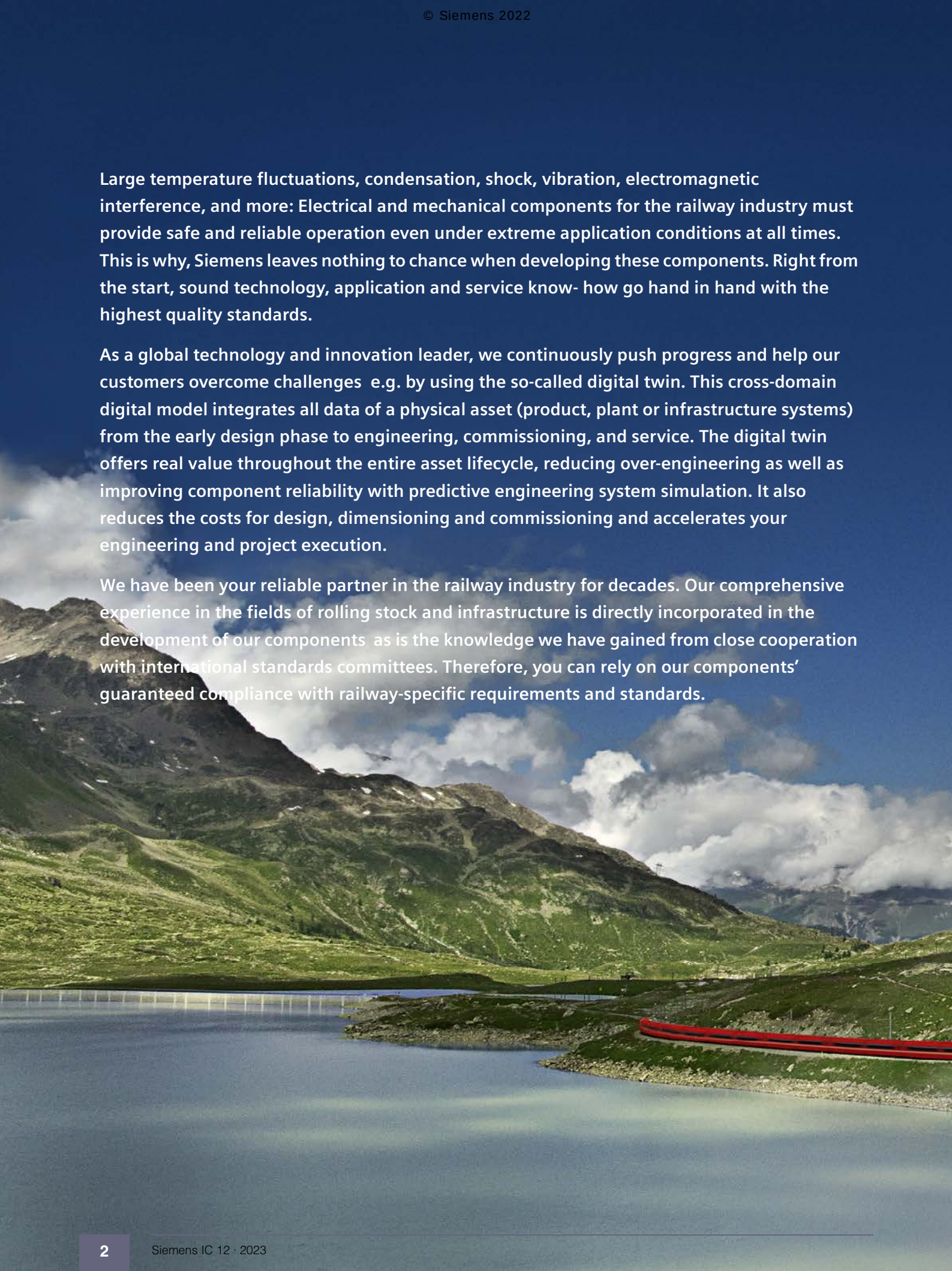


Catalog IC 12 · 2023

Supersedes:
Catalog IC 12 · 2019

Refer to the Industry Mall for current updates of this catalog:
www.siemens.com/industrymall

The products and systems described in this catalog are manufactured/distributed under application of a certified quality management system in accordance with EN ISO 9001
(For Certified Registration No., see www.siemens.com/system-certificates/cp).
The certificate is recognized by all IQNet countries.



Large temperature fluctuations, condensation, shock, vibration, electromagnetic interference, and more: Electrical and mechanical components for the railway industry must provide safe and reliable operation even under extreme application conditions at all times. This is why, Siemens leaves nothing to chance when developing these components. Right from the start, sound technology, application and service know- how go hand in hand with the highest quality standards.

As a global technology and innovation leader, we continuously push progress and help our customers overcome challenges e.g. by using the so-called digital twin. This cross-domain digital model integrates all data of a physical asset (product, plant or infrastructure systems) from the early design phase to engineering, commissioning, and service. The digital twin offers real value throughout the entire asset lifecycle, reducing over-engineering as well as improving component reliability with predictive engineering system simulation. It also reduces the costs for design, dimensioning and commissioning and accelerates your engineering and project execution.

We have been your reliable partner in the railway industry for decades. Our comprehensive experience in the fields of rolling stock and infrastructure is directly incorporated in the development of our components as is the knowledge we have gained from close cooperation with international standards committees. Therefore, you can rely on our components' guaranteed compliance with railway-specific requirements and standards.

Developed, tested and certified in accordance with current standards and directives

Siemens is a founding member of the IRIS Initiative, and consistently implements its requirements.

Our railway components comply with all the relevant standards, for example: DIN, EN, IEC, IEEE, ISO, EAC/GOST and ANSI, as well as the current fire protection standard EN45545.

With our certified components, we actively support the worldwide vehicle approval process.

Technical Support

One click – and you have all the information you need.

Industry Online Support – get fast and up-to-date information online

www.siemens.com/online-support

In Industry Online Support you will find FAQs, manuals, certificates, applications & tools, and much more

Support Request – the fast track to the experts

www.siemens.com/support-request

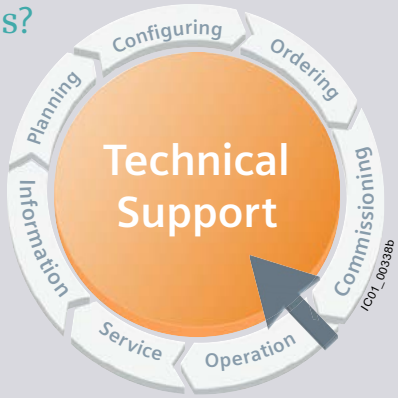
Using the Support Request form in Online Support you can send your query directly to Technical Support.

Conversion tool – the easy and efficient way to find successor products

www.siemens.com/conversion-tool

Any more questions?

Our experts are there to help you with competent technical advice.



Competent and fast technical advice regarding:

- Product selection
- Conversion from old to new
- Competitor conversion
- Special versions
- Particular requirements
- Commissioning
- Maintenance

Support Request:
www.siemens.com/support-request

Introduction

Electrical components for the railway industry – SIRIUS

Overview

SIRIUS range of electrical components for the railway industry

Whether for rolling stock or infrastructure applications, we offer a comprehensive portfolio of electrical components for countless applications. One of our portfolio highlights is SIRIUS, the complete range for industrial controls. SIRIUS offers everything required for the switching, protection, or starting of loads, as well as for their monitoring, control, detection, commanding, signaling, or supply. Our portfolio is rounded out by numerous products specifically developed and tested for the railway industry.

SIRIUS 3RV2 motor starter protectors for motor protection

- Spring-loaded or screw-type connection system on the terminals (also ring cable lug connection on request)
- For screw and snap-on mounting on DIN rail
- Short-circuit breaking capacity up to 100 kA
- Trip class 10 (sizes S00-S3)
- Integrated motor protection up to 100 A at +70 °C
- Comprehensive accessories/infeed systems
- Rated current:
  - Up to +60 °C 100 %
  - Up to +70 °C 87 %
- Mechanical service life:
  - 250 to 500 switching cycles

SIRIUS 3RT2 motor contactors up to 45 kW

- Spring-loaded or screw-type connection system on the terminals (also ring cable lug connection on request)
- Coil with suppressor diode or varistor circuit
- For screw and snap-on mounting on DIN rail
- Extended operating range: 0.7 – 1.25 x Us
- Communication via IO-Link for stationary applications
- Mounting:
  - Electronic coil: clearance up to ambient temperatures of 70 °C is not required
- Contacts:
  - Electronic coil: Auxiliary switches expandable in the same way as standard contactors

SIRIUS 3RT1 motor contactors from 55 to 250 kW

- Screw-type connection system via busbar connection or box terminal
- Optional control via a separate control signal input of 24 to 110 V DC (operating range from 0.7 to 1.25 x Us)
- Can be used at ambient temperatures up to 70 °C
- Contacts:
  - Two NO contacts and two NC contacts as standard
  - Auxiliary switches expandable in the same way as standard contactors

SIRIUS 3RF solid-state switching devices

- Solid-state switching devices for switching 1- and 3-phase resistive and 3-phase motor loads
- Spring-loaded, screw-type and ring cable lug connection system
- Extremely durable, low-maintenance, rugged, and reliable thanks to long switching service life
- Wear- and noise-free switching, also for noise-sensitive areas
- Expandable functionality through plug-on function modules
- Vibration resistance in accordance with EN 61373 Category 1, Class B

SIRIUS 3TC DC contactors

- 3TC44 for screw and snap-on mounting on DIN rail
- 3TC48 to 3TC78 for screw mounting
- Solenoid coil fitted with varistor
- Extended operating range: 0.7 – 1.25 x Us
- Contactors for switching DC voltages up to 1500 V
- Version with series resistor:
  - Mounting clearance up to ambient temperatures of 70 °C is not required
  - Mounting: with size 2 (3TC44) a clearance of 10 mm is required
  - Contacts: auxiliary switches not expandable; two NO contacts and one NC contact as standard

Electrical components for the railway industry – SIRIUS

SIRIUS 3RH2 contactor relays

- Spring-loaded and screw-type connection system on all terminals (also ring cable lug connection on request)
- Coil with suppressor diode or varistor circuit
- For screw and snap-on mounting on DIN rail
- Extended operating range: 0.7 to 1.25 x Us
- Electronic coil with very low switch-on and holding power
- With electronic coil:
  - Ambient temperature up to 70 °C
  - Mounting without clearance
  - A 4-pole auxiliary switch block can be mounted
- Standard coil (coupling contactors):
  - Ambient temperature > 60 °C
  - Mounting with a clearance of 10 mm
  - It is not possible to mount an auxiliary switch block

SIRIUS 3RH2 latched contactor relays

- Screw-type connection system
- Solenoid coil fitted with varistor
- For screw and snap-on mounting on DIN rail
- Extended operating range: 0.7 – 1.25 x Us
- Electronic coil with very low switch-on and holding power
- With electronic coil:
  - Ambient temperature up to 70 °C
  - Mounting without clearance
  - A 4-pole auxiliary switch block can be mounted

SIRIUS 3TH4 contactor relays with 8 and 10 contacts

- Screw-type connection system
- Solenoid coil fitted with varistor
- For screw and snap-on mounting on DIN rail
- Extended operating range: 0.7 – 1.25 x Us
- The contacts are not expandable
- Mounting:
  - At ambient temperatures between 55 °C and 70 °C a clearance of 10 mm is required for side-by-side mounting

SIRIUS ACT push buttons and signaling devices

- Modern design and flexible concept:
  - 4 design lines in plastic, shiny metal and matte metal in 22/30 mm
  - Actuators, holders, contact module and LED modules can be ordered individually and combined freely
- Broad product range:
  - State-of-the-art functions, such as ID key-operated switches on RFID basis
  - Customized variants, e.g. special tumbler arrangements, labeling, pre-assembled enclosures
- Communication:
  - Communication-enabled due to optional connection to AS-Interface, IO-Link or PROFINET
- Ruggedness:
  - Degree of protection IP69K is our standard

SIRIUS monitoring relays

- Monitoring relays for electrical parameters, thermistor motor protection, temperature, filling level, speed
- All versions with removable terminals, featuring either spring-loaded or screw-type connection system
- Applicability in all networks thanks to wide voltage range
- Variable adjustability
- 3-phase current monitoring integrated in the main circuit
- Communication via IO-Link for stationary applications

SIRIUS 3RQ coupling relays

- SIRIUS 3RQ2 coupling relays in robust industrial housing (22.5 mm width) and 3RQ3 coupling relays in slim design (6.2 mm)
- Coupling technology with power, plug-in and coupling relays in accordance with the railway standard
- Coupling links with two-tier design and connections on two levels
- Versions with removable terminals, featuring either spring-loaded or screw-type connection system
- Versions with very slim design of only 6.2 mm (3RQ3)
- Versions with up to 3 changeover contacts in width of only 22.5 mm (3RQ2), also available with hard gold-plated contacts for switching of small currents
- Low power consumption
- Applicability in all networks thanks to wide voltage range
- Version with solid-state compatible outputs (hard gold-plating)

SIRIUS 3RP2 timing relays

- Electronic timing relays (multifunction) with up to 15 time ranges
- Electronic timing relays with two changeover contacts and positively-driven relay contacts
- Individual or selectable time ranges
- Switch position and voltage indication via LED
- With removable terminals, featuring either spring-loaded or screw-type connection system
- For screw and snap-on mounting on DIN rail
- Electronic timing relays with positively-driven relay contacts:
  - 2 changeover contacts
  - Vibration resistance in accordance with DIN EN 61373 Category 1, Class B
  - Interference immunity in accordance with EN 50121-3-2

SIRIUS 3SK1 safety relays

- Suitable for all safety applications up to SIL 3/PL e
- Modular hardware configuration
- Simple commissioning using DIP switches and software parameter assignment
- Simple selection thanks to a small number of multifunctional devices
- SIRIUS safety relays can be integrated into systems simply and independently of the automation solution
- More functionality and flexibility through freely configurable safety logic
- Vibration resistance in according with DIN EN 61373 Category 1, Class B
- Interference immunity in accordance with EN 50121-3-2 Table 1

SIRIUS 3SE5 position switches

- Modular device design with easy plug-in connection system
- Four different enclosure versions in plastic and metal
- Optional LED display for all enclosures
- Positive opening of NC contacts
- Area of application up to SIL 3 in accordance with IEC 62061
- High contact reliability, also with 5 V DC/1 mA
- Safety position switches with separate actuator with/without tumbler
- High degree of protection up to IP 66/IP 67
- Extended temperature range: -40 °C to +85 °C
- Versions with increased corrosion protection

Electrical components for the railway industry – SENTRON

Overview

SENTRON protection and switching devices

Tested protection and switching devices from the SENTRON portfolio ensure reliable low-voltage power distribution in infrastructure and railway applications.

The perfectly coordinated components offer outstanding flexibility, convenience, and safety for the railway industry.

5SY4, 5SY5, 5SY7 MCBs

- Optional top or bottom infeed thanks to identical terminals
- Convenient entry thanks to large and easily accessible wiring space
- Rapid manual removal from the busbar assembly
- Vibration- and shock-proof in accordance with DIN EN 61373 and DIN EN 50155 "1B"
- Applicability at ambient temperatures from -40 °C to +70 °C, with max. humidity of 95 %
- Rated switching capacity: 10 kA AC and 1 kA DC
- Vibration resistance:
  - According to IEC 60068-2-6. 50 m/s² with 25 to 150 Hz and 60 m/s² with 35 Hz (4sec)
  - According to EN 61373 Category 1, Class B
- 5SY5: Usable for DC applications up to 250 volts per pole

5SY17 Circuit Breaker for Equipment

- Circuit Breaker for Equipment offer optimum protection for all applications in AC and DC control circuits in industrial applications and plant engineering.
- They protect solenoid valves, servo motors, signal lamps or even PLC inputs.
- EN 61373, EN 45545-2, UL 1077, IEC 60934

5SL6 COM miniature circuit breakers with communication and measuring function

- The new communication-capable MCB's record measured values and status information and transmit this data wirelessly to higher-level systems.

5ST3 COM Auxiliary switches and fault signal contacts (AS+FC)

- 5ST3 COM Auxiliary switches and fault signal contacts (AS+FC) with Communication and metering functions

7KN Powercenter 1000

- Wireless radio transmission of measured values and data to the 7KN Powercenter data transceiver
- Parameter assignment, firmware updates and further processing of the data via the 7KN Powercenter 1000 data transceiver

5ST3010 auxiliary switches (AS) for MCBs

- 5ST3 add-on components: can be combined with 5SY MCBs and 5SU1 RCBOs
- Signaling of the miniature circuit breaker's contact position by the auxiliary switch (AS) – released by hand or due to fault
- Auxiliary switch version with test button for testing of the control circuit without switching the miniature circuit breaker
- Rated breaking capacity: 60 A
- Ambient temperatures: –25 °C to +55 °C
- Climate resistance: according to IEC 60068-2-30 28 cycles

5SV RCCBs

- Enhanced comfort and safety due to improved design
- Comprehensive uniform accessories for additional functions
- Consistent busbar system concept for all RCCBs with N connection on the right or left
- Easy removal of individual equipment from the linked assembly
- Rated residual current: 30, 300 mA
- Quick and easy replacement thanks to fast manual removal of the RCCBs from the assembly
- Vibration resistance in accordance with DIN EN 61373 Category 1, Class B
- Vibration- and Shocktests according DIN EN 50155 7391
- Properties for fire protection according DIN EN 45545-2 7444

5SU1 RCBOs

- Clear, visible and controllable connection of the supply line
- Convenient entry thanks to large and easily accessible wiring space
- Peak withstand current (> 1 kA) for safe operation
- Retrofitting of add-on components for miniature circuit breakers on the right side
- Rated residual current: 10, 30, 300 mA, Rated current: 6 to 40 A
- Width: 2 WU
- For all 10 kA versions up to 40 A:
  - Full insulation through integrated, movable terminal covers in the area of conductor entries
  - Replacement time savings thanks to rapid manual removal of the miniature circuit breakers from the assembly when changing the connections
- Vibration resistance in accordance with DIN EN 61373 Category 1, Class B
- Vibriation- and Shocktests according DIN EN 50155 7511
- Properties for fire protection according DIN EN 45545-2 7512
- Oscillating- and Shock Test Certificate 7209

Remote controlled mechanisms 5ST30

- The market's most modular system
- Easy selection between manual/off/RC mode
- Easy connection to RCBOs, RCDs, MCBs, and other devices with adapters
- Rated voltages: 12 ... 30/177 ... 270 V AC or 12...48 V DC
- Width: 2 WU
- Applicability at ambient temperatures from -40 °C to +70 °C
- Climate resistance: according to IEC 60068-2-30 28 cycles
- Vibration resistance: according to IEC 60068-2-6. 50 m/s^2 with 10 to 150 Hz

3NA3360, 3NA3812 LV HRC fuse links

- Rated breaking capacity 120 KA AC, 25 kA DC
- Rated breaking capacity: 25 kA DC
- Rated current: 2 to 1250 A
- Contact blade: corrosion-free, silver-plated
- Climatic withstand capability: –20 °C up to +50 °C with 95% relative humidity
- Blown-fuse monitoring with 3NX1021 und 3NX1023

3NH3030 LV HRC fuse bases and accessories

- Made of ceramic material for screw mounting
- With flat connections, screw
- Size 00, 1, 2, 4

1

Fire safety is essential for railway safety

Overview

In the event of a fire, a train must be able to reach an appropriate evacuation location to protect people, goods and installations. Automatic fire detection has become an essential aspect of a comprehensive fire safety concept. This is especially the case for train traffic through tunnels and more generally in non-secured areas.

Fire detection for rolling stock

Whether you are a rolling stock manufacturer or train operator, our fire safety solutions for rolling stock meet all your expectations.

As a rolling stock manufacturer, you want to:

- purchase reliable, turnkey solutions with associated services
- supply and easily integrate products and systems
- use products and systems that completely fulfill current standards

As a train operator, you want to:

- ensure continuous and flexible operation by using high-performance systems
- efficiently manage the availability of your rolling stock
- optimize operating and operational costs
- ensure the highest level of safety for passengers and staff

Backed by our expertise in the field of fire protection, we offer you innovative and lasting solutions for rolling stock like high-speed trains, locomotives, trams and metro lines.

DSW – Series for rough environmental requirements

- Solution for rough enviromental conditions
- Rail base with external industry standard plug
- Plug & Play solution
- Power supply 24 V DC or 110 V DC
- Alarm and Fault signaling via relay output
- Stand-alone connectivity

DS1 – Series for standard installation

- High-end multi criteria spot detector
- Rail base for standard ceiling installation
- Power supply 24 V DC or 110 V DC
- Alarm and Fault signaling via relay output
- 3 parameters selectable
- Stand-alone connectivity

DS2 – Series for hidden installation and plug&play connectivity

- High-end multi criteria spot detector
- Rail base with external industry standard plug
- Plug & Play solution
- Power supply 24 V DC or 110 V DC
- Alarm and Fault signaling via relay output
- 3 parameters selectable
- Stand-alone connectivity

ASD – Series for advances smoke detection

- Aspiration smoke detection for railway
- Aspirating smoke detector for high-end fire detection in trains
- Very sensitive and reliable fire detection through differentiation between smoke and deceptive phenomena
- Quick & easy configuration to minimize start-up sequence
- Meets rail specific standards and achieves safety integrity level 2 (SIL2)

Overview

Air Damper actuators with / without spring return functionality for railway vehicles

Our new damper actuators with DC24 V and DC110 V for use in rail vehicles can be used typically for shut-off and regulation of air volume flows in air conditioning units and air distribution systems.

Typical applications:

- Compact air conditioning units (Driver's cab air-conditioning)
- Roof-top mounted air conditioning units
- Underfloor air conditioning units
- General air distribution

Damper actuators with spring return functionality

- GPC… series, for open-close and modulating control
  - Nominal torque 4 Nm
  - Running time 60 s
  - Operating voltage DC 24 V / DC 110 V
  - Connection cables railway specific
  - Emergency function with spring return
  - Position indication
  - Integrated switches for auxiliary functions
  - Degree of protection IP54
  - Printed circuit board with protective coating
- Damper actuators with spring return functionality for difficult operating conditions; they fulfill the main requirements as per:
  - EN 50155 (electronic equipment on rail vehicles)
  - EN 45545 (fire protection of rail vehicles) internal applications
  - EN 61373 (shock and vibration, rail applications)
- These damper actuators are expressly suitable for air conditioning units and air distribution systems for railway vehicles. Typically, used to operate air dampers that must be driven to a defined emergency position in the event of a loss of voltage.
- For damper areas of approx. 0.6 m^2
- Suitable for use with 2-position, as well as modulating controllers (DC 0/2…10 V)

Damper actuators without spring return functionality

- GDD / GDA / GLD / GLA… series, for open-close and modulating control
  - Nominal torque 5 / 8 / 10 Nm
  - Operating voltage DC 24 V / DC 110 V
  - Runtime 30 s / 90 s
  - Rotary angle 0…90°
  - Connection cables railway specific
  - Feedback potentiometer
  - Adjustable auxiliary switches
  - Degree of protection IP54
  - Printed circuit board with protective coating
- Damper actuators without spring return functionality; they fulfill the main requirements as per:
  - EN 50155 (electronic equipment on rail vehicles)
  - EN 45545 (fire protection of rail vehicles) internal applications
  - EN 61373 (shock and vibration, rail applications)
- These damper actuators are expressly suitable for air conditioning units and air distribution systems for railway vehicles. Thanks to a very low sound power level (<28dB(A)), the damper actuators are virtually predestined for use in sleeping cars, couchettes, and passenger coaches.
- For damper areas of approx. 0.8 m^2
- Suitable for use with 2-position, as well as modulating controllers (DC 0/2…10 V)

Overview

SIPLUS extreme RAIL – automation with railway approvals

Thanks to their extensive approvals and conformity to railway standards, the new SIPLUS extreme RAIL products are the perfect choice for a wide range of rolling stock and trackside applications. Based on SIMATIC industrial controllers, common features such as integrated system diagnostics and security and safety are already included. Whether simple, complex or distributed - SIPLUS extreme RAIL offers a durable and robust solution for your automation tasks.

SIPLUS extreme RAIL-Controller

- Basic and advanced controller for use in simple applications such as sanding systems and hygiene cubicles up to complex setups such as HVAC, signaling systems and interlockings
- Compliant to EN 50155, EN 45545 and EN 50124
- Failsafe controller certified for EN 50126, EN 50128, EN 50129 and EN 50159
- Insulation testing for every item
- Conformal Coating
- Temperature classes OT4: -40 °C to +85 °C* and OT1: -25 °C to +70 °C* (* includes +15 K overtemperature for 10 minutes)
- PROFINET, Ethernet, CAN, OPC UA and PROFISAFE communication
- High electromagnetic immunity to interference (EMC) and mechanical resilience (vibration and shock)
- Integrated system diagnostics and security
- 110 V IOs available

SIPLUS extreme Rail HMI

- HMI Panels for visualization of simple, medium and complex applications
- Compliant to EN 50155, EN 45545 and EN 50124
- Insulation testing for every item
- Conformal Coating
- Temperature class OT1: -25 °C to +70 °C* (* includes +15 K overtemperature for 10 minutes)
- PROFINET, Ethernet, CAN, OPC UA and PROFISAFE communication
- High electromagnetic immunity to interference (EMC) and mechanical resilience (vibration and shock)
- Integrated system diagnostics and security
- Horizontal installation

SIPLUS extreme Rail Distributed I/O

- Distributed I/O controller for medium and complex applications
- Compliant to EN 50155, EN 45545 and EN 50124
- Failsafe controller certified for EN 50126, EN 50128, EN 50129 and EN 50159
- Insulation testing for every item
- Conformal Coating
- Temperature classes OT4: -40 °C to +85 °C* and OT1: -25 °C to +70 °C* (* includes +15 K overtemperature for 10 minutes)
- Seamless integration into the common TIA Portal engineering framework
- PROFINET, Ethernet, CAN, OPC UA and PROFISAFE communication
- High electromagnetic immunity to interference (EMC) and mechanical resilience (vibration and shock)
- Integrated system diagnostics and security

Electrical components for the railway industry – SIDOOR

Overview

SIDOOR – Innovative door control systems and now also for metro gap filler control systems

In the field of railway applications, we offer SIDOOR automatic control system for platform screen doors and gates (PSDs & PSGs), interior train doors and now also for gap fillers.

Safe and convenient operation of the doors or steps is always ensured (friction and energy limitation).

Controller for gap filler – SIDOOR ATE530G coated

- Extends a step until 30 kg within 1 s by a maximum of 163 mm against a fixed stop
- Project specific EC motor
- Ice function: A higher extension force can be created within the first 50 mm (parameterizable)
- Variant with additional, transparent protective coating to prevent impairment or damage by moisture and atmospheric pollutants
- Certified according to: DIN EN 50657: 2017 (Basic Integrity)

Controllers for platform screen doors – SIDOOR ATE530S COATED and SIDOOR ATE531S

- Less mounting and wiring effort thanks to PROFINET. Furthermore, program changes, software updates and the teach-in drive of all SIDOOR systems can be started from a platform or even from the metro line control center. This substantially reduces commissioning times.
- Seamless integration into the TIA system architecture and expansion of the inputs and outputs for additional actuators and sensors, for example by SIPLUS ET 200SP RAIL
- Detailed diagnostics and parameter assignment options
- The 5 inputs and 2 outputs can be individually configured
- Freely configurable unlocking sequences
- Certified according to: IEC 62061 (SIL 2 for named functions), EN 60335-1, EN ISO 13849-1, EN 14752 (force and energy)
- Variant with additional, transparent protective coating to prevent impairment or damage by moisture and atmospheric pollutants
  - Corresponds to EN 50155 chapter 12, chapter 9.4
- SIDOOR ATE531S (fig. without lid)
  - additional temperature range extended to +70 °C

Motors for platform screen doors and gates– SIDOOR MEG251 and SIDOOR MED280

- Low noise, low heat rise, maintenance-free
- SIDOOR MEG251 left/right:
  - Compact size – EC geared motor for door weights up to 250 kg
  - For retrofit applications (replacement for SIDOOR ATE250S, including SIDOOR MEG250)
- SIDOOR MED280:
  - Gearless EC direct drive for door weights up to 280 kg – provides even higher reliability and energy balance = less wear = long service life
  - Just one motor for different installation orientations = asset minimization

Door drive for interior railway doors – SIDOOR ATD400T with SIDOOR MDG180 DIN EN 45545-2 or SIDOOR M3

- Complies with the new fire protection standard for components in rail vehicles according to DIN EN 45545-2 – Hazard Level HL 3
- Certified safety according to DIN EN 14752 (fail-safe limitation of force and energy)
- Extended operating temperature range: -25 °C to +70 °C and for 10 minutes up to +85 °C with reduced track-related speed profile parameters
- SIDOOR MDG180 DIN EN 45545-2 left/right:
  - Compact design – DC geared motor for door weights up to 180 kg
- SIDOOR M3 left/right:
  - better cost position, when extended fire protection standards are not needed
- SIDOOR ATD400T:
  - Including push-to-open and push-to-close function

Overview

Communication solutions for railway industry with SCALANCE and RUGGEDCOM

Siemens offers a wide range of communication products and technologies that are specifically designed to give railway operators all the tools they need for continuously trouble-free railway operation based on current security standards – from the integration of legacy infrastructure to long-haul fiber backbones and widespread wireless connectivity for mobile and stationary applications. Siemens is active worldwide, and has the knowledge and experience to deliver complete, standardized communication solutions to the railway industry.

SCALANCE XC-200

- Meets the railway standard EN 50121-4 (trackside)
- Redundant power supply
- Up to 24 x RJ45 ports 10/100 Mbit/s for mounting in the control cabinet
- Additional versions with optical ports (SC/ST/LC) up to 1 Gbit/s and with conformal coating (XC-200EEC) available
- Slot for optional C-PLUG removable data storage medium for easy device replacement without additional equipment such as a field PG
- Fast mobile network diagnostics by smartphone or tablet via WLAN and NFC (Near Field Communication)

SCALANCE XP208EEC, XP208PoE EEC, XP216EEC and XP216PoE EEC

- Meets the railway standards EN 50155 and EN 45545-2 (train- and trackside)
- Managed Switch, high degree of protection (IP 65) for use outside the control cabinet, temperature range -40 °C to +70 °C with coated PCBs (conformal coating), stable metal enclosure
- Flat type for installing in partitions etc., many mounting options
- Clearly highlighted diagnostic area
- Supports PoE ports (IEEE 802.3 at type 2, 30 W per port)
- Variants:
  - XP208EEC: 8-port managed switch
  - XP208PoE EEC: 8-port managed switch, 4 ports with PoE function
  - XP216EEC: 16-port managed switch
  - XP216PoE EEC: 16-port managed switch, 8 ports with PoE function

SCALANCE XR324-12M TS / XR324-4M PoE TS

- Meets the railway standards EN 50155, EN 45545-2 and EN 50121-4 (train- and trackside)
- Modular, managed Layer 2 Industrial Ethernet 19" rack switches
- Redundancy functions for highly available ring topologies, tried and tested in industrial applications (MRP/HRP), equipped with additional IT functions, e.g. VLAN, RSTP, MSTP
- Gigabit Ethernet support on all 24 ports
- Ambient temperature -40 °C to +70 °C
- Can be used in harsh environments due to vibration-proof/shock-proof plug-in connection
- Variants:
  - SCALANCE XR324-12 M TS: 12 slots for electrical (RJ45 / M12) and/or optical 2-port media modules (multi-mode or single-mode), which are inserted into the media module slots of the basic unit
  - SCALANCE XR324-4M PoE TS:
    - 16 integrated RJ45 ports, of which 8 are PoE-capable
    - 4 slots for electrical (RJ45 / M12) and/or optical 2-port media modules, which are inserted into the media module slots (multi- or single-mode) of the basic unit

SCALANCE XM408-8C with Port Extender PE408PoE

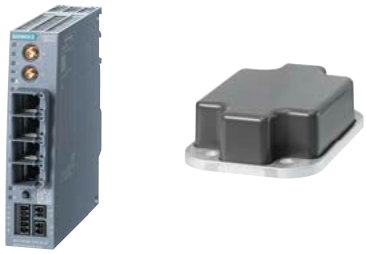
- Meets the railway standard EN 50121-4 (trackside)
- SCALANCE XM408-8C with 8 ports available in total, of which
  - up to 8 x 10/100/1000 Mbit/s are RJ45 ports with retaining collars
  - up to 8 x SFP slots (combo ports), 100 or 1000 Mbit/s of either electric port or SFP slot
- Two port extenders with 8 ports each can be connected to implement a maximum of 24 ports in one switch
- Fast mobile network diagnostics by smartphone or tablet via WLAN and NFC
- High-speed media redundancy through integral redundancy manager even for large networks, for both Gigabit Ethernet and Fast Ethernet
- Opt. activation of the Layer 3 functions in connection with the KEY-PLUG XM-400
- PE408PoE Port Extender for SCALANCE XM-400 managed modular IE switch; extension by 8 x 10/100/1000 Mbit/s RJ45 with up to 8 ports PoE according to IEEE 802.3 at type 2

Electrical components for the railway industry – SCALANCE I RUGGEDCOM

SCALANCE MUM856-1

- Meets the railway standards EN 50155, EN 45545 and EN 5012
- 5G/4G/3G router for wireless connection via the mobile radio network – perfect for large bandwidth requirements, e.g. for video transmission, data link for automatic ticket machines, infotainment services, internet on board and telemetry
- Bandwidth up to 1000 Mbit/s downlink and 500 Mbit/s uplink (5G)
- Redundant power supply
- Network management via SNMP
- Integrated firewall and IPsec / OpenVPN
- Ambient temperature -30 °C to +60 °C

SCALANCE M876-4 + ANT896-6MH



- Meets the railway standards EN 50155 and EN 50121-4
- 4G/3G router for wireless connection via the mobile radio network – perfect for large bandwidth requirements, e.g. for video transmission, data link for automatic ticket machines, infotainment services, internet on board and telemetry
- Bandwidth up to 100 Mbit/s downlink and 50 Mbit/s uplink (4G)
- Redundant power supply
- Managed 4-port switch, network management via SNMP
- Integrated firewall and IPsec/OpenVPN
- Ambient temperature -20 °C to +60 °C
- 2G/3G/4G antenna ANT896-6MH for mounting on the vehicle roof

SCALANCE W774-1 M12 EEC and SCALANCE W778-1 M12 EEC

- Meets the railway standards EN 50155 and EN 50121-4
- Industrial Wireless LAN Access Points for installation in control cabinets or for indoor use with IEEE 802.11a/b/g/n support and data transfer rates up to 300 Mbit/s
- Low-profile, compact aluminum enclosure, shock and vibration-proof, for high mechanical requirements, variants in protection class IP30 and IP65
- M12 connections for 10/100 Mbit/s with PoE
- Coated PCBs (conformal coating) and extended temperature range (-30 °C to +70 °C)
- Mounting outside of the cabinet also possible thanks to IP65 protection class (SCALANCE W778-1 M12)
- Additional functions (iFeatures) can be activated optionally with a KEY-PLUG, e.g. iPRP for reliable redundancy with WLAN

SCALANCE W1788-2 M12 EEC

- Meets the railway standards EN 50155, EN 45545-4 and EN 50121-4
- Industrial Wireless LAN Access Point for installation in control cabinets or for indoor use with IEEE 802.11ac support with transfer rates up to 1700 Mbit/s
- Rugged aluminum enclosure, shock and vibration-proof, for high mechanical requirements, protection class IP65, coated PCB (conformal coating)
- M12 connection for 10/100/1000 Mbit/s with PoE
- Antenna positioning optimized for 4 x 4 MIMO; no interference between the antennas for direct mounting on the device
- Ambient temperatures: -20 °C to +60 °C
- Additional industrial functions (iFeatures) can be activated optionally via a CLP, e.g. iPRP for reliable redundancy with WLAN

SCALANCE WAM766-1 EEC

- Meets the railway standards EN 50155, EN 45545-2
- Industrial Wireless LAN Access Point for installation in control cabinets or for indoor use with IEEE 802.11ax support and data transfer rates up to 1,201 Mbit/s
- Rugged aluminum enclosure, shock and vibration-proof, for high mechanical requirements, protection class IP65, conformal coating, e1 approval
- M12 connection for 10/100/1000 Mbit/s with PoE
- Interfaces: 2 x 2:2 MIMO N-Connect antenna connections
- Ambient temperatures: -30 °C to +75 °C
- Additional industrial functions (iFeatures) can be activated optionally via a CLP, e.g. iPRP for reliable redundancy with WLAN

IWLAN accessories: antennas and cables

- Remote antennas increase the reliability of wireless links by optimizing signal reception and emission
- Use in Industrial Wireless LAN (IWLAN) and WLAN according to IEEE 802.11 at 2.4 GHz and 5 GHz
- The connection cables meet the increased requirements for environmental conditions and fire protection that are required for use in vehicles (including EN 45545-2)

RUGGEDCOM RS900G / RS900GP

- Meet the railway standard EN 50121-4
- Managed Ethernet switch for reliable operation in critical infrastructure
- Multiple fiber connector types (LC, SC, ST, SFP)
- Long-haul optics allow Gigabit uplinks for distances up to 70 km
- Operating temperature from -40 °C to +85 °C
- Variants:
  - RS900G: Managed Ethernet switch with 10 ports, Gigabit fiber-optic uplinks and 128 bit encryption
  - RS900GP: Managed Ethernet switch with 10 ports, of which 8 are Power-over-Ethernet (PoE) ports and 2 Gigabit uplinks, with 128 bit encryption

RUGGEDCOM RSG920P

- Meets the railway standards EN 45545-2 and EN50121-4
- High port density to meet the Ethernet requirements along the track
- Compact layer 2 Gigabit switch with 20 Gigabit ports, including 4 PoE ports and 4 SFP slots and I/Os with PoE supply
- SFP ports for greater flexibility and migration in future Ethernet networks
- 19" switch performance features in compact design to save space
- Application and commissioning with USB console and MicroSD firmware/configuration
- RPS1300 power supply suitable for Power-over-Ethernet devices, max. power 140 W

RUGGEDCOM RSG907R / RSG909R

- Meet the railway standard EN 50121-4
- PRP/HSR coupling functionality to cover all types of redundant network topologies
- 3 x RNA (Redundant Network Access) and coupler Ethernet ports according to IEC 62439-3 (1000BASE-X), plus
  RSG907R: 4 x SAN (Singly Attached Node) fiber optic ports (LC, 100BASE-FX)
  RSG909R: 6 x SAN (Singly Attached Node) copper Ethernet (RJ45)
- Power redundancy: Integrated power supply with redundant inputs
  - Universal high voltage range: 88 – 300 VDC or 85 – 264 VA;
  - Universal low voltage power supply range: 10 – 60 VDC

Electrical components for the railway industry – SCALANCE I RUGGEDCOM

RUGGEDCOM RSG908C / RSG910C

- Meet the railway standards EN 50155 and EN 50121-4
- IEEE 1588 v2 Ordinary & Transparent Clocks
- RUGGEDCOM RSG908C: 4 x 1000BASE-X SFP uplink Ethernet ports and 4 x100BASE-FX LC fiber optic ports
- RUGGEDCOM RSG910C: 4 x 1000BASE-X SFP uplink Ethernet ports and 6 x 10/100/1000BASE-TX RJ45 copper Ethernet ports

RUGGEDCOM RST916P / RST916C

- Meet the railway standards EN 50155 and EN 50121-4
- IEEE 1588 v2 Ordinary & Transparent Clocks
- Removable storage medium, CLP, for device configuration back-up
- RUGGEDCOM RST916P: 12 x 10/100/1000BASE-T RJ45 ports, 4 x 1G BASE-X/1000BASE-X SFP+ 10 x 10/100/1000BASE-T IEE 802.3bt Types 1, 2, and 3 compliant PoE ports (60 W/port)
- RUGGEDCOM RST916C: 12 x 10/100/1000BASE-T RJ45 ports and 4 x 1G/10G BASE-X/1000BASE-X SFP+

RUGGEDCOM RX1400

- Meet the railway standard EN 50121-4
- Rugged Industrial Ethernet switch and TCP/IP router with LTE and fiber-optic WAN options in compact design
- For safe, cost-effective implementation of extensive communication applications and a high processing performance in harsh industrial environments
- 4 x Fast Ethernet copper ports and 2 x Gigabit SFP slots (Small Form Factor Pluggable)
- Supports multi-mode and single-mode SFPs for distances up to 100 km
- Equipped with GPS input
- Available with or without LTE modem for Europe, North America, the Asia-Pacific Region and Japan
- Operating temperatures from -40 °C to +85 °C; fanless operation
- The RUGGEDCOM VPE1400 provides a virtualized environment to run a guest Linux operating system and third party applications on the RX1400, enabling intelligence at the network edge

RUGGEDCOM RX1500 / RX1501 / RX1510 / RX1524 / RX1536

- Meet the railway standards EN 50155 and EN 50121-4 (Only RUGGEDCOM RX1524 and RX1536)
- Modular and field-replaceable layer 2 and layer 3 switch and router
- M12 line modules with very wide range of functions (M12/RJ45, Fast Ethernet / Gigabit, etc.)
- ROX II software features with integrated router/firewall / VPN / VRRP/MPLS
- Input voltage: 24 V DC, 48 V DC, 88 to 300 V DC, and 85 to 264 V AC for worldwide operability
- Operating temperature from -40 °C to +85 °C

RUGGEDCOM RSG2100 / RSG2100P

- Meet the railway standard EN 50121-4
- Modular fully managed Ethernet switch for use in electrically harsh and climatically demanding environments
- Up to 3 Gigabit Ethernet ports and 16 Fast Ethernet ports (copper and /or fiber optic)
- 2-port modules for outstanding flexibility
- Store and forward switching
- Supports many fiber-optic types (multi-mode, single-mode) with diverse connectors (ST, MTRJ, LC, SC, SFP)
- Fully integrated, dual redundant (optional) power supplies
- Variant available with up to 4 ports conforming with IEEE 802.3af (10/100BaseTX)

RUGGEDCOM RSG2300 / RSG2300P

- Meets the railway standard EN 50121-4
- Fully managed Ethernet rack switch with 32 ports and 4 modular Gigabit uplink ports and 24 Fast Ethernet copper ports
- Optional: up to 4 x 1000LX Gigabit Ethernet ports (copper and/or fiber-optic) and up to 8 x 100FX Fast Ethernet ports (copper and/or fiber-optic)
- Non-blocking, store and forward switching
- Supports many fiber-optic types (multi-mode, single-mode) with diverse connectors (ST, MTRJ, LC, SC, SFP)
- Fully integrated, doubly redundant (optional) power supplies
- Variant available with up to four ports conforming with IEEE 802.3af (10/100BaseTX)

RUGGEDCOM RST2228 / RST2228P

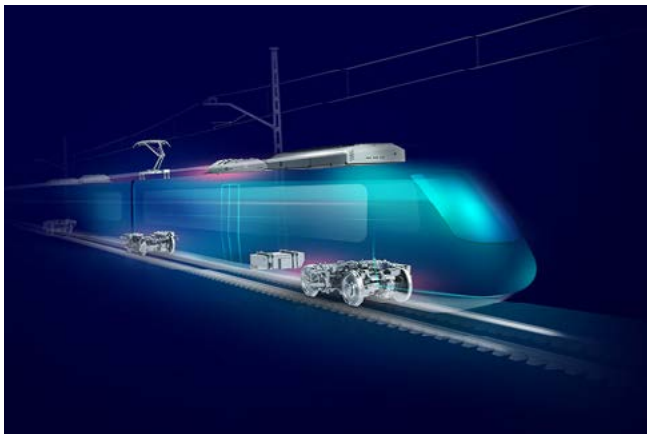
- Meets the railway standards EN 50155 and EN 50121-4
- 19" Layer 2 rack switch with up to 28 Ports: 4 x 1/10 Gigabit ports (SFP), 24 Gigabit/Fast Ethernet ports (SFP, RJ45, LC)
- Power-over-Ethernet Variant available
- Supports IEEE 8023.at/802.3bt (draft) with max. 60W per port
- Maximum Power budget 500W
- Modular; field-replaceable Ethernet media modules with 4 ports for outstanding flexibility
- Supports IEEE 1588 v2 time synchronization with hardware time stamping and transparent clock
- Non-blocking, store and forward switching
- Integrated dual redundant power supplies

RUGGEDCOM WIN

- First broadband wireless product portfolio designed for private networks delivering the benefits of 4G technology to critical infrastructure applications in harsh environments
- Provides enhanced security, network simplicity and private network feature set
- Mobile WiMAX compliance based on IEEE 802.16e standard and WiMAX Forum Wave2 (MIMO) certification
- Lowest frequency use: leverages OFDMA and built-in GPS to enable users to deploy an entire network on a single frequency channel
- Quality of service: separate traffic types over the air and guarantee latency, minimum bandwidth and jitter, according to application needs
- Stand-alone architecture: does not require an entire network infrastructure to be in place, while maintaining the interoperability and technology advances of broadband wireless
- Improved security: built-in features ensure NERC CIP compliance, such as two-factor mutual authentication and AES encryption
- Operating temperature from -40 °C to +75 °C

MoComp – made to move.

Overview



We keep things moving …

... in all kinds of weather, year in and year out, around the world, optimized for your vehicle. Components in the MoComp product family make this possible including superior pantographs, auxiliary traction converters, motors, gear units, brake systems, and bogies for all types of rail vehicle.

The products as well as complete propulsion systems are developed, produced, and tested using state-of-the-art methods and technologies. Whether for individual components or an optimized overall system, our focus is always on energy efficiency, weight management, system integration, and reliability. We´re your reliable partner with proven expertise, innovations, and competitive technologies.

Railway components that can do more

With the MoComp product family, you benefit from over 140 years of experience. But our railway components can do even more. They were developed by a vehicle manufacturer – always with your vehicle and its performance in mind – as an individual product or system. In partnership with you, we develop your application to suit your requirements and the needs of your customers.

Your partner for innovation

Many innovations are developed off the beaten track using the latest technologies and materials and with the help of experience, a pioneering spirit, comprehensive expertise, and good ideas:

- Systems for using alternative energies like batteries or hydrogen
- Space-optimized and extremely aerodynamic pantographs
- Lightweight bogies
- Permanent magnet synchronous machines
- High-speed asynchronous machines with optimized gear units
- Auxiliary and traction converters with the latest IGBT and silicon carbide technology
- Highly efficient closed-loop control
- Digitalization and monitoring
- Highly efficient open-loop control
- Airless brake system

We're there for you – on site and around the world

As a system supplier, we provide you with the complete powertrain from a single source, from the main switch to the wheel. We¡¯re by your side throughout the entire product lifecycle, exactly where you need us! We support you worldwide with Siemens Mobility¡¯s extensive manufacturing and service organization for local content, interface-optimized logistics and communication processes, and guaranteed services. You benefit from high energy efficiency and perfect vehicle performance as well as optimized service intervals for low lifecycle costs.

Spotlight

One special highlight is our development of the airless, electrohydraulic brake system, whose control system is fully integrated in the drive control. As a result, your vehicle is ready for operation sooner, your compressed air supply can be smaller, weight is lower, and more installation space is available for other components. Headways are also shorter because the brake can release much more quickly and the train requires much less time to get moving after the doors are closed.

Our new airless brake system is the world´s first completely electrohydraulic friction brake to be used in rail vehicles (brake by wire).

Find out more about railway components from Siemens Mobility: www.siemens.com/mocomp

MoComp® component family

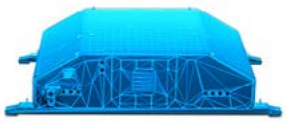
Pantographs

- Pantographs in reliable contact with the overhead line for all types of electric rail vehicle.

Traction converters

- Traction converters with the best possible efficiency for all standard voltage classes and cooling types for all rail vehicles.

Auxiliary converters



- The right power supply for every on-board system converter:
  - a versatile power supply for use in vehicles.

Bogies

- Reliable bogies for mass transit and mainline applications:
  - bogies with diagnostic systems.

Gear units

- Rail transmissions for all types of vehicle:
  - helical and bevel gear units in single-stage or multi-stage versions as well as special solutions.

Traction motors

- More comfortable traveling with our motors:
  - optimal traction performance, low noise, and a high comfort level for passengers.

Brake systems

- Innovative Siemens brake systems:
  - an economical solution that has added potential for cross-discipline system optimization

Medium-Voltage Components

Overview

Vacuum interrupters for medium voltage switching devices

- Extremely safe switching and long service life due to vacuum design
- Many years of manufacturing experience, with more than 5 million interrupters supplied
- Customer-specific development according to OEM customer requirements
- High product variance for different switching applications
- Use in:
  - Medium- and low-voltage switching devices
  - Medium-voltage contactors, circuit breakers, load-break switches and switch disconnectors for railway applications

3AH47 VCB for traction applications

- Rated voltages up to 27.5 kV, frequencies of 16.7 - 60 Hz, Rated current up to 2500 A
- Rated short-circuit breaking current up to 50 kA
- 1-, 2- and 3-pole version
- Vertical pole assembly fixed to operating mechanism via post insulators
- Customer benefits:
  - compact & high mechanically stable design
  - various additional equipment available
  - economical integration
  - competent consultation by our experts

Overview

Siemens surge arresters for railway applications – reliable, stable and safe overvoltage protection

Siemens has been designing and manufacturing surge arresters for all kinds of applications since 1925. For more than 80 years we've been manufacturing surge arresters for rail systems. Continuous research and development, the wealth of Siemens know-how, and comprehensive worldwide experience give Siemens surge arresters a leading edge in overvoltage protection Their uncompromising quality ensures a long service life and the highest reliability in any application.

Siemens surge arresters are an indispensable aid to insulation coordination in electrical power systems. Valuable equipment, such as traction vehicles, is optimally protected against lightning and switching overvoltages. Siemens surge arresters have been designed to meet the requirements of a wide range of common installation environments, from arctic cold to the heat of the desert and the dampness of tropical climates.

All Siemens surge arresters feature a superior sealing system that reliably prevents moisture ingress to ensure the highest possible degree of overvoltage protection and decades of trouble-free service.

3EB4 surge arrester for railway applications

- Housing made of glass fiber reinforced plastic (FRP) tube and silicone rubber sheds
- For AC systems up to 25 kV
- For DC systems up to 3 kV
- Train speeds up to 420 km/h
- Short circuit current capability 50 kA
- Tested according to IEC 60099-4 (AC version) and EN 50526-1 (DC version)
- Fire test according to DIN EN 45545-2
- Shock and vibration test according to IEC 61373
- For use on:
  - High-speed trains and intercity trains
  - Commuter and regional trains
  - (Multi-traction) locomotives
  - Urban transportation (light rail, metros and tram cars)

3EB5 surge arrester for railway applications

- Cage design™ with directly molded silicone rubber housing
- For AC systems up to 25 kV
- For DC systems up to 3 kV
- Travel speed up to 200 km/h
- Short circuit current capability 65 kA
- Tested according to IEC 60099-4 (AC version) and EN 50526-1 (DC version)
- Fire test according to DIN EN 45545-2
- Shock and vibration test according to IEC 61373
- For use on:
  - Intercity trains
  - Commuter and regional trains
  - (Multi-traction) locomotives
  - Urban transportation (light rail, metros and tram cars)

NEW

Click on this video symbol in the catalog PDF for further product information.

NEW

Click on this video symbol in the catalog PDF for further product information.

Overview

More information	
Homepage, see www.siemens.com/sirius	Conversion tool, see www.siemens.com/conversion-tool
Industry Mall, see www.siemens.com/product?3RT_3TK_3TC	TIA Selection Tool Cloud (TST Cloud), see www.siemens.com/tstcloud/?node=Contactor

Size		**S00**				**S0**					
Type		3RT201				3RT202					
3RT20 contactors											
Type		**3RT2015**	**3RT2016**	**3RT2017**	**3RT2018**	**3RT2023**	**3RT2024**	**3RT2025**	**3RT2026**	**3RT2027**	**3RT2028**
AC, DC operation		(p.2/43, 2/44, 2/104, 2/105)				(p. 2/45)					
AC-3											
I_e/AC-3/400 V	A	7	9	12	16	9	12	17	25	32	38
400 V	**kW**	**3**	**4**	**5.5**	**7.5**	**4**	**5.5**	**7.5**	**11**	**15**	**18.5**
230 V	kW	1.5	2.2	3	4	2.2	3	4	5.5	7.5	11
690 V	kW	4	5.5	5.5	7.5	7.5	7.5	11	11	18.5	18.5
1 000 V	kW	--	--	--	--	--	--	--	--	--	--
AC-4 (at I_a = 6 x I_e)											
400 V	**kW**	**3**	**4**	**4**	**5.5**	**4**	**5.5**	**7.5**	**7.5**	**11**	**11**
400 V (200 000 operating cycles)	kW	1.15	2	2	2.5	2	2.6	3.5	4.4	6	6
AC-1 (40 °C, ≤ 690 V)											
I_e	**A**	**18**	**22**	**22**	**22**	**40**	**40**	**40**	**40**	**50**	**50**
Accessories for contactors											
Auxiliary switches	• On front	**3RH29** (p. 2/59)				**3RH29** (p. 2/59)					
	• Lateral	**3RH29** (p. 2/61)				**3RH29** (p. 2/61)					
Function modules	• Direct-on-line starting, star-delta (wye-delta) starting	**3RA281.**[1)]									
	• IO-Link, AS-Interface	**3RA271.-.AA00**[1)]									
Surge suppressors		**3RT2916**[1)]				**3RT2926**[1)]					
3RU2 and 3RB3 overload relays											
3RU thermal overload relays		[1)]									
3RB electronic overload relays		[1)]									
3RV20 motor starter protectors											
Motor starter protectors		**3RV2011** 0.11 ... 16 A (p. 2/177)				**3RV2021** 0.45 ... 40 A (p. 2/178)					
Link modules		**3RA1921, 3RA2911** (p. 2/203)				**3RA2921** (p. 2/203)					
3RA23 reversing contactor assemblies											
Complete units	Type	[1)]									
400 V	**kW**	**3**	**4**	**5.5**	**7.5**		**5.5**	**7.5**	**11**	**15**	**18.5**
Assembly kits, etc.		**3RA2913-2AA.** (p. 2/64)				--	**3RA2923-2AA.** (p. 2/64)				
Function modules		**3RA271.-.BA00**[1)]									
3RA24 contactor assemblies for star-delta (wye-delta) starting											
Complete units	Type	**3RA2415**[1)]	**3RA2416**[1)]	**3RA2417**[1)]		**3RA2423**[1)]		**3RA2425**[1)]	**3RA2426**[1)]		
400 V	**kW**	**5.5**	**7.5**	**11**		**11**		**15/18.5**	**22**		
Assembly kits/wiring modules		**3RA2913-2BB.** (p. 2/65)				**3RA2923-2BB.** (p. 2/65)					
Function modules		**3RA271.-.CA00**[1)]									

[1)] see Catalog IC 10.

Introduction

Size		S2				S3			
Type		3RT203				3RT204			
3RT20 contactors									
Type		**3RT2035**	**3RT2036**	**3RT2037**	**3RT2038**	**3RT2045**	**3RT2046**	**3RT2047**	
AC, DC operation		(p. 2/46, 2/48)				(p. 2/46, 2/49)			
AC-3									
I_e/AC-3/400 V	A	41	50	65	80	80	95	110	
400 V	**kW**	**18.5**	**22**	**30**	**37**	**37**	**45**	**55**	
230 V	kW	11	15	18.5	22	22	22	30	
690 V	kW	22	22	37	45	55	75	90	
1 000 V	kW	--	--	--	--	37	37	37	
AC-4 (at I_a = 6 x I_e)									
400 V	**kW**	**18.5**	**22**	**30**	**37**	**37**	**45**	**55**	
400 V (200 000 operating cycles)	kW	11.6	12.6	14.7	15.8	17.9	22	24.3	
AC-1 (40 °C, ≤ 690 V)									
I_e	**A**	**60**	**70**	**80**	**90**	**125**	**130**	**130**	
Accessories for contactors									
Auxiliary switches	• On front	**3RH29**			(p. 2/59)	**3RH29**			(p. 2/59)
	• Lateral	**3RH29**			(p. 2/61)	**3RH29**			(p. 2/61)
Function modules	• Direct-on-line starting	**3RA283.**[1)]							
	• IO-Link, AS-Interface	**3RA271.-.AA00**[1)]							
Surge suppressors		**3RT2936**[1)]				**3RT2936, 3RT2946**[1)]			
Terminal covers		**3RT2936-4EA2**			(p. 2/72)	**3RT2946-4EA2**			(p. 2/72)
3RU2 and 3RB overload relays									
3RU thermal overload relays		[1)]							
3RB electronic overload relays		[1)]							
3RV20 motor starter protectors									
Motor starter protectors		**3RV2031, 3RV2032**		9.5 ... 80 A	(p. 2/179)	**3RV2041, 3RV2042**		28 ... 100 A	(p. 2/180)
Link modules		**3RA2931**			(p. 2/203)	**3RA1941**			(p. 2/203)
3RA23 reversing contactor assemblies									
Complete units	Type	**3RA2335**[1)]	**3RA2336**[1)]	**3RA2337**[1)]	**3RA2338**[1)]	**3RA2345**[1)]	**3RA2346**[1)]	**3RA2347**[1)]	
400 V	**kW**	**18.5**	**22**	**30**	**37**	**37**	**45**	**55**	
Assembly kits/wiring modules		**3RA2933-2AA.**			(p. 2/64)	**3RA2943-2AA.**			(p. 2/64)
Function modules		**3RA271.-.BA00**[1)]							
Mechanical interlocks		**3RA2934-2B**			(p. 2/68)	**3RA2934-2B**			(p. 2/68)
3RA24 contactor assemblies for star-delta (wye-delta) starting									
Complete units	Type	**3RA2434**[1)]	**3RA2435**[1)]	**3RA2436**[1)]	**3RA2437**[1)]	**3RA2444**[1)]	**3RA2445**[1)]	**3RA2446**[1)]	
400 V	**kW**	**22/30**	**37**	**45**	**55**	**55**	**75**	**90**	
Assembly kits/wiring modules		**3RA2933-2BB./-2C**			(p. 2/65)	**3RA2943-2BB./-2C**			(p. 2/65)
Function modules		**3RA271.-.CA00**[1)]							

[1)] see Catalog IC 10.

Size			**S6**			**S10**			**S12**	
Type			3RT105			3RT1.6			3RT1.7	
3RT10 contactors · 3RT12 vacuum contactors										
Type			**3RT1054**	**3RT1055**	**3RT1056**	**3RT1064**	**3RT1065**	**3RT1066**	**3RT1075**	**3RT1076**
AC, DC operation			(p. 2/50)			(p. 2/50)			(p. 2/50)	
Type			--	--	--	**3RT1264**[1]	**3RT1265**[1]	**3RT1266**[1]	**3RT1275**[1]	**3RT1276**[1]
AC-3										
I_e/AC-3/400 V		A	115	150	185	225	265	300	400	500
400 V		**kW**	**55**	**75**	**90**	**110**	**132**	**160**	**200**	**250**
230 V		kW	37	45	55	55	75	90	132	160
690 V	3RT10/3RT12	kW	110	132	160	200	250	250	400	400/500
1 000 V	3RT10/3RT12	kW	75	90	90	90/315	132/355	132/400	250/560	250/710
AC-4 (at I_a = 6 x I_e)										
400 V		**kW**	**55**	**75**	**90**	**110**	**132**	**160**	**200**	**250**
400 V (200 000 operating cycles)	3RT10/3RT12	kW	29	38	45	54/78	66/93	71/112	84/140	98/161
AC-1 (40 °C, ≤ 690 V)										
I_e	3RT10/3RT12	**A**	**160**	**185**	**215**	**275/330**	**330**	**330**	**430/610**	**610**
3RT14 AC-1 contactors										
Type			**3RT1456** (p. 2/87)			**3RT1466**	**3RT1467** (p. 2/87)		**3RT1476** (p. 2/87)	
I_e/AC-1/40 °C/≤ 690 V		**A**	**275**			**400**	**500**		**690**	
Accessories for contactors										
Auxiliary switches	• On front		**3RH19, 3RT1926** (p. 2/60)							
	• Lateral		**3RH19** (p. 2/62, 2/63)							
Surge suppressors			**3RT1956-1C**[1] (RC element)							
Terminal covers			**3RT1956-4EA.** (p. 2/72)			**3RT1966-4EA.** (p. 2/72)				
Box terminal blocks			**3RT1955-4G, 3RT1956-4G** (p. 2/70)			**3RT1966-4G** (p. 2/70)				
3RB2 overload relays										
3RB electronic overload relays			[1]							
3RV10 molded case motor starter protectors										
Molded case motor starter protectors			**3RV1063**[1] 40 ... 200 A			**3RV1073**[1] 160 ... 400 A			**3RV1083** 252 ... 630 A	
Reversing contactor assemblies[1]										
Complete units		Type	--							
400 V		**kW**	**55**	**75**	**90**	**110**	**132**	**160**	**200**	**250**
Assembly kits/ wiring modules			**3RA1953-2A** (p. 2/64)			**3RA1963-2A** (p. 2/64)			**3RA1973-2A** (p. 2/64)	
Mechanical interlocks			**3RA1954-2A** (p. 2/68)							
Contactor assemblies for star-delta (wye-delta) starting[1]										
Complete units		Type	--							
400 V		**kW**	--							
Assembly kits/ wiring modules			**3RA1953-2B** (p. 2/66)			**3RA1963-2B** (p. 2/66)			**3RA1973-2B** (p. 2/66)	

[1] see Catalog IC 10.

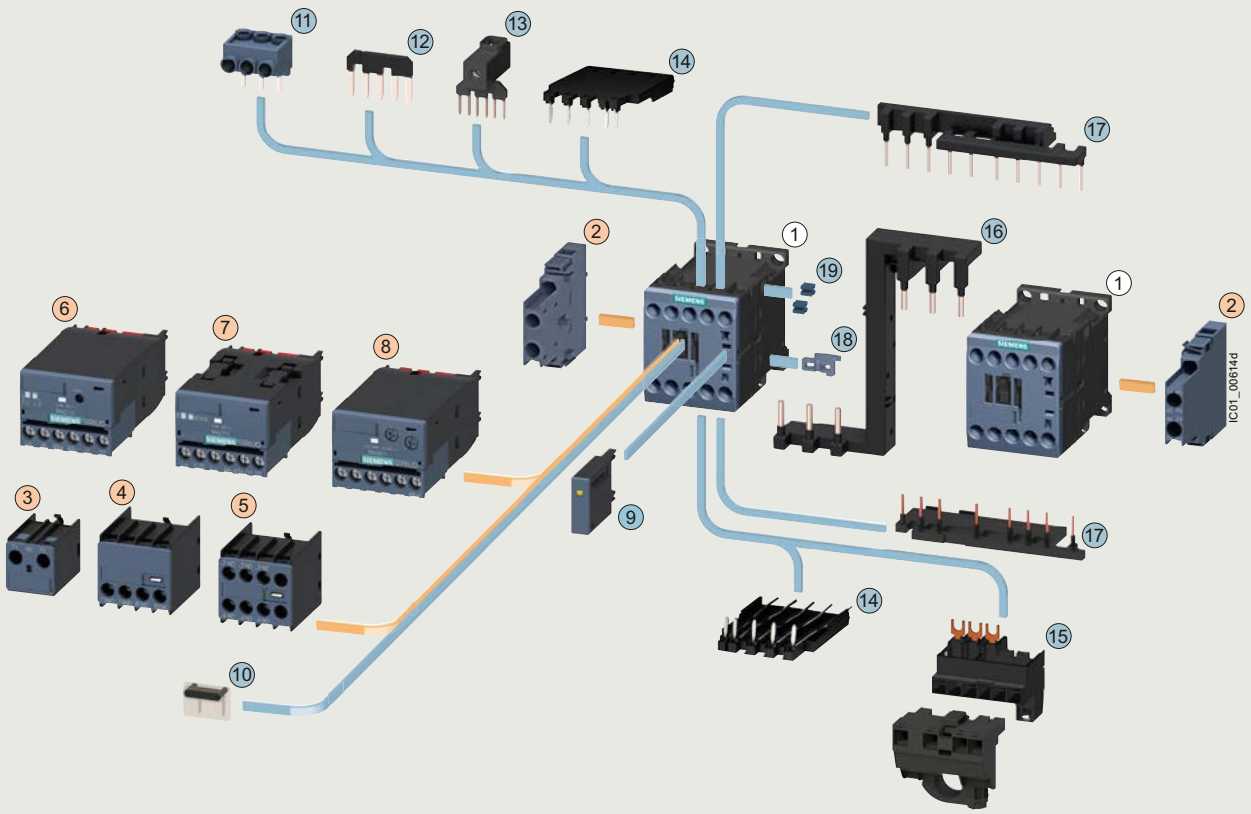
Overview

The SIRIUS family of controls

The SIRIUS modular system with its components for the switching, starting, protection and monitoring of motors and industrial systems stands for the fast, flexible and space-saving construction of control cabinets.

3RT2.1 contactors · Size S00 with mountable accessories

The figure shows the version with screw terminals



(1) Contactor, size S00

(2) 2-pole auxiliary switch, laterally mountable
(3) 1-pole auxiliary switch, for snapping onto the front cable entry from the top
(4) 2-pole auxiliary switch, for snapping onto the front cable entry from the bottom
(5) 4-pole auxiliary switch, for snapping onto the front
(6) 3RA27 function module for AS-Interface
(7) 3RA27 function module for IO-Link
(8) 3RA28 function module
(9) Surge suppressor with/without LED
(10) Cover, sealable
(11) 3-phase infeed terminal
(12) Star jumper, 3-pole, without connecting terminal
(13) Link for paralleling, 3-pole, with connecting terminal
(14) Solder pin adapter
(15) Connection module (adapter and connector) for contactors with screw terminals
(16) Safety main current connector for two contactors

Assembly kit 3RA2913-2AA1
Consisting of:

(17) Wiring modules on the top and bottom for connecting the main, auxiliary and control current paths, electrical interlock[1] included, interruptible (NC contact interlock)
(18) Mechanical interlocks[2]
(19) Two connecting clips for two contactors[2]

For contactors
For contactors and coupling contactors

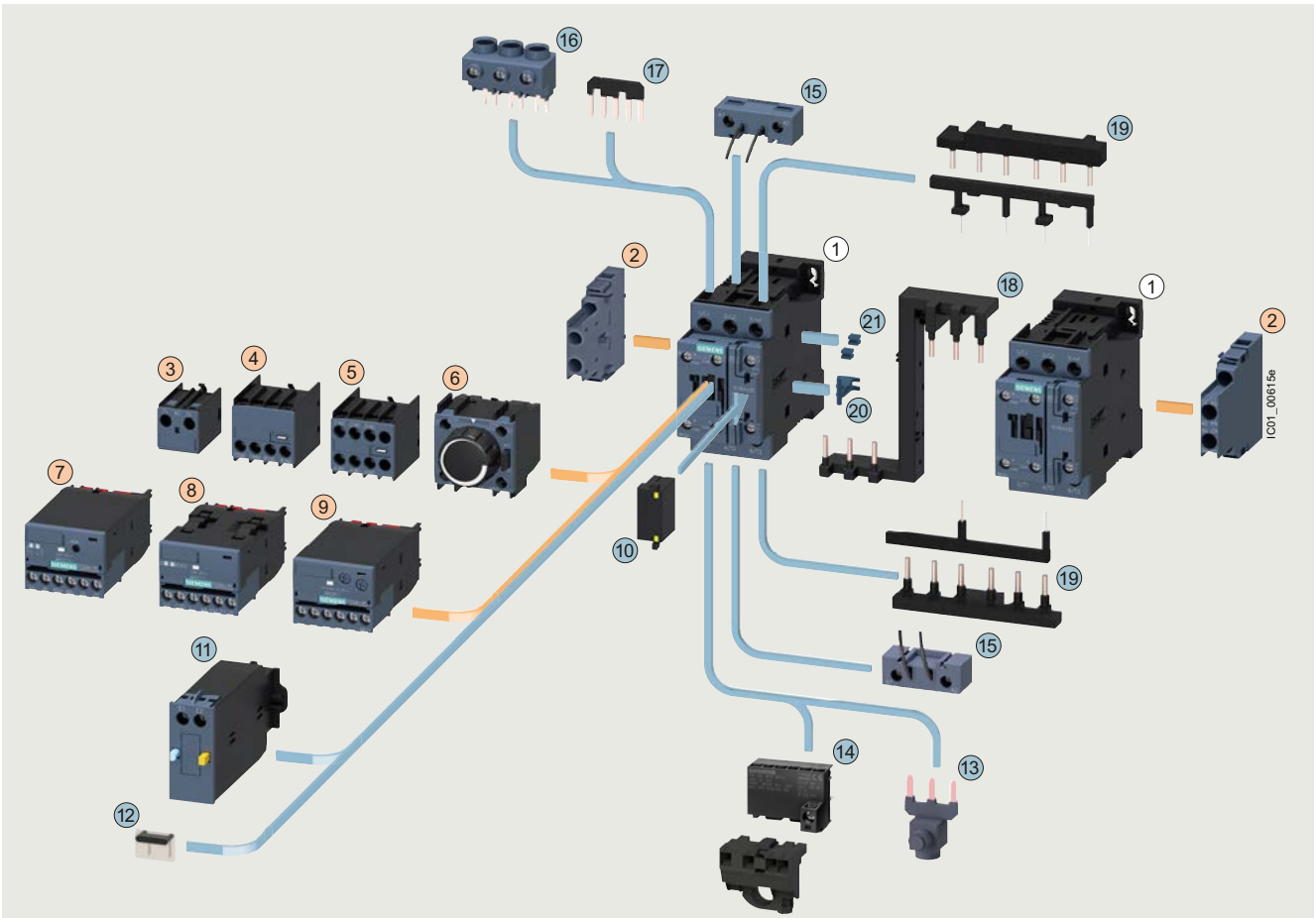
[1] 3RT201. contactors with one NC contact in the basic unit are required for the electrical interlock. An additional NO contact is required for momentary-contact operation.

[2] The parts (18) and (19) can only be ordered together as 3RA2912-2H mechanical connectors.

Accessories and spare parts, see pages 2/52 to 2/75.

3RT2.2 contactors · Size S0 with mountable accessories

The figure shows the version with screw terminals



(1) Contactor, size S0

(2) 2-pole auxiliary switch, laterally mountable
(3) 1-pole auxiliary switch, for snapping onto the front cable entry from the top
(4) 2-pole auxiliary switch, for snapping onto the front cable entry from the bottom
(5) 4-pole auxiliary switch, for snapping onto the front
(6) Pneumatically delayed auxiliary switch
(7) 3RA27 function module for AS-Interface
(8) 3RA27 function module for IO-Link
(9) 3RA28 function module
(10) Surge suppressor with/without LED
(11) Mechanical latching block
(12) Cover, sealable

(13) Link for paralleling, 3-pole, with connecting terminal
(14) Connection module (adapter and plug) for contactors with screw terminals
(15) Coil connection module, on the top or bottom
(16) 3-phase infeed terminal
(17) Link for paralleling (star jumper), 3-pole, without connecting terminal
(18) Safety main current connector for two contactors

Assembly kit 3RA2923-2AA1
Consisting of:

(19) Wiring modules on the top and bottom for connecting the main current paths, electrical interlock included (NC contact interlock)
(20) Mechanical interlocks [1)]
(21) Two connecting clips for two contactors [1)]

For contactors
For contactors and coupling contactors

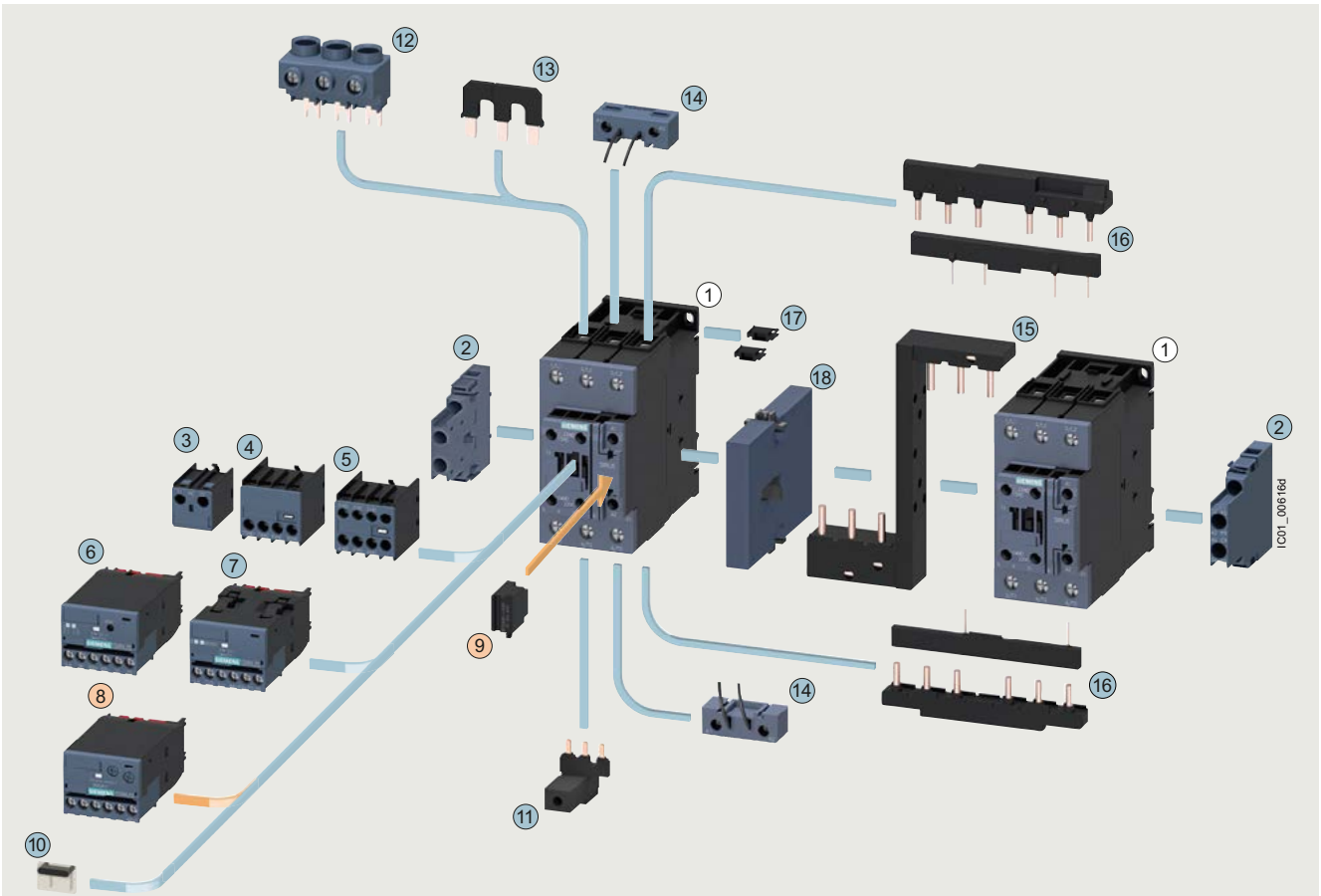
[1)] The parts (20) and (21) can only be ordered together as 3RA2922-2H mechanical connectors.

Accessories and spare parts, see pages 2/52 to 2/75.

General data

3RT2.3 contactors · Size S2 with mountable accessories

The figure shows the version with screw terminals



① Contactor, size S2

② 2-pole auxiliary switch, laterally mountable
③ 1-pole auxiliary switch, for snapping onto the front, cable entry from the top
④ 2-pole auxiliary switch, for snapping onto the front, cable entry from the bottom
⑤ 4-pole auxiliary switch, for snapping onto the front
⑥ 3RA27 function module for AS-Interface
⑦ 3RA27 function module for IO-Link
⑧ 3RA28 function module
⑨ Surge suppressor with/without LED
⑩ Cover, sealable
⑪ Link for paralleling, 3-pole, with connecting terminal
⑫ 3-phase infeed terminal
⑬ Link for paralleling (star jumper), 3-pole, without connecting terminal
⑭ Coil connection module, top or bottom
⑮ Safety main current connector for two contactors

Assembly kit 3RA2933-2AA1
Consisting of:
⑯ Wiring modules on the top and bottom for connecting the main current paths, electrical interlock included (NC contact interlock)
⑰ Two connecting clips for two contactors

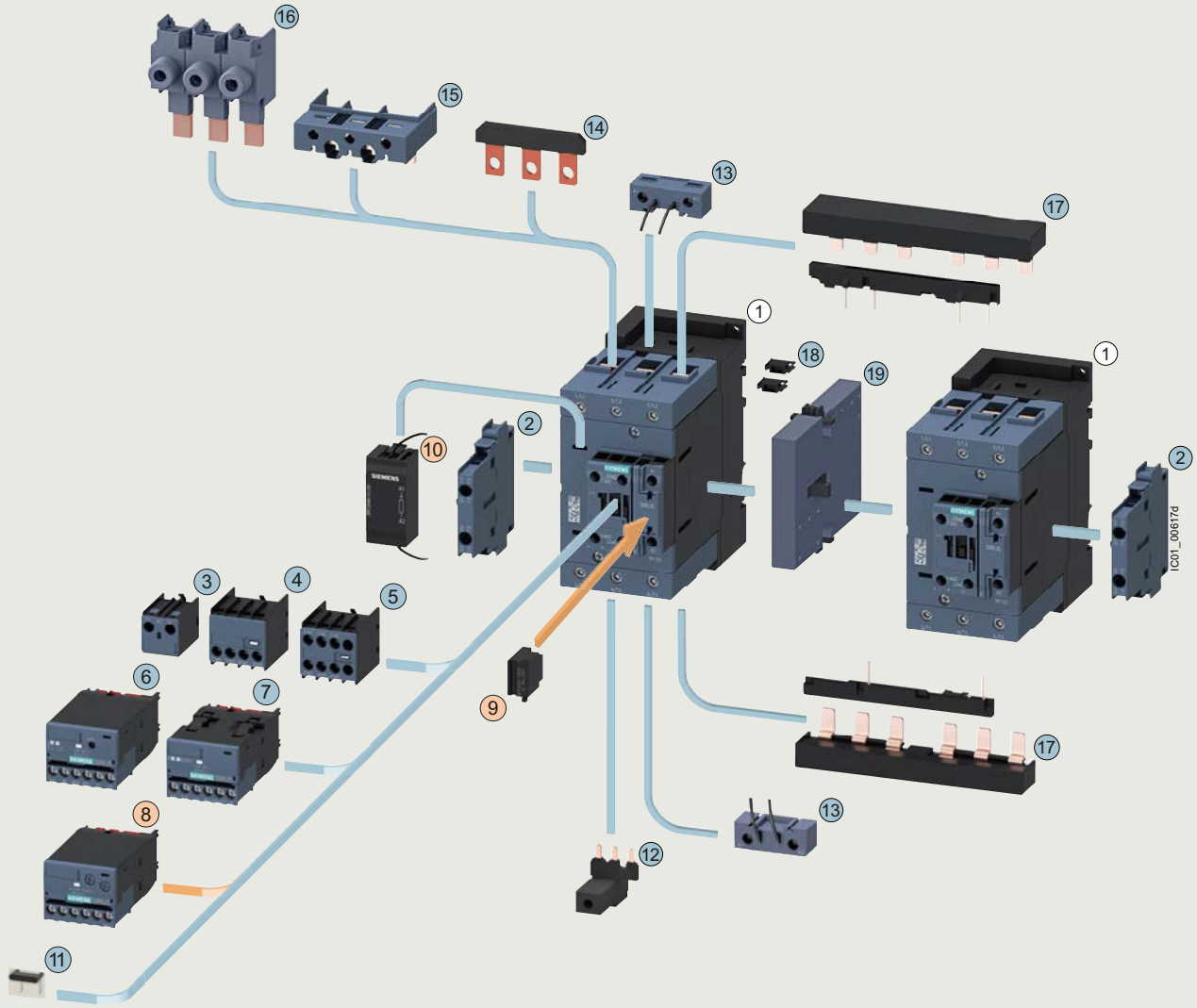
To be ordered separately:
⑱ Mechanical interlocks

For contactors
For contactors and coupling contactors

Accessories and spare parts, see pages 2/52 to 2/75.

3RT2.4 contactors · Size S3 with mountable accessories

The figure shows the version with screw terminals



(1) Contactor, size S3

(2) 2-pole auxiliary switch block, laterally mountable
(3) 1-pole auxiliary switch block, for snapping onto the front, cable entry from the top
(4) 2-pole auxiliary switch block, for snapping onto the front, cable entry from the bottom
(5) 4-pole auxiliary switch block, for snapping onto the front
(6) 3RA27 function module for AS-Interface
(7) 3RA27 function module for IO-Link
(8) 3RA28 function module
(9) Surge suppressor with/without LED (Varistor, diode assembly), can be plugged in on the front
(10) Surge suppressor without LED (RC element), can be plugged in on the front in the recesses on the left next to the connection block
(11) Cover, sealable

(12) Links for paralleling, 3-pole, with connecting terminal
(13) Coil connection module, top or bottom
(14) Links for paralleling (star jumper), 3-pole without connecting terminal
(15) Auxiliary terminal, 3-pole
(16) Single-phase infeed terminals (3 units)

Assembly kit 3RA2943-2AA1
Consisting of:
(17) Wiring modules on the top and bottom for connecting the main, auxiliary and control current paths, electrical interlock[1] included, interruptible (NC contact interlock)
(18) Two connectors for two contactors

To be ordered separately:
(19) Mechanical interlock

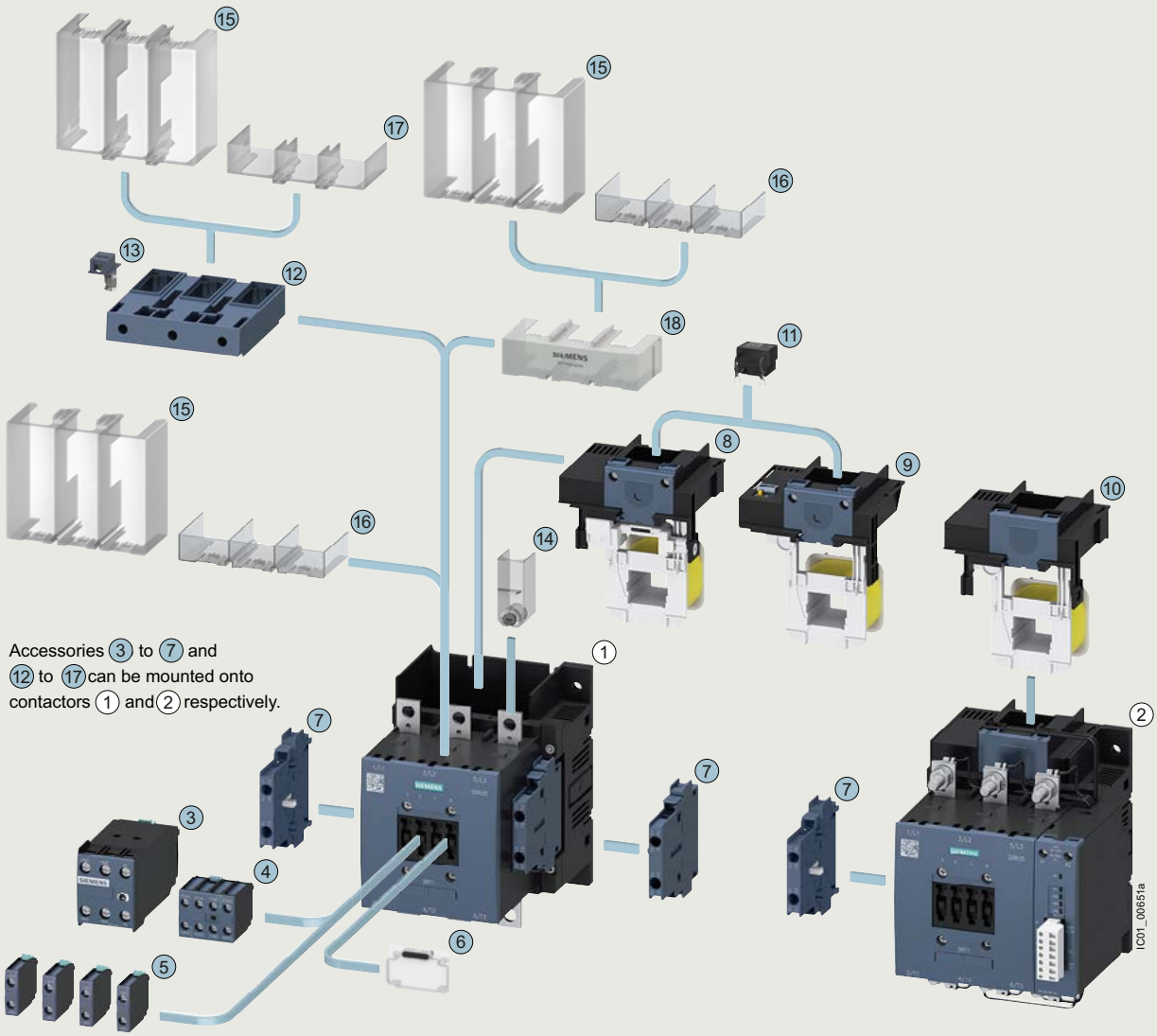
[1] 3RT201. contactors with one NC contact in the basic unit are required for the electrical interlock. An additional NO contact is required for momentary-contact operation.

For contactors
For contactors and coupling contactors

Accessories and spare parts, see pages 2/52 to 2/75.

General data

3RT105 and 3RT145 contactors · Size S6 with mountable accessories



(1) 3RT105 and 3RT145 air-break contactors, size S6 (version without withdrawable coil)

(2) 3RT105.-.P and 3RT145.-.P air-break contactors with solid-state operating mechanism and remaining lifetime indicator, size S6 (version with withdrawable coil and laterally mountable add-on module)

Can be mounted onto the front of contactors (1) and (2)

(3) 3RT1926: Auxiliary switch, electronically delayed (ON-delay or OFF-delay or star-delta (wye-delta) starting)

(4) 3RH192: 4-pole auxiliary switch

(5) 3RH192: 1-pole auxiliary switch (max. four can be snapped on)

(6) 3RT1926-4MA10: Cover, sealable

Can be mounted onto the side of contactors (1) and (2)

(7) 3RH192: 2-pole auxiliary switch

Can be inserted in top of contactors

(8) 3RT1955-5A.3.: Withdrawable coil, standard operating mechanism

(9) 3RT1955-5N.3.: Withdrawable coil, solid-state operating mechanism

(10) 3RT1955-5P.3.: Withdrawable coil, solid-state operating mechanism and remaining lifetime indicator

Can be plugged onto the top of contactor operating mechanisms (8) and (9)

(11) 3RT1956-1C: Surge suppressor (RC element)

Can be mounted onto the top or bottom on busbars or box terminals of contactors (1) and (2)

(12) 3RT1956-4G: Box terminal block

(13) 3TX7500-0A: Auxiliary terminal, 1-pole

(14) 3TX6526-3B: Terminal cover (can be screwed on), covers one busbar connection

(15) 3RT1956-4EA1: Terminal cover for busbar connection and on box terminal

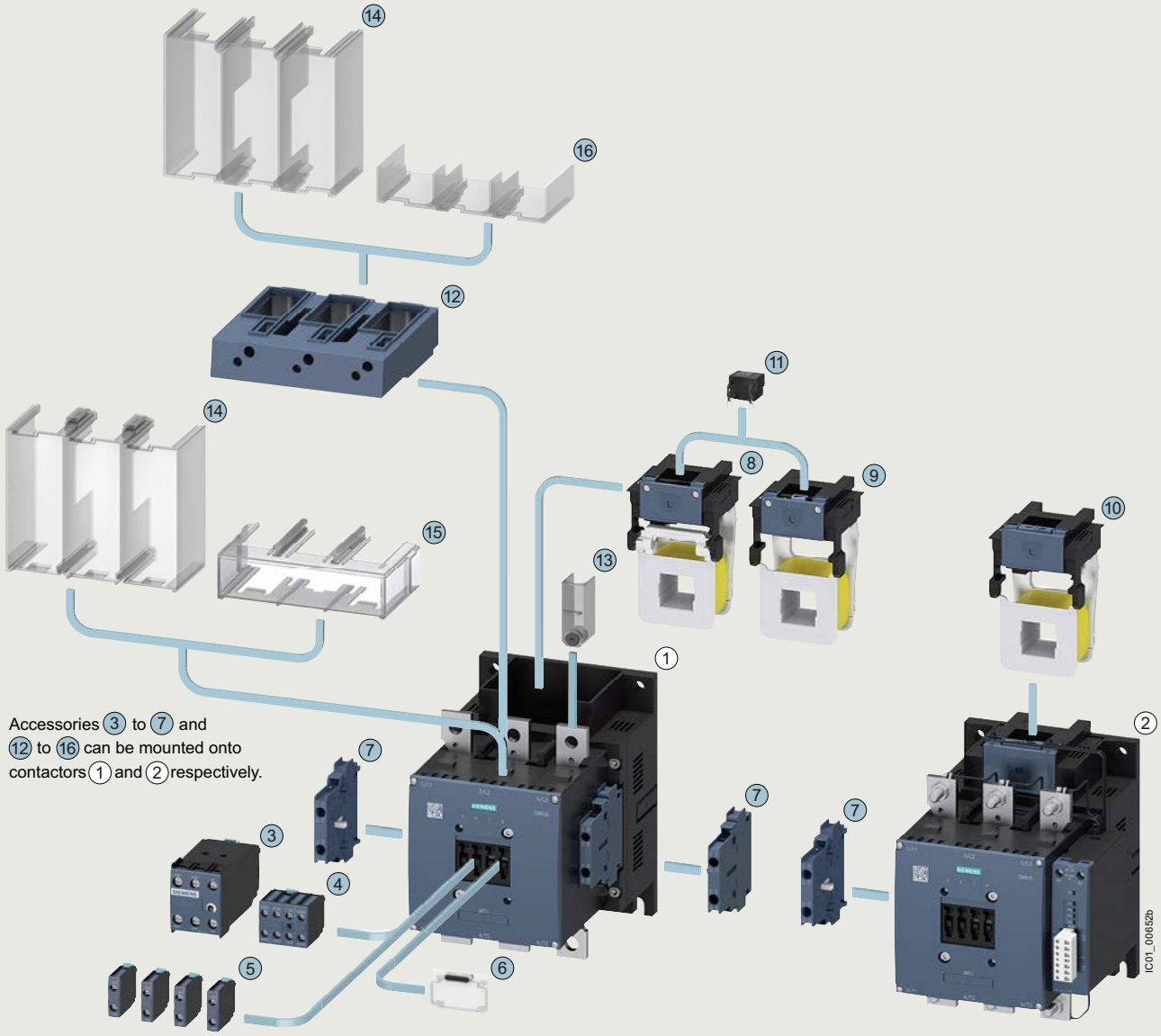
(16) 3RT1956-4EA3: Terminal cover for busbar connection

(17) 3RT1956-4EA2: Terminal cover on box terminal

(18) 3RT1956-4EA4: Terminal cover for busbar connection, covers (15), (16) and (18) can be mounted

Accessories and spare parts, see pages 2/52 to 2/75.

3RT106 and 3RT146 contactors · Size S10 with mountable accessories



1 3RT106 and 3RT146 air-break contactors, size S10 (version without withdrawable coil)

2 3RT106.-.P and 3RT146.-.P air-break contactors with solid-state operating mechanism and remaining lifetime indicator, size S10 (version with withdrawable coil and laterally mountable add-on module)

Can be mounted onto the front of contactors 1 and 2

3 3RT1926: Auxiliary switch, electronically delayed (ON-delay or OFF-delay or star-delta (wye-delta) starting)

4 3RH192: 4-pole auxiliary switch

5 3RH192: 1-pole auxiliary switch (max. four can be snapped on)

6 3RT1926-4MA10: Cover, sealable

Can be mounted onto the side of contactors 1 and 2

7 3RH192: 2-pole auxiliary switch

Can be inserted in the top of contactors

8 3RT1965-5A.3.: Withdrawable coil, standard operating mech.

9 3RT1965-5N.3.: Withdrawable coil, solid-state operating mech.

10 3RT1965-5P.3.: Withdrawable coil, solid-state operating mech. and remaining lifetime indicator

Can be plugged onto the top of contactor operating mechanisms 8 and 9

11 3RT1956-1C: Surge suppressor (RC element)

Can be mounted at the top or bottom on busbars or box terminals of contactors 1 and 2

12 3RT1966-4G: Box terminal block

13 3TX6546-3B: Terminal cover (can be screwed on), covers one busbar connection

14 3RT1966-4EA1: Terminal cover for busbar connection and on box terminal

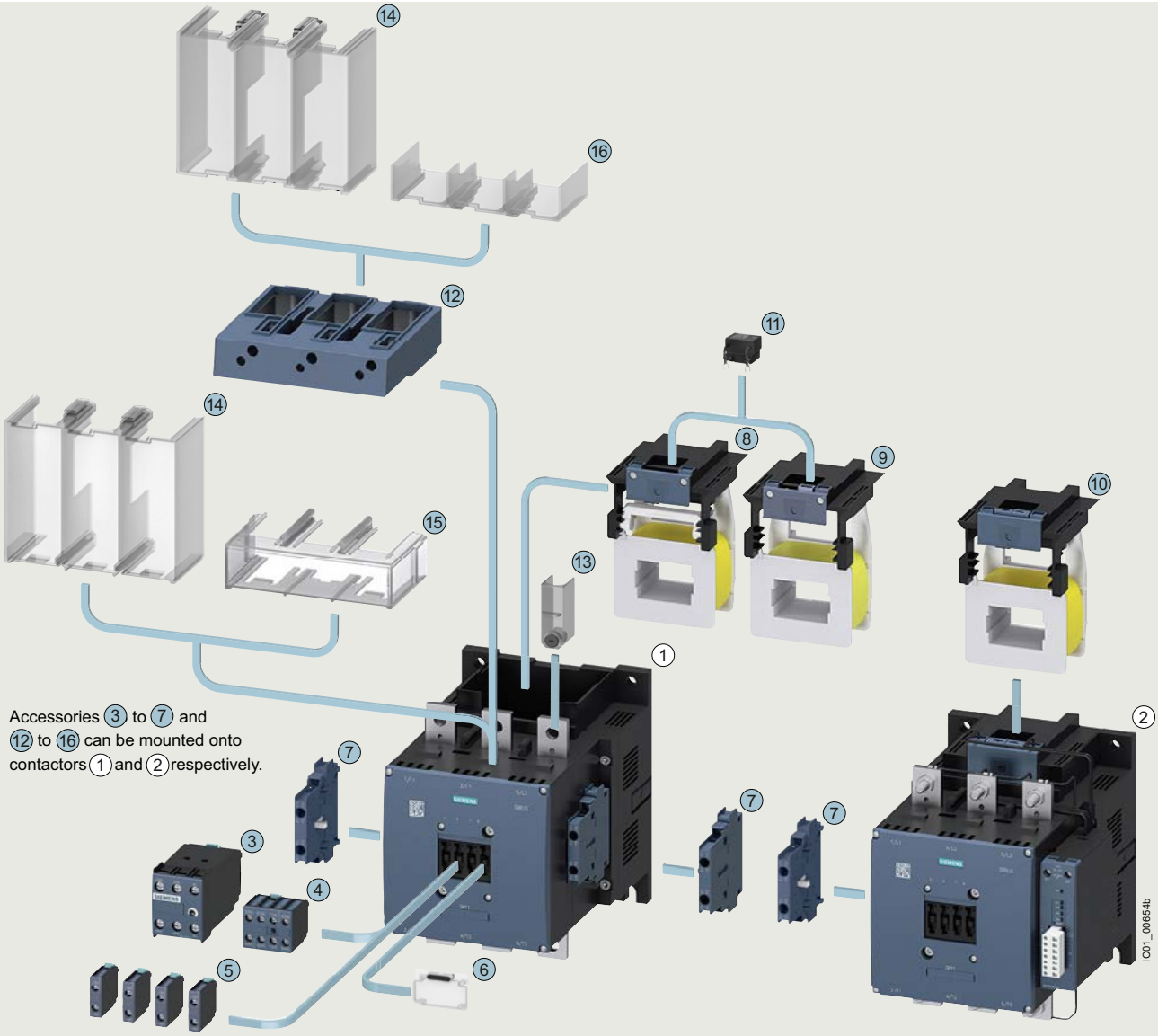
15 3RT1966-4EA3: Terminal cover for busbar connection

16 3RT1966-4EA2: Terminal cover on box terminal

Accessories and spare parts, see pages 2/52 to 2/75.

General data

3RT107 and 3RT147 contactors · Size S12 with mountable accessories



1 3RT107 and 3RT147 air-break contactors, size S12 (version without withdrawable coil)

2 3RT107.-.P and 3RT147.-.P air-break contactors with solid-state operating mechanism and remaining lifetime indicator, size S12 (version with withdrawable coil and laterally mountable add-on module)

Can be mounted onto the front of contactors 1 and 2

3 3RT1926: Auxiliary switch, electronically delayed (ON-delay or OFF-delay or star-delta (wye-delta) starting)

4 3RH192: 4-pole auxiliary switch

5 3RH192: 1-pole auxiliary switch (max. four can be snapped on)

6 3RT1926-4MA10: Cover, sealable

Can be mounted onto the side of contactors 1 and 2

7 3RH192: 2-pole auxiliary switch

Can be inserted in top of contactors

8 3RT1975-5A.3.: Withdrawable coil, standard operating mech.

9 3RT1975-5N.3.: Withdrawable coil, solid-state operating mech.

10 3RT1975-5P.3.: Withdrawable coil, solid-state operating mech. and remaining lifetime indicator

Can be plugged onto top of contactor operating mechanisms 8 and 9

11 3RT1956-1C: Surge suppressor (RC element)

Can be mounted at the top or bottom on busbars or box terminals of contactors 1 and 2

12 3RT1966-4G: Box terminal block

13 3TX6546-3B: Terminal cover (can be screwed on), covers one busbar connection

14 3RT1966-4EA1: Terminal cover for busbar connection and on box terminal

15 3RT1966-4EA3: Terminal cover for busbar connection

16 3RT1966-4EA2: Terminal cover on box terminal

Accessories and spare parts, see pages 2/52 to 2/75.

Overview

Contactors with screw terminals: 3RT20 (sizes S00 to S3) and 3RT10 (sizes S6 to S12)

3RT power contactors

Our power range:

- Contactors for switching motors: :
  - Size S00: 3RT201 up to 7.5 kW
  - Size S0: 3RT202 up to 18.5 kW
  - Size S2: 3RT203 up to 37 kW
  - Size S3: 3RT204 up to 55 kW
  - Sizes S6 to S12: 3RT10 up to 250 kW
- Vacuum contactors for switching motors:
  - Sizes S10 and S12: 3RT12 up to 250 kW
  - Size 14: 3TF6 up to 450 kW

Standards

IEC 60947-1, IEC 60947-4-1, IEC 60947-5-1 (auxiliary switches)

Ambient conditions

If the devices are used in ambient conditions which deviate from common industrial conditions (IEC 60721-3-3 "Stationary Use, Weather-Protected"), information must be obtained about possible restrictions with regard to the reliability and endurance of the device and possible protective measures. In this case, contact our Technical Support:
www.siemens.com/support-request.

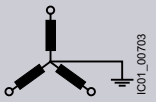
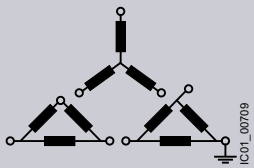
Ratings of three-phase motors

The quoted rating (in kW) refers to the output power on the motor shaft (according to the nameplate).

The power rating specifications of the contactors in kW (in accordance with IEC 60947-4-1, Table G) are guide values for 4-pole standard motors at 50 Hz AC and specified voltage (e.g. 400 V). The actual starting and rated data of the motor to be switched must be considered when selecting the units. The motor current, motor protection device and the permissible contactor current according to the utilization category must be aligned with each other.

Voltage specifications

The specifications for 3-phase systems acc. to IEC 60947-4-1 apply for the following line system configurations:

Voltage data U_e in the catalog	**Line system configurations**	
	Three-phase Four-wire systems 	**Three phase Three-wire systems** 
V	V	V
230	--	230
400	230/400	400
440	260/440	440
500	--	500
690	400/690	690 (from size S3 only)
1 000	--	1 000

-- Not specified

Contactors in safety-related applications

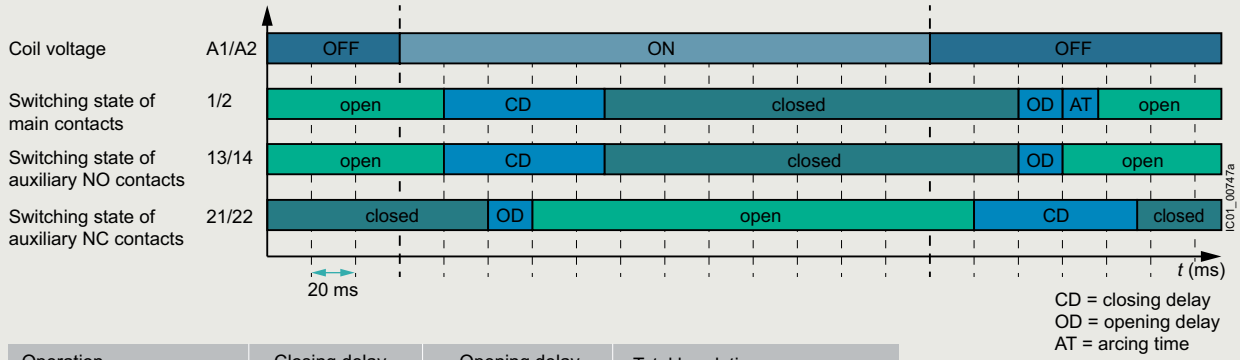
Contactors are a significant part of safety-related applications. They are generally the actuators that perform the switching operation leading to the safe disconnection of the corresponding application or system.

Contactors with mirror contacts according to IEC 60947-4-1 are generally required for use in safety-related applications. Most of our contactors meet this requirement; a corresponding note can be found in the technical product data sheet.

Contactors with increased tamper protection

Increased tamper protection is ensured either by using our contactor versions with factory-installed, permanently mounted auxiliary switches protected against mechanical external actuation (e.g. 3RT20..-.....-3MA0 or 3RT10..-.....-3PA0 contactors), or by using the 3RT2916-4MA10 or 3RT1926-4MA10 sealable cover as an accessory (see page 2/72).

Operating times



Operation	Closing delay	Opening delay	Total break time = Opening delay + Arcing time 10 … 15 ms
AC	20 ... 95 ms	40 ... 60 ms	50 ... 75 ms
DC	20 ... 95 ms	40 ... 60 ms	50 ... 75 ms

Operating times using the example of contactor 3RT1054-1AB36

Main circuit

Short-circuit protection

For short-circuit protection of contactors with overload relays or of load feeders, refer to the Configuration Manuals, see "More information" on page 2/18.

Surge suppression

Contactors supplied without a coil circuit can be retrofitted with RC elements, varistors, diodes or diode assemblies (combination of diode and Zener diode for short break times) for damping opening surges in the coil.

Note:

The break times of the contactor, the opening delay times of the NO contacts and the closing delay times of the NC contacts increase if the contactor coils are attenuated against voltage peaks. Different accessories are available for the contactors (time change with: interference suppression diode 6x to 10x; diode assembly 2x to 6x; suppressor diode +1 to 5 ms; varistor +2 to 5 ms).

For details, see Equipment Manual.

Control circuit

Connection methods

Screw terminals or spring-loaded terminals

Electromagnetic compatibility (EMC)

The contactors fulfill the requirements for environment category A.

Note:

When the contactors are used in an **environment with frequency converters**, the configuration notes must be observed, see Equipment Manual.

Auxiliary circuit

Connection methods

Screw terminals or spring-loaded terminals

Contact reliability

If voltages ≤ 110 V and currents ≤ 100 mA are to be switched, the auxiliary contacts of the 3RT contactors or 3RH contactor relays should be used as they guarantee a high level of contact reliability.

These auxiliary contacts are particularly suitable for solid-state circuits with currents ≥ 1 mA at a voltage ≥ 17 V.

3RT20 contactors

Main circuit

Connection methods

- 3RT201 and 3RT202 contactors:
  Screw terminals or spring-loaded terminals;
  spring-loaded terminals with convenient plug-in design for device connectors
- 3RT203 and 3RT204 contactors:
  Screw terminals with box terminal;
  direct connection to the connecting bar is possible with cable lugs for 3RT204 when the box terminal is removed.

Short-circuit protection

Short-circuit protection of 3RT20 contactors without overload relays, see pages 2/23, 2/28, 2/31 and 2/35.

For fuseless assembly of motor feeders consisting of 3RV2 motor starter protector and 3RT20 contactor, selection aids are available, see "SIRIUS 3RA2 load feeders".

Motor protection

For protection against overload, 3RU2 thermal overload relays or 3RB3 electronic overload relays can be mounted on the 3RT20 contactors.

Plant and application monitoring

For monitoring and measuring in the application, 3RR2 monitoring relays can be mounted on the 3RT20 contactors.

Surge suppression

- 3RT201 contactors:
  The surge suppressors are plugged onto the front of the contactors here. Space is provided for them next to a snap-on auxiliary switch.
- 3RT202 and 3RT203 contactors:
  Surge suppressors (varistors, RC elements or diode assemblies) can be plugged into the front of the contactors.
- 3RT204 contactors:
  The varistors and diode combinations are plugged into the front of the contactors. The RC element is plugged into the two recesses on the front of the contactor to the left of the terminal block for the auxiliary switches.

Control circuit

Contactors with voltage tap-off

The 3RT20 contactors with voltage tap-off are special versions for mounting the SIRIUS 3RA27 function modules for connection to the control system via IO-Link or AS-Interface.

Without a function module, these contactors can be used like the standard versions.

Operating mechanism types

3RT20 contactors are available as standard versions with AC or DC operating mechanisms or as versions with a wide-range solid-state operating mechanism and a universal actuating voltage (AC or DC operation possible).

Versions with solid-state operating mechanisms for AC or DC operation with a fail-safe PLC input are also available for the 3RT203 and 3RT204 contactors.

Control takes place via the control supply voltage connection A1 - A2 with varying operating ranges (see relevant product data sheet for further details).

DC coupling contactors with reduced power consumption are also ideally suited for connection to the controller.

Solenoid coils/operating mechanisms

Coil replacement is possible for contactors 3RT202 to 3RT204.

NOTICE:
Removal or changing of the operating mechanism is not permitted for 3RT20..-.S contactors with fail-safe control.

Auxiliary circuit

Auxiliary contact complement

- 3RT201 contactors: An auxiliary contact is integrated in the basic unit.
- Contactors 3RT202 to 3RT204: The basic units contain two integrated auxiliary contacts (1 NO + 1 NC).

All basic units, with the exception of coupling contactors in sizes S00 and S0, can be expanded using auxiliary switches.

For detailed information about the fitting of auxiliary switches, see pages 2/55 to 2/58.

3RT10 contactors

Main circuit

Connection methods

Screw terminals with connecting bars that the cables can be connected to using either cable lugs or flexible or rigid busbars. Alternatively, box terminals are available as accessories.

Short-circuit protection

For short-circuit protection of 3RT10 contactors without overload relays, see page 2/39.

Motor protection

For protection against overload, 3RB2 electronic overload relays (see page 2/79 onwards) can be mounted on the 3RT10 contactors.

Control circuit

Operating mechanism types

The operating mechanisms are powered via a supply voltage with an operating range from 0.8 to 1.1 x U_S, optionally also controlled depending on the chosen mode of operation. Various rated voltage ranges are available for AC/DC control.

The following control and/or operating mechanism versions are available for contactors 3RT105 to 3RT107:

- 3RT10..-.A:
  Standard operating mechanism for AC and DC operation (reduced power consumption when closing and in the closed state)
- Solid-state operating mechanisms
  Overvoltage damping of the operating mechanism coil is already integrated in the electronics for contactors with solid-state operating mechanisms.
  The following versions are available:
  - 3RT10..-.N:
    With two operating modes: Direct control or via PLC input (24 V DC)
  - 3RT10..-.P:
    Control via PLC input (24 V DC) only, but with additional remaining lifetime indicator (RLT)
  - 3RT10..-.S:
    Control via fail-safe PLC input (24 V DC) only, for simplification of safety applications (without mode of operation selection)

Solenoid coils/operating mechanisms

The operating mechanisms for 3RT10..-.A/-.N/-.P contactors are removable and can be replaced simply by unlocking and pulling them out.

NOTICE:
Removal or changing of the operating mechanism is not permitted for 3RT10..-.S contactors with fail-safe control.

Surge suppression

Exchangeable operating mechanisms with integrated coil circuit (varistor) are available.

Auxiliary circuit

Auxiliary contact complement

These contactors are supplied with two laterally mounted auxiliary switches. The fitting of auxiliary switches is possible on the front and on the side.

Contactors for special applications

- SIRIUS 3RT.4 contactors for low or non-inductive loads (AC-1), 3-pole, see page 2/79 onwards
- SIRIUS 3RT20 and 3RT10 contactors with an extended application range, 3-pole (for railway applications), see page 2/101 onwards

Article No. scheme

Product versions		Article number
SIRIUS power contactors		**3RT2** □ □ □ **–** □ □ □ □ □ **–** □ □ □ □
Device type	e.g. 0 = 3-pole motor contactor	□
Size of the contactor	e.g. 4 = S3	□
Rating dependent on size	e.g. 5 = 37 kW for S3	□
Type of electrical connection	e.g. 1 = Screw terminals (main and auxiliary circuits)	□
Operating range/solenoid coil circuit	e.g. A = AC standard/without coil circuit	□
Rated control supply voltage	e.g. P0 = 230 V AC, 50 Hz	□ □
Auxiliary switches	e.g. 0 = for S3: 1 NO + 1 NC integrated	□
Special version		□ □ □ □
Example		**3RT2 0 4 5 – 1 A P 0 0**

Note:

The Article No. scheme shows an overview of product versions for better understanding of the logic behind the article numbers.

For your orders, please use the article numbers quoted in the selection and ordering data.

2

Technical specifications

More information	
Technical specifications, see https://support.industry.siemens.com/cs/ww/en/ps/16134/td	System Manual for modular system, see https://support.industry.siemens.com/cs/ww/en/view/60311318
FAQs, see https://support.industry.siemens.com/cs/ww/en/ps/16134/faq	Equipment Manual, see https://support.industry.siemens.com/cs/ww/en/view/60306557
	Application Manual for controls with IE3/IE4 motors, see https://support.industry.siemens.com/cs/ww/en/view/94770820
	Configuration Manual for load feeders, see https://support.industry.siemens.com/cs/ww/en/view/39714188
	Configuration Manual for UL, see https://support.industry.siemens.com/cs/ww/en/view/53433538

Type			Contactors		
			3RT2		3RT1
Size			S00 to S2	S3	S6 to S12
Rated data of the auxiliary contacts					
according to IEC 60947-5-1 Data apply to integrated auxiliary contacts and conventional contacts in the auxiliary switches					
Rated insulation voltage U_i (pollution degree 3)		V	690	1 000 (3RT20..-0CC0: 690)	--
• For laterally mountable auxiliary switches		V	690	690	500
• For front auxiliary switches		V	690	690	690
Conventional thermal current I_{th} = rated operational current I_e/AC-12		A	10		
AC load					
Rated operational current I_e/AC-15/AC-14					
• At rated operational voltage U_e	Up to 230 V	A	10[1]	6	6
	400 V	A	3		3
	500 V	A	2		2
	690 V	A	1		1[2]
DC load					
Rated operational current I_e/DC-12					
• At rated operational voltage U_e	24 V	A	10		10
	60 V	A	6		6
	110 V	A	3		3
	125 V	A	2		2
	220 V	A	1		1
	440 V	A	0.3		0.3
	600 V	A	0.15		0.15[2]
Rated operational current I_e/DC-13					
• At rated operational voltage U_e	24 V	A	10[1]		10[3]
	60 V	A	2		2
	110 V	A	1		1
	125 V	A	0.9		0.9
	220 V	A	0.3		0.3
	440 V	A	0.14		0.14
	600 V	A	0.1		0.15[2]
Contact reliability at 17 V, 1 mA Acc. to IEC 60947-5-4			Frequency of contact faults < 10^{-8} i.e. < 1 fault per 100 million operating cycles		

1) 3RH22, 3RH29, 3RT2...-....4, 3RT2...-....6: I_e = 6 A at AC-15/AC-14 and DC-13.

2) With laterally mountable auxiliary switches, only the currents for rated operational voltages up to 500 V apply.

3) For laterally mountable auxiliary switches, DC-13/at 24 V: Max. 6 A.

Type	**3RT contactors**
Size	**S00 to S12**

Electrical endurance of auxiliary contacts

It is assumed that the operating mechanisms are switched randomly, i.e. not synchronized with the phase angle of the supply system.

The electrical endurance is mainly dependent on the breaking current.

Sizes S00 to S3

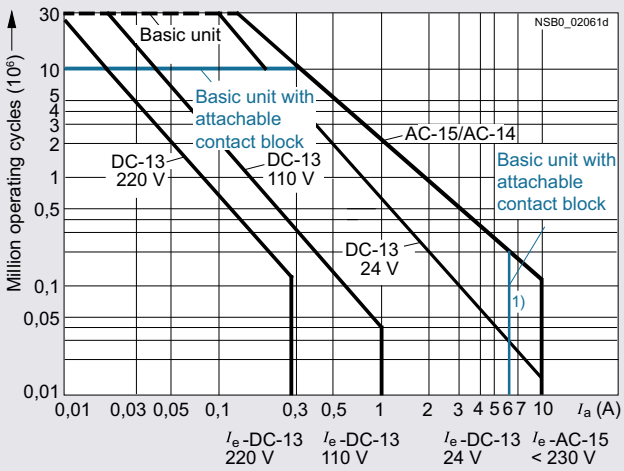


Diagram legend:
I_a = Breaking current
I_e = Rated operational current

The characteristic curves apply to:
- Integrated auxiliary contacts on 3RT2.
- 3RH2911, 3RH2921 auxiliary switches[1)]

Sizes S6 to S12

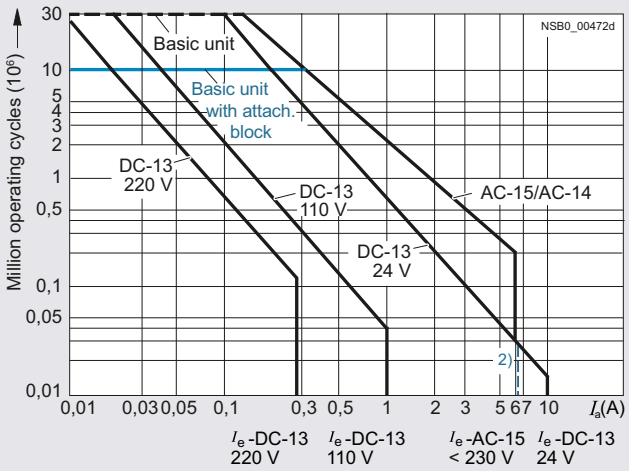


Diagram legend:
I_a = Breaking current
I_e = Rated operational current

The characteristic curves apply to:
- Integrated auxiliary contacts on 3RT10
- 3RH1921 auxiliary switches[3)]

1) 3RH22, 3RH29, 3RT2...-....4, 3RT2...-....6: I_e = 6 A at AC-15/AC-14 and DC-13, 3RT2.4: I_e = 6 A at AC-15/AC-14.

2) For laterally mountable auxiliary switches, DC-13/at 24 V: Max. 6 A.

3) With laterally mountable auxiliary switches, the currents for rated operational voltages up to 500 V apply.

Type	3RT2 contactors
Size	S00 and S0

Contact endurance of the main contacts

The characteristic curves show the contact endurance of the contactors when switching low inductive or non-inductive AC loads (AC-1) and motor-driven loads (AC-3) depending on the breaking current and rated operational voltage. It is assumed that the operating mechanisms are switched randomly, i.e. not synchronized with the phase angle of the supply system.

The rated operational current I_e complies with utilization category AC-4 (breaking 6 times the rated operational current) and is intended for a contact endurance of approximately 200 000 operating cycles.

If a shorter contact endurance is sufficient, the rated operational current I_e/AC-4 can be increased.

If the contacts are used for mixed operation, i.e. normal switching (breaking the rated operational current according to utilization category AC-3) in combination with intermittent inching (breaking of several times the rated operational current according to utilization category AC-4), the contact endurance can be calculated approximately from the following equation:

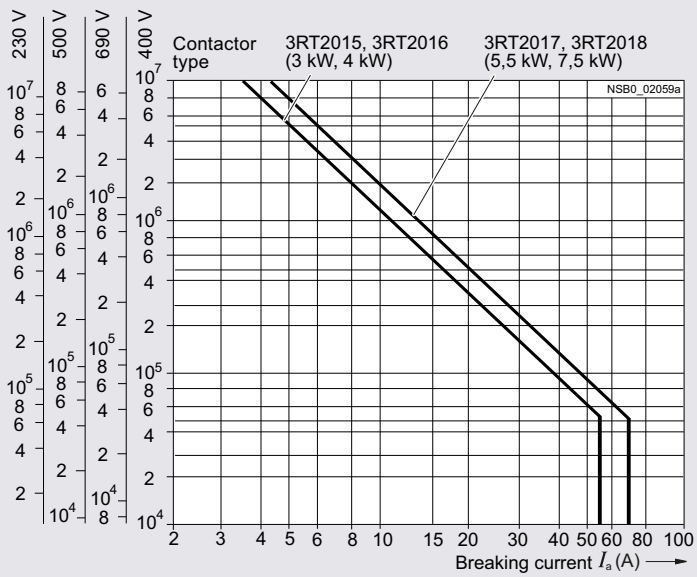
$$X = \frac{A}{1 + \frac{C}{100}\left(\frac{A}{B} - 1\right)}$$

Characters in the equation:

- X Contact endurance for mixed operation in operating cycles
- A Contact endurance for normal operation ($I_a = I_e$) in operating cycles
- B Contact endurance for inching (I_a = multiple of I_e) in operating cycles
- C Inching operations as a percentage of total switching operations

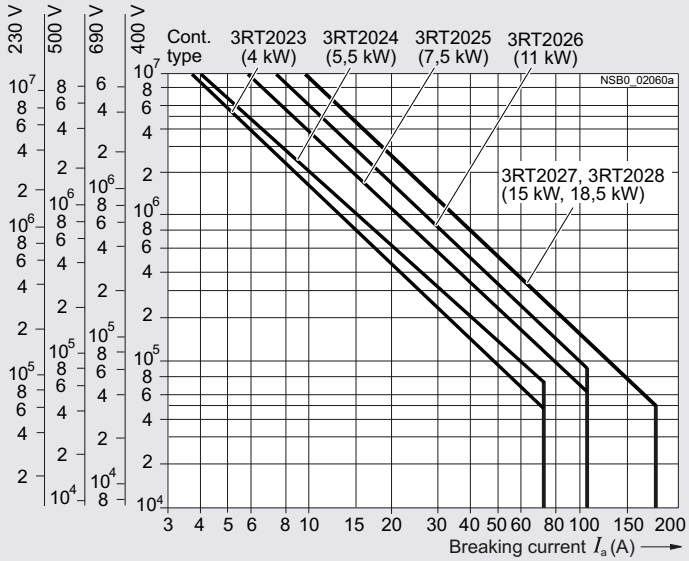
Size S00

Operating cycles at



Size S0

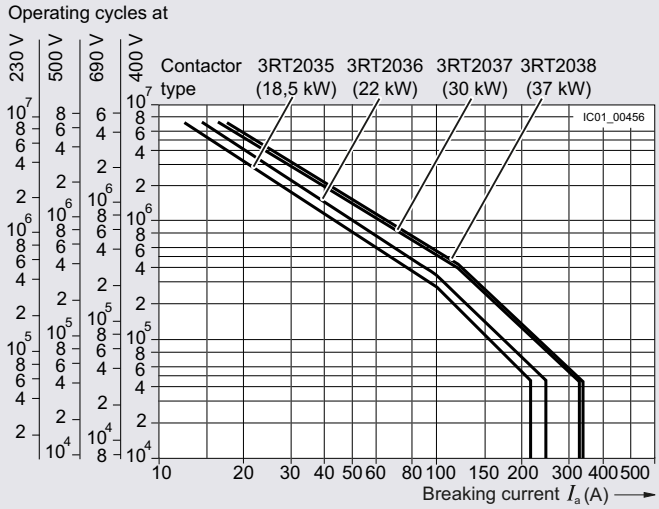
Operating cycles at



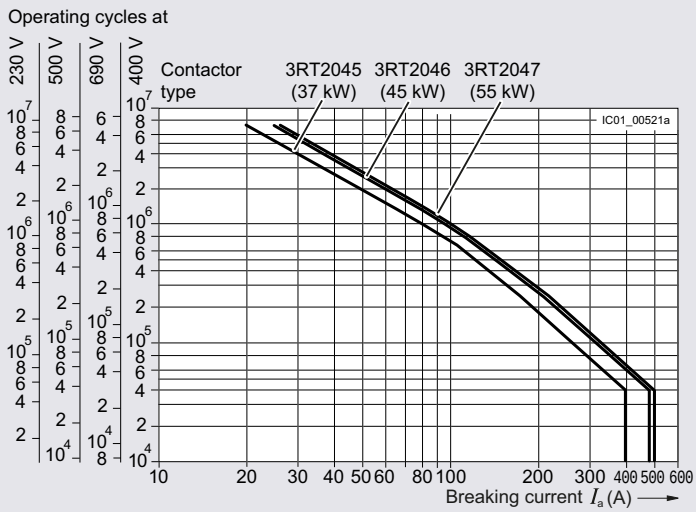
Type	**3RT contactors**
Size	**S2 to S12**

Contact endurance of main contacts (continued)

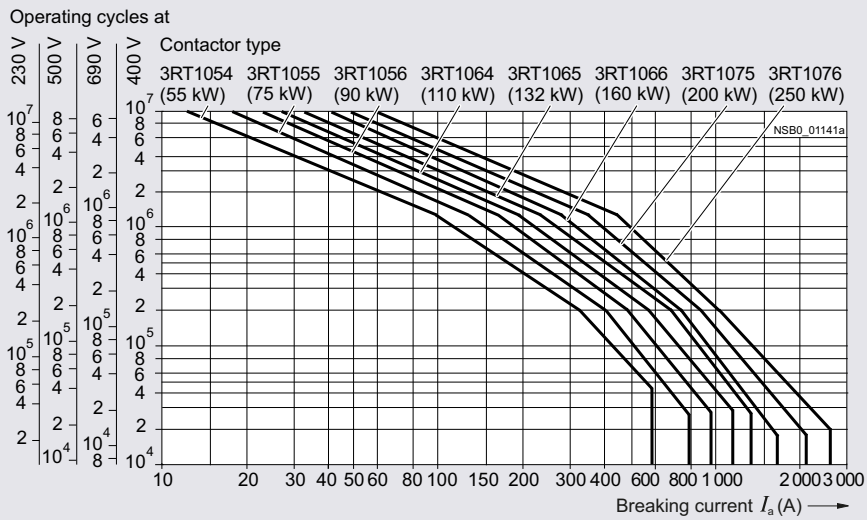
Size S2



Size S3

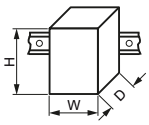
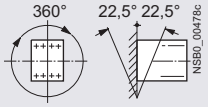


Sizes S6 to S12



SIRIUS 3RT contactors, 3-pole up to 250 kW

2

			Contactors	
Type			**3RT2015, 3RT2016**	**3RT2017, 3RT2018**
Size			**S00**	
General data				
Dimensions (W x H x D)				
• Basic unit				
- Screw terminals		mm	45 x 58 x 73	
- Spring-loaded terminals		mm	45 x 70 x 73	
• Basic unit with mounted auxiliary switch				
- Screw terminals		mm	45 x 58 x 117	
- Spring-loaded terminals		mm	45 x 70 x 121	
• Basic unit with mounted function module or solid-state time-delay auxiliary switch				
- Screw terminals		mm	45 x 58 x 147	
- Spring-loaded terminals		mm	45 x 70 x 147	
Permissible mounting position				
The contactors are designed for operation on a vertical mounting surface.				
Upright mounting position				
			Special version required	
Mechanical service life				
• Basic unit		Operating cycles	30 million	
- With mounted auxiliary switch		Operating cycles	10 million	
- With solid-state compatible auxiliary switch		Operating cycles	5 million	
Electrical endurance			For contact endurance of the main contacts, see page 2/20.	
Rated insulation voltage U_i (pollution degree 3)		V	690	
Rated impulse withstand voltage U_{imp}				
• Auxiliary circuit		kV	6	
• Main circuit		kV	6	
Protective separation between the coil and the main contacts acc. to IEC 60947-1, Annex N		V	400	
Mirror contacts				
A mirror contact is an auxiliary NC contact that cannot be closed simultaneously with an NO main contact.				
• 3RT2.1 (removable auxiliary switch)			Yes, this applies to both the basic unit as well as to between the basic unit and the mounted auxiliary switch according to IEC 60947-4-1 Annex F	
• 3RH2919-.NF.. solid-state compatible auxiliary switches			No mirror contact for size S00	
Ambient temperature				
• During operation		°C	-25 ... +60	
• During storage		°C	-55 ... +80	
Degree of protection IP on the front according to IEC 60529			IP20 (screw terminals and spring-loaded terminals)	
Touch protection on the front acc. to IEC 60529			Finger-safe for vertical touching from the front (screw terminals and spring-loaded terminals)	
Shock resistance				
• Rectangular pulse				
- AC operation		*g*/ms	6.7/5 and 4.2/10	7.3/5 and 4.7/10
- DC operation		*g*/ms	6.7/5 and 4.2/10	7.3/5 and 4.7/10
• Sine pulse				
- AC operation		*g*/ms	10.5/5 and 6.6/10	11.4/5 and 7.3/10
- DC operation		*g*/ms	10.5/5 and 6.6/10	11.4/5 and 7.3/10

			Contactors	
Type			3RT2015, 3RT2016	3RT2017, 3RT2018
Size			S00	
Short-circuit protection				
Main circuit				
• Fuse links, operational class gG: LV HRC, type 3NA; DIAZED, type 5SB; NEOZED, type 5SE according to IEC 60947-4-1				
- Type of coordination "1"		A	35	50
- Type of coordination "2"		A	20	25
- Weld-free (test conditions according to IEC 60947-4-1)		A	10	
• Miniature circuit breaker (up to 230 V) with C characteristic Short-circuit current 1 kA, type of coordination "1"		A	10	
Auxiliary circuit				
Short-circuit test according to IEC 60947-5-1				
• With fuse links, operational class gG: DIAZED, type 5SB; NEOZED, type 5SE with short-circuit current I_k = 1 kA		A	10	
• With 230 V miniature circuit breaker, C characteristic with short-circuit current I_k = 400 A		A	6	
Short-circuit protection for contactors with overload relays			See Configuration Manual for load feeders	
Short-circuit protection for fuseless load feeders			See 3RA2 load feeders	
Control				
Solenoid coil operating range				
• AC operation	50 Hz		0.8 ... 1.1 x U_s	
	60 Hz		0.85 ... 1.1 x U_s	
• DC operation	Up to 50 °C		0.8 ... 1.1 x U_s	
	Up to 60 °C		0.85 ... 1.1 x U_s	
Power consumption of the solenoid coils (for cold coil and 1.0 x U_s)				
• AC operation, 50/60 Hz, standard version				
- Closing		VA	27/24.3	37/33
- P.f.			0.8/0.75	
- Closed		VA	4.2/3.3	5.7/4.4
- P.f.			0.25/0.25	
• AC operation, 50 Hz, for USA/Canada				
- Closing		VA	26.4	36
- P.f. for closing			0.81	0.8
- Closed		VA	4.4	5.9
- P.f. for closed			0.24	
• AC operation, 60 Hz, for USA/Canada				
- Closing		VA	31.7	43
- P.f. for closing			0.81	0.8
- Closed		VA	4.8	6.5
- P.f. for closed			0.25	
• DC operation (closing = closed)		W	4	
Permissible residual current of the electronics (with 0 signal)				
• AC operation			< 3 mA x (230 V/U_s)[1)]	< 4 mA x (230 V/U_s)[1)]
• DC operation			< 10 mA x (24 V/U_s)[1)]	
Operating times within operating range				
Total break time = Opening delay + Arcing time				
• AC operation				
- Closing delay		ms	9 ... 35	
- Opening delay		ms	4 ... 15	
• DC operation				
- Closing delay		ms	30 ... 100	
- Opening delay		ms	7 ... 13	
• Arcing time		ms	10 ... 15	

1) The 3RT2916-1GA00 additional load module is recommended for higher residual currents.

SIRIUS 3RT contactors, 3-pole up to 250 kW

			Coupling contactors		
Type			3RT201.-.HB4.	3RT201.-.JB4.	3RT201.-.KB4.
Size			S00		
Control					
Solenoid coil operating range			0.7 ... 1.25 x U_S		
Power consumption of the solenoid coils (for cold coil) Closing = Closed	At U_S 24 V DC	W	2.8		
Permissible residual current of the electronics (with 0 signal)			< 6 mA x (24 V/U_S)		
Upright mounting position			On request		
Overvoltage configuration of the solenoid coil			No overvoltage damping 	Integrated diode 	Integrated suppressor diode 
Operating times within operating range					
Total break time = Opening delay + Arcing time					
• DC operation					
- Closing delay		ms	25 ... 130		
- Opening delay		ms	7 ... 20	38 ... 65	7 ... 20
• Arcing time		ms	10 ... 15		

			Coupling contactors		
Type			3RT201.-.MB4.-0KT0	3RT201.-.VB4.	3RT201.-.SB4.
Size			S00		
Control					
Solenoid coil operating range			0.85 ... 1.85 x U_S		
Power consumption of the solenoid coils (for cold coil) Closing = Closed	At U_S 24 V DC	W	1.6		
Permissible residual current, upright mounting position			On request		
Overvoltage configuration of the solenoid coil			No overvoltage damping 	Integrated diode 	Integrated suppressor diode 
Operating times within operating range					
Total break time = Opening delay + Arcing time					
• DC operation					
- Closing delay		ms	25 ... 120		
- Opening delay		ms	5 ... 20	20 ... 80	5 ... 20
• Arcing time		ms	10 ... 15		

			Contactors			
Type			3RT2015	3RT2016	3RT2017	3RT2018
Size			S00			
Rated data of the main contacts						
Load rating with AC						
Utilization category AC-1						
• Rated operational currents I_e	At 40 °C up to 690 V	A	18	22		
	At 60 °C up to 690 V	A	16	20		
• Rated power for AC loads[1] P.f. = 0.95 (at 60 °C)	230 V	kW	6	7.5		
	400 V	kW	10.5	13		
	690 V	kW	18	22		
• Minimum cross-section in the main circuit for max. AC-1 rated value		mm^2	2.5	4		
Utilization categories AC-2 and AC-3						
• Rated operational currents I_e	Up to 400 V	A	7	9	12	16
	440 V	A	7	9	11	14
	500 V	A	6	7.7	9.2	12.4
	690 V	A	4.9	6.7		8.9
• Rated power for slip-ring or squirrel-cage motors at 50 Hz and 60 Hz	At 230 V	kW	1.5	2.2	3	4
	400 V	kW	3	4	5.5	7.5
	690 V	kW	4	5.5		7.5
Thermal load capacity	10 s current	A	56	72	96	128
Power loss per conducting path	At I_e/AC-3	W	0.42	0.7	1.24	2.2
Utilization category AC-4 (at $I_a = 6 \times I_e$)[2]						
• Maximum values						
- Rated operational current I_e	Up to 400 V	A	6.5	8.5		11.5
- Rated power for squirrel-cage motors at 50 Hz and 60 Hz	Up to 400 V	kW	3	4		5.5
• The following applies to a contact endurance of about 200 000 operating cycles:						
- Rated operational currents I_e	Up to 400 V	A	2.6	4.1		5.5
	690 V	A	1.8	3.3		4.4
- Rated power for squirrel-cage motors at 50 Hz and 60 Hz	At 230 V	kW	0.67	1.1		1.5
	400 V	kW	1.15	2		2.5
	690 V	kW	1.15	2.5		3.5

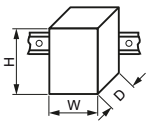
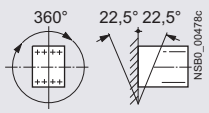
1) Industrial furnaces and electric heaters with resistance heating, etc. (increased power consumption on heating up has been taken into account).

2) The data applies to 3RT2516 and 3RT2517 contactors (2 NO + 2 NC) up to a rated operational voltage of 400 V only.

SIRIUS 3RT contactors, 3-pole up to 250 kW

2

			Contactors	
Type			**3RT2015**	**3RT2016 to 3RT2018**
Size			**S00**	
Rated data of the main contacts (continued)				
Load rating with DC				
Utilization category DC-1, (*L/R* ≤ 1 ms)				
• Rated operational currents I_e (at 60 °C)				
- 1 conducting path	Up to 24 V	A	15	20
	60 V	A	15	20
	110 V	A	1.5	2.1
	220 V	A	0.6	0.8
	440 V	A	0.42	0.6
	600 V	A	0.42	0.6
- 2 conducting paths in series	Up to 24 V	A	15	20
	60 V	A	15	20
	110 V	A	8.4	12
	220 V	A	1.2	1.6
	440 V	A	0.6	0.8
	600 V	A	0.5	0.7
- 3 conducting paths in series	Up to 24 V	A	15	20
	60 V	A	15	20
	110 V	A	15	20
	220 V	A	15	20
	440 V	A	0.9	1.3
	600 V	A	0.7	1
Utilization category DC-3/DC-5, shunt-wound and series-wound motors (*L/R* ≤ 15 ms)				
• Rated operational currents I_e (at 60 °C)				
- 1 conducting path	Up to 24 V	A	15	20
	60 V	A	0.35	0.5
	110 V	A	0.1	0.15
	220 V	A	--	
	440 V	A	--	
	600 V	A	--	
- 2 conducting paths in series	Up to 24 V	A	15	20
	60 V	A	3.5	5
	110 V	A	0.25	0.35
	220 V	A	--	
	440 V	A	--	
	600 V	A	--	
- 3 conducting paths in series	Up to 24 V	A	15	20
	60 V	A	15	20
	110 V	A	15	20
	220 V	A	1.2	1.5
	440 V	A	0.14	0.2
	600 V	A	0.14	0.2
Switching frequency				
Switching frequency *z* in operating cycles/hour				
Contactors without overload relays				
• No-load switching frequency	AC/DC	1/h	10 000	
• Switching frequency *z* during rated operation (Dependence of the switching frequency *z'* on operational current *I'* and operational voltage *U'*: $z' = z \cdot (I_e/I') \cdot (U_e/U')^{1.5} \cdot 1/h$)				
- I_e/AC-1	At 400 V	1/h	1 000	
- I_e/AC-2	At 400 V	1/h	750	
- I_e/AC-3	At 400 V	1/h	750	
- I_e/AC-4	At 400 V	1/h	250	
Contactors with overload relays				
• Mean value		1/h	15	

		Contactors	
Type		3RT2023 to 3RT2025	3RT2026 to 3RT2028
Size		S0	
General data			
Dimensions (W x H x D)			
AC operation			
• Basic unit			
- Screw terminals	mm	45 x 85 x 97	
- Spring-loaded terminals	mm	45 x 102 x 97	
• Basic unit with mounted auxiliary switch			
- Screw terminals	mm	45 x 85 x 141	
- Spring-loaded terminals	mm	45 x 102 x 145	
• Basic unit with mounted function module or solid-state time-delay auxiliary switch			
- Screw terminals	mm	45 x 85 x 171	
- Spring-loaded terminals	mm	45 x 102 x 171	
DC operation			
• Basic unit			
- Screw terminals	mm	45 x 85 x 107	
- Spring-loaded terminals	mm	45 x 102 x 107	
• Basic unit with mounted auxiliary switch			
- Screw terminals	mm	45 x 85 x 151	
- Spring-loaded terminals	mm	45 x 102 x 155	
• Basic unit with mounted function module or solid-state time-delay auxiliary switch			
- Screw terminals	mm	45 x 85 x 181	
- Spring-loaded terminals	mm	45 x 102 x 181	
Permissible mounting position			
The contactors are designed for operation on a vertical mounting surface.			
Upright mounting position		 Special version required, also applies for 3RT202.-.K.40 coupling contactors	
Mechanical service life			
• Basic unit and basic unit with mounted auxiliary switch	Operating cycles	10 million	
• Basic unit with solid-state compatible auxiliary switch	Operating cycles	5 million	
Electrical endurance		For contact endurance of the main contacts, see page 2/20.	
Rated insulation voltage U_i (pollution degree 3)	V	690	
Rated impulse withstand voltage U_{imp}			
• Auxiliary circuit	kV	6	
• Main circuit	kV	6	
Protective separation between the coil and the main contacts (acc. to IEC 60947-1, Annex N)	V	400	
Mirror contacts A mirror contact is an auxiliary NC contact that cannot be closed simultaneously with an NO main contact.			
• Integrated auxiliary switches		Yes, acc. to IEC 60947-4-1, Annex F	
• 3RT2.2. (removable auxiliary switch)		Yes, acc. to IEC 60947-4-1, Annex F	
Permissible ambient temperature			
• During operation	°C	-25 ... +60	
• During storage	°C	-55 ... +80	
Degree of protection IP on the front according to IEC 60529		IP20 (screw terminals and spring-loaded terminals)	
Touch protection on the front acc. to IEC 60529		Finger-safe for vertical touching from the front (screw terminals and spring-loaded terminals)	
Shock resistance			
• Rectangular pulse			
- AC operation	*g*/ms	7.5/5 and 4.7/10	8.3/5 and 5.3/10
- DC operation	*g*/ms	10/5 and 7.5/10	
• Sine pulse			
- AC operation	*g*/ms	11.8/5 and 7.4/10	13.5/5 and 8.3/10
- DC operation	*g*/ms	15/5 and 10/10	

SIRIUS 3RT contactors, 3-pole up to 250 kW

		Contactors		
Type		3RT2023 to 3RT2025	3RT2026	3RT2027, 3RT2028
Size		S0		
Short-circuit protection				
Main circuit				
• Fuse links, operational class gG: LV HRC, type 3NA; DIAZED, type 5SB; NEOZED, type 5SE according to IEC 60947-4-1				
- Type of coordination "1"	A	63	100	125
- Type of coordination "2"	A	25	35	50
- Weld-free (test conditions acc. to IEC 60947-4-1)	A	10	16	
• Miniature circuit breaker with C characteristic (short-circuit current 3 kA, type of coordination "1")	A	25	32	40
Auxiliary circuit				
• Fuse links, operational class gG: DIAZED, type 5SB; NEOZED, type 5SE (weld-free protection at $I_k \leq 1$ kA)	A	10		
• 230 V miniature circuit breaker, C characteristic (short-circuit current $I_k < 400$ A)	A	10		
Short-circuit protection for contactors with overload relays		See Configuration Manual for load feeders		
Short-circuit protection for fuseless load feeders		See 3RA2 load feeders		

			Contactors			
Type			3RT2023 to 3RT2025	3RT2026 to 3RT2028	3RT202.-.NB3	3RT202.-.NF3.	3RT202.-.NP3
Size			S0				
Control							
Type of operating mechanism			AC or DC		AC/DC		
Solenoid coil operating range	AC/DC		0.8 ... 1.1 x U_s[1]		0.7 ... 1.3 x U_s[2]		
Power consumption of the solenoid coils (for cold coil and 1.0 x U_s)							
• AC operation, 50 Hz, standard version							
- Closing		VA	65	77	6.6	11.9	12.7
- P.f.			0.82		0.98		
- Closed		VA	7.6	9.8	1.9	1.6	3.9
- P.f.			0.25		0.86	0.79	0.51
• AC operation, 50/60 Hz, standard version							
- Closing		VA	68/67	81/79	6.6/6.7	11.9/12.0	12.7/14.7
- P.f.			0.72/0.74		0.98/0.98		
- Closed		VA	7.9/6.5	10.5/8.5	1.9/2.0	1.6/1.8	3.9/4.3
- P.f.			0.25/0.28		0.86/0.82	0.79/0.74	0.51/0.56
• AC operation, 50 Hz, for USA/Canada							
- Closing		VA	65	77	--		
- P.f.			0.82	0.82	--		
- Closed		VA	7[3]/7.6	9.8	--		
- P.f.			0.25	0.28	--		
• AC operation, 60 Hz, for USA/Canada							
- Closing		VA	73	87	--		
- P.f.			0.76		--		
- Closed		VA	7.2	9.4	--		
- P.f.			0.28		--		
• DC operation (closing = closed)		W	5.9/5.9		5.9/1.4	10.2/1.3	14.3/1.9
Permissible residual current of the electronics (with 0 signal)							
• AC operation		mA	< 6 mA x (230 V/U_s)		< 7 mA x (230 V/U_s)		
• DC operation		mA	< 16 mA x (24 V/U_s)				
Operating times within operating range							
Total break time = Opening delay + Arcing time							
• AC operation							
- Closing delay		ms	8 ... 40		50 ... 80		
- Opening delay		ms	4 ... 16		30 ... 50		
• DC operation							
- Closing delay		ms	50 ... 170		50 ... 80		
- Opening delay		ms	15 ... 18		30 ... 50		
• Arcing time		ms	10				

1) Coil operating range
- At 50 Hz: 0.8 to 1.1 x U_s
- At 60 Hz: 0.85 to 1.1 x U_s.

2) The following applies to $U_{s\,max}$ = 280 V: Upper limit = 1.1 x $U_{s\,max}$.

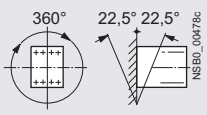
3) Value applies to 3RT2023 contactor 50 Hz AC.

			Coupling contactors
Type			**3RT202.-.KB4.**
Size			**S0**
Control			
Solenoid coil operating range			0.7 ... 1.25 x U_s
Power consumption of the solenoid coils (for cold coil) Closing = Closed	At U_s 24 V DC	W	4.5
Permissible residual current of the electronics (with 0 signal)			< 10 mA x (24 V/U_s)
Overvoltage configuration of the solenoid coil			Integrated varistor  *U*
Operating times within operating range			
Total break time = Opening delay + Arcing time			
• DC operation			
- Closing delay		ms	52 ... 270
- Opening delay		ms	19 ... 21
• Arcing time		ms	10

			Contactors					
Type			**3RT2023**	**3RT2024**	**3RT2025**	**3RT2026**	**3RT2027**	**3RT2028**
Size			**S0**					
Rated data of the main contacts								
Load rating with AC								
Utilization category AC-1								
• Rated operational current I_e	At 40 °C up to 690 V	A	40				50	
	At 60 °C up to 690 V	A	35				42	
• Rated power for AC loads[1] P.f. = 0.95 (at 60 °C)	230 V	kW	13.3				15.5	
	400 V	kW	23				27.5	
	690 V	kW	40				47.5	
• Minimum cross-section in the main circuit for max. AC-1 rated value		mm^2	10					
Utilization categories AC-2 and AC-3								
• Rated operational currents I_e	Up to 400 V	A	9	12	17	25	32	38
	440 V	A	9	12	17	22	32	35
	500 V	A	9	12	17	18	32	
	690 V	A	9		13		21	
• Rated power for slip-ring or squirrel-cage motors at 50 Hz and 60 Hz	At 230 V	kW	2.2	3	4	5.5	7.5	11
	400 V	kW	4	5.5	7.5	11	15	18.5
	690 V	kW	7.5		11		18.5	
Thermal load capacity	10 s current	A	80	110	150	200	260	304
Power loss per conducting path	At I_e/AC-3	W	0.4	0.5	0.9	1.6	2.7	3.8
Utilization category AC-4 (for I_a = 6 x I_e)								
• Maximum values:								
- Rated operational current I_e	Up to 400 V	A	8.5	12.5	15.5		22	
- Rated power for squirrel-cage motors at 50 Hz and 60 Hz	At 400 V	kW	4	5.5	7.5		11	
• The following applies to a contact endurance of about 200 000 operating cycles:								
- Rated operational currents I_e	Up to 400 V	A	4.1	5.5	7.7	9	12	
	690 V	A	3.3	5.5	7.7	9	12	
- Rated power for squirrel-cage motors at 50 Hz and 60 Hz	At 110 V	kW	0.5	0.73	1	1.2	1.6	
	230 V	kW	1.1	1.5	2	2.5	3.4	
	400 V	kW	2	2.6	3.5	4.4	6	
	690 V	kW	2.5	4.6	6	7.7	10.3	

[1] Industrial furnaces and electric heaters with resistance heating, etc. (increased power consumption on heating up has been taken into account).

				Contactors	
Type				**3RT2023 to 3RT2025**	**3RT2026 to 3RT2028**
Size				**S0**	
Rated data of the main contacts (continued)					
Load rating with DC					
Utilization category DC-1, (*L/R* ≤ 1 ms)					
• Rated operational currents I_e (at 60 °C)					
- 1 conducting path	Up to 24 V	A		35	
	60 V	A		20	
	110 V	A		4.5	
	220 V	A		1	
	440 V	A		0.4	
	600 V	A		0.25	
- 2 conducting paths in series	Up to 24 V	A		35	
	60 V	A		35	
	110 V	A		35	
	220 V	A		5	
	440 V	A		1	
	600 V	A		0.8	
- 3 conducting paths in series	Up to 24 V	A		35	
	60 V	A		35	
	110 V	A		35	
	220 V	A		35	
	440 V	A		2.9	
	600 V	A		1.4	
Utilization category DC-3/DC-5, shunt-wound and series-wound motors (*L/R* ≤ 15 ms)					
• Rated operational currents I_e (at 60 °C)					
- 1 conducting path	Up to 24 V	A		20	
	60 V	A		5	
	110 V	A		2.5	
	220 V	A		1	
	440 V	A		0.09	
	600 V	A		0.06	
- 2 conducting paths in series	Up to 24 V	A		35	
	60 V	A		35	
	110 V	A		15	
	220 V	A		3	
	440 V	A		0.27	
	600 V	A		0.16	
- 3 conducting paths in series	Up to 24 V	A		35	
	60 V	A		35	
	110 V	A		35	
	220 V	A		10	
	440 V	A		0.6	
	600 V	A		0.6	
Switching frequency					
Switching frequency *z* in operating cycles/hour					
Contactors without overload relays					
• No-load switching frequency		AC	1/h	5 000	
		DC	1/h	1 500	
		AC/DC	1/h	1 500	
• Switching frequency *z* during rated operation (Dependence of the switching frequency *z'* on operational current *I'* and operational voltage *U'*: $z' = z \cdot (I_e/I') \cdot (U_e/U')^{1.5}$ ·1/h)					
- I_e/AC-1	At 400 V		1/h	1 000	
- I_e/AC-2	At 400 V		1/h	1 000	750
- I_e/AC-3	At 400 V		1/h	1 000	750
- I_e/AC-4	At 400 V		1/h	300	250
Contactors with overload relays					
• Mean value			1/h	15	

		Contactors			
Type		3RT2035	3RT2036	3RT2037	3RT2038
Size		S2			
General data					
Dimensions (W x H x D)					
• Basic unit - Screw/spring-loaded terminals	mm	55 x 114 x 130			
• Basic unit with mounted auxiliary switch - Screw terminals - Spring-loaded terminals	mm mm	55 x 114 x 174 55 x 114 x 178			
• Basic unit with mounted function module or solid-state time-delay auxiliary switch - Screw/spring-loaded terminals	mm	55 x 114 x 204			
Permissible mounting position The contactors are designed for operation on a vertical mounting surface.					
Upright mounting position		 Special version required			
Mechanical service life					
• Basic units and basic units with mounted auxiliary switch	Operating cycles	10 million (3RT203.-.S.30: 5 million)			
• Basic units with solid-state compatible auxiliary switch	Operating cycles	5 million			
Electrical endurance		For contact endurance of the main contacts, see page 2/21.			
Rated insulation voltage U_i (pollution degree 3)	V	690			
Rated impulse withstand voltage U_{imp}					
• Auxiliary circuit	kV	6			
• Main circuit	kV	6			
Protective separation between the coil and the main contacts (acc. to IEC 60947-1, Annex N)	V	400			
Mirror contacts A mirror contact is an auxiliary NC contact that cannot be closed simultaneously with an NO main contact.					
• Integrated auxiliary switches		Yes, acc. to IEC 60947-1, Annex F			
• 3RT2.3. (removable auxiliary switch)		Yes, acc. to IEC 60947-1, Annex F			
Permissible ambient temperature					
• During operation	°C	-25 ... +60			
• During storage	°C	-55 ... +80			
Degree of protection IP on the front according to IEC 60529		IP20 (screw terminals and spring-loaded terminals)			
Touch protection on the front acc. to IEC 60529		Finger-safe for vertical touching from the front (screw terminals and spring-loaded terminals)			
Shock resistance					
• Rectangular pulse - AC operation - DC operation	 *g*/ms *g*/ms	 11.8/5 and 7.4/10 7.7/5 and 4.5/10			
• Sine pulse - AC operation - DC operation	 *g*/ms *g*/ms	 18.5/5 and 11.6/10 12/5 and 7/10			
Short-circuit protection					
Main circuit					
• Fuse links, operational class gG: LV HRC, type 3NA; DIAZED, type 5SB; NEOZED, type 5SE according to IEC 60947-4-1					
- Type of coordination "1"	A	160		250	
- Type of coordination "2"	A	80		125	160
- Weld-free (test conditions acc. to IEC 60947-4-1)	A	16	25	50	
Auxiliary circuit					
• Fuse links, operational class gG: DIAZED, type 5SB; NEOZED, type 5SE (weld-free protection at $I_k \leq 1$ kA)	A	10			
• 230 V miniature circuit breaker, C characteristic (short-circuit current $I_k < 400$ A)	A	10			
Short-circuit protection for contactors with overload relays		See Configuration Manual for load feeders			
Short-circuit protection for fuseless load feeders		See 3RA2 load feeders			

			Contactors			Coupling contactors
Type			3RT203.-.A../ 3RT203.-.C...	3RT203.-.N.3.	3RT203.-.S.3.	3RT203.-.KB4.
Size			S2			
Control						
Type of operating mechanism			AC	AC/DC		DC
Solenoid coil operating range						
• AC operation[1]			0.8 ... 1.1 x U_s	--		
• AC/DC operation[1]			--	0.8 ... 1.1 x U_s		--
• DC operation			--			0.8 ... 1.2 x U_s
Power consumption of the solenoid coils (for cold coil and 1.0 x U_s)						
• AC operation, 50 Hz, standard version						
- Closing		VA	190	--		
- P.f.			0.72	--		
- Closed		VA	16	--		
- P.f.			0.37	--		
• AC operation, 50/60 Hz, standard version						
- Closing		VA	210/188	--		
- P.f.			0.69/0.65	--		
- Closed		VA	17.2/16.5	--		
- P.f.			0.36/0.39	--		
• AC operation, 60 Hz, for USA/Canada						
- Closing		VA	212	--		
- P.f.			0.67	--		
- Closed		VA	18.5	--		
- P.f.			0.37	--		
• AC/DC operation						
- Closing for AC operation		VA	--	40		--
- P.f.			--	0.95		--
- Closed for AC operation		VA	--	2		--
- P.f.			--	0.95	0.7	--
- Closing for DC operation		VA	--	23[2]	40	--
- Closed for DC operation		VA	--	1	1.6	--
• DC operation						
- Closing for DC operation		W	--			21.5[3]
- Closed for DC operation		W	--			1
Permissible residual current of the electronics (with 0 signal)						
• AC/DC operation		mA	--	< 20		--
• DC operation		mA	--			< 20
Overvoltage configuration of the solenoid coil			--	Integrated varistor  U		
PLC control input acc. to IEC 60947-1						
• Solid-state operating mechanism			--		Type 1	--
• Rated voltage		V DC	--		24	--
• Operating range		V DC	--		17 ... 30	--
• Power consumption		mA	--		≤ 30	--
• Recovery time after mains failure, typical		s	--		2	--
Operating times within operating range						
Total break time = Opening delay + Arcing time						
• AC operation	Closing delay	ms	10 ... 80	35 ... 110		
	Opening delay	ms	10 ... 18	30 ... 55		
• DC operation	Closing delay	ms	--	35 ... 110		35 ... 80
	Opening delay	ms	--	30 ... 55		
• Arcing time		ms	10 ... 20			

[1] Coil operating range
- At 50 Hz: 0.8 to 1.1 x U_s,
- At 60 Hz: 0.85 to 1.1 x U_s.

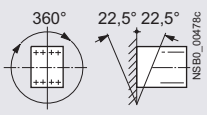
[2] In the case of AC/DC coils, increased pickup currents (2.6 A on average) arise during the first 230 ms. For direct control by PLC, we therefore recommend special coupling contactors with reduced power consumption. The connection of one 3RT203.-.KB4. coupling contactor is possible per PLC output port with an output current of 2 A, see page 2/46.

[3] In the case of DC coils, increased pickup currents (2.1 A on average) arise during the first 230 ms.

			Contactors			
Type			3RT2035	3RT2036	3RT2037	3RT2038
Size			S2			
Rated data of the main contacts						
Load rating with AC						
Utilization category AC-1						
• Rated operational current I_e	At 40 °C up to 690 V	A	60	70	80	90
	At 60 °C up to 690 V	A	55	60	70	80
• Rated power for AC loads[1] P.f. = 0.95 (at 60 °C)	230 V	kW	23	26	30	34
	400 V	kW	39	46	53	59
	690 V	kW	68	79	91	102
• Minimum cross-section in the main circuit for max. AC-1 rated value		mm^2	16	25		35
Utilization categories AC-2 and AC-3						
• Rated operational currents I_e	Up to 400 V	A	41	51	65	80
	440 V	A	41	51	65	80
	500 V	A	41	51	65	80
	690 V	A	24		47	58
• Rated power for slip-ring or squirrel-cage motors at 50 Hz and 60 Hz	At 230 V	kW	11	15	18.5	22
	400 V	kW	18.5	22	30	37
	690 V	kW	22		37	45
Thermal load capacity	10 s current	A	400	420	520	640
Power loss per conducting path	At I_e/AC-3	W	2.2	4	3.8	5.7
Utilization category AC-4 (for $I_a = 6 \times I_e$)						
• Maximum values						
- Rated operational current I_e	Up to 400 V	A	35	41	55	
- Rated power for squirrel-cage motors at 50 Hz and 60 Hz	At 400 V	kW	18.5	22	30	
• The following applies to a contact endurance of about 200 000 operating cycles:						
- Rated operational currents I_e	Up to 400 V	A	22	24	28	30
	690 V	A	18.5	20	22	24
- Rated power for squirrel-cage motors at 50 Hz and 60 Hz	At 110 V	kW	3.2	3.5	4.1	4.3
	230 V	kW	6.7	7.3	8.5	9.1
	400 V	kW	11.6	12.6	14.7	15.8
	690 V	kW	16.8	18.2	20	21.8

[1] Industrial furnaces and electric heaters with resistance heating, etc. (increased power consumption on heating up has been taken into account).

			Contactors			
Type			**3RT2035**	**3RT2036**	**3RT2037**	**3RT2038**
Size			**S2**			
Rated data of the main contacts (continued)						
Load rating with DC						
Utilization category DC-1, (*L/R* ≤ 1 ms)						
• Rated operational currents I_e (at 60 °C)						
- 1 conducting path	Up to 24 V	A	55			
	60 V	A	23			
	110 V	A	4.5			
	220 V	A	1			
	440 V	A	0.4			
	600 V	A	0.25			
- 2 conducting paths in series	Up to 24 V	A	55			
	60 V	A	45			
	110 V	A	45			
	220 V	A	5			
	440 V	A	1			
	600 V	A	0.8			
- 3 conducting paths in series	Up to 24 V	A	55			
	60 V	A	55			
	110 V	A	55			
	220 V	A	45			
	440 V	A	2.9			
	600 V	A	1.4			
Utilization category DC-3/DC-5, shunt-wound and series-wound motors (*L/R* ≤ 15 ms)						
• Rated operational currents I_e (at 60 °C)						
- 1 conducting path	Up to 24 V	A	35			
	60 V	A	6			
	110 V	A	2.5			
	220 V	A	1			
	440 V	A	0.1			
	600 V	A	0.06			
- 2 conducting paths in series	Up to 24 V	A	55			
	60 V	A	45			
	110 V	A	25			
	220 V	A	5			
	440 V	A	0.27			
	600 V	A	0.16			
- 3 conducting paths in series	Up to 24 V	A	55			
	60 V	A	55			
	110 V	A	55			
	220 V	A	25			
	440 V	A	0.6			
	600 V	A	0.35			
Switching frequency						
Switching frequency *z* in operating cycles/hour						
Contactors without overload relays						
• No-load switching frequency	AC	1/h	5 000			
	DC	1/h	1 500			
	AC/DC	1/h	1 500 (3RT203.-.S.30: 1 000)			
• Switching frequency *z* during rated operation (Dependence of the switching frequency *z'* on operational current *I'* and operational voltage *U'*: $z' = z \cdot (I_e/I') \cdot (U_e/U')^{1.5} \cdot 1/h$)						
- I_e/AC-1 at 400 V		1/h	1 200 (3RT203.-.S.30: 1 000)	1 000	800	700
- I_e/AC-2 at 400 V		1/h	750	600	400	350
- I_e/AC-3 at 400 V		1/h	1 000	800	700	500
- I_e/AC-4 at 400 V		1/h	300	250	200	150
Contactors with overload relays						
• Mean value		1/h	15			

		Contactors		
Type		3RT2045	3RT2046	3RT2047
Size		S3		
General data				
Dimensions (W x H x D)				
• Basic unit - Screw/spring-loaded terminals	mm	70 x 140 x 152		
• Basic unit with mounted auxiliary switch - Screw terminals - Spring-loaded terminals	mm mm	70 x 140 x 196 70 x 140 x 200		
• Basic unit with mounted function module or solid-state time-delay auxiliary switch - Screw/spring-loaded terminals	mm	70 x 140 x 226		
Permissible mounting position The contactors are designed for operation on a vertical mounting surface.				
Upright mounting position		 Special version required		
Mechanical service life				
• Basic units and basic units with mounted auxiliary switch	Operating cycles	10 million		
• Basic units with solid-state compatible auxiliary switch	Operating cycles	5 million		
Electrical endurance		For contact endurance of the main contacts, see page 2/21.		
Rated insulation voltage U_i (pollution degree 3)	V	1 000 (3RT20..-.....-0CC0: 690)		
Rated impulse withstand voltage U_{imp}				
• Auxiliary circuit	kV	6		
• Main circuit	kV	8		
Protective separation between the coil and the main contacts (acc. to IEC 60947-1, Annex N)	V	690		
Mirror contacts A mirror contact is an auxiliary NC contact that cannot be closed simultaneously with an NO main contact.				
• Integrated auxiliary switches		Yes, acc. to IEC 60947-4-1, Annex F		
• 3RT2.4. (removable auxiliary switch)		Yes, acc. to IEC 60947-4-1, Annex F		
Permissible ambient temperature				
• During operation	°C	-25 ... +60		
• During storage	°C	-55 ... +80		
Degree of protection IP on the front according to IEC 60529		IP20 (screw terminals and spring-loaded terminals)		
Touch protection on the front acc. to IEC 60529		Finger-safe for vertical touching from the front (screw terminals and spring-loaded terminals)		
Shock resistance				
• Rectangular pulse - AC operation - DC operation	 *g*/ms *g*/ms	 10.3/5 and 6.7/10 6.7/5 and 4.0/10 (3RT204.-.KB40: 6.3/5 and 3.6/10)		
• Sine pulse - AC operation - DC operation	 *g*/ms *g*/ms	 16.3/5 and 10.5/10 10.6/5 and 6.3/10 (3RT204.-.KB40: 9.8/5 and 5.6/10)		
Short-circuit protection				
Main circuit				
• Fuse links, operational class gG: LV HRC, type 3NA; DIAZED, type 5SB; NEOZED, type 5SE according to IEC 60947-4-1				
- Type of coordination "1"	A	250		
- Type of coordination "2"	A	160	160	200
- Weld-free (test conditions acc. to IEC 60947-4-1)	A	On request		
Auxiliary circuit				
• Fuse links, operational class gG: DIAZED, type 5SB; NEOZED, type 5SE (weld-free protection at $I_k \leq 1$ kA)	A	10		
• 230 V miniature circuit breaker, C characteristic (short-circuit current $I_k < 400$ A)	A	10		
Short-circuit protection for contactors with overload relays		See Configuration Manual for load feeders		
Short-circuit protection for fuseless load feeders		See 3RA2 load feeders		

			Contactors			Coupling contactors
Type			3RT204.-.A..., 3RT204.-.C...	3RT204.-.N.3.	3RT204.-.S.3.	3RT204.-.KB4.
Size			S3			
Control						
Type of operating mechanism			AC	AC/DC		DC
Solenoid coil operating range						
• AC operation[1]			0.8 ... 1.1 x U_s	--		
• AC/DC operation[1]			--	0.8 ... 1.1 x U_s		--
• DC operation			--			0.8 ... 1.2 x U_s
Power consumption of the solenoid coils (for cold coil and 1.0 x U_s)						
• AC operation, 50 Hz, standard version						
- Closing		VA	296	--		
- P.f.			0.61	--		
- Closed		VA	19	--		
- P.f.			0.38	--		
• AC operation, 50/60 Hz, standard version						
- Closing		VA	348/296	--		
- P.f.			0.62/0.55	--		
- Closed		VA	25/18	--		
- P.f.			0.35/0.41	--		
• AC operation, 60 Hz, for USA/Canada						
- Closing		VA	326	--		
- P.f.			0.62	--		
- Closed		VA	22	--		
- P.f.			0.38	--		
• AC/DC operation						
- Closing for AC operation		VA	--	163	130	--
- P.f.			--	0.95		--
- Closed for AC operation		VA	--	3.1	2.4	--
- P.f.			--	0.95	0.7	--
- Closing for DC operation		VA	--	76[2]	130	--
- Closed for DC operation		VA	--	1.8		--
• DC operation						
- Closing for DC operation		W	--			25[3]
- Closed for DC operation		W	--			0.9
Permissible residual current of the electronics (with 0 signal)						
• AC/DC operation		mA	--	< 20		--
• DC operation		mA	--			< 20
Overvoltage configuration of the solenoid coil			--	Integrated varistor  U		
PLC control input acc. to IEC 60947-1						
• Solid-state operating mechanism			--		Type 1	--
• Rated voltage		V DC	--		24	--
• Operating range		V DC	--		17 ... 30	--
• Power consumption		mA	--		≤ 30	--
• Recovery time after mains failure, typical		s	--		2	--
Operating times within operating range						
Total break time = Opening delay + Arcing time						
• AC operation	Closing delay	ms	13 ... 50	50 ... 70		--
	Opening delay	ms	10 ... 21	38 ... 57		--
• DC operation	Closing delay	ms	--	50 ... 70		
	Opening delay	ms	--	38 ... 57		
• Arcing time		ms	10 ... 20			

1) Coil operating range
- At 50 Hz: 0.8 to 1.1 x U_s
- At 60 Hz: 0.85 to 1.1 x U_s.

2) In the case of AC/DC coils, increased pickup currents (6.5 A on average) arise during the first 150 ms. For direct control by PLC, we therefore recommend special coupling contactors with reduced power consumption. The connection of one 3RT204.-.KB4. coupling contactor is possible per PLC output port with an output current of 2 A, see page 2/46.

3) In the case of DC coils, increased pickup currents (2.1 A on average) arise during the first 150 ms.

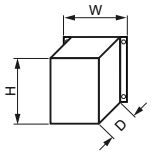
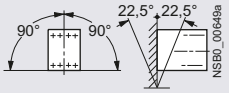
				Contactors		
Type				3RT2045	3RT2046	3RT2047
Size				S3		
Rated data of the main contacts						
Load rating with AC						
Utilization category AC-1						
• Rated operational current I_e	At 40 °C up to 690 V		A	125	130	
	At 60 °C up to 690 V		A	105	110	
	At 40 °C up to 1 000 V		A	60	70	
	At 60 °C up to 1 000 V		A	50	60	
• Rated power for AC loads[1] P.f. = 0.95 (at 60 °C)	230 V		kW	40	42	
	400 V		kW	69	72	
	690 V		kW	119	125	
• Minimum cross-section in the main circuit for max. AC-1 rated value			mm^2	50		
Utilization categories AC-2 and AC-3						
• Rated operational currents I_e	Up to 400 V		A	80	95	110
	500 V		A	80	95	110
	690 V		A	58	78	98
	1 000 V		A	30		
• Rated power for slip-ring or squirrel-cage motors at 50 Hz and 60 Hz	At 230 V		kW	22	22	30
	400 V		kW	37	45	55
	690 V		kW	55	75	90
	1 000 V		kW	37		
Thermal load capacity	10 s current		A	760		880
Power loss per conducting path	At I_e/AC-3		W	5.3	6.6	7.9
Utilization category AC-4 (for $I_a = 6 \times I_e$)						
• Maximum values						
- Rated operational current I_e	Up to 400 V		A	66	80	97
- Rated power for squirrel-cage motors at 50 Hz and 60 Hz	At 400 V		kW	37	45	55
• The following applies to a contact endurance of about 200 000 operating cycles:						
- Rated operational currents I_e	Up to 400 V		A	34	42	46
	690 V		A	24	30	36
- Rated power for squirrel-cage motors at 50 Hz and 60 Hz	At 110 V		kW	4.9	6.1	6.7
	230 V		kW	10.4	12	14
	400 V		kW	17.9	22	24.3
	690 V		kW	21.8	27.4	32.9

[1] Industrial furnaces and electric heaters with resistance heating, etc. (increased power consumption on heating up has been taken into account).

SIRIUS 3RT contactors, 3-pole up to 250 kW

2

				Contactors		
Type				**3RT2045**	**3RT2046**	**3RT2047**
Size				**S3**		
Rated data of the main contacts (continued)						
Load rating with DC						
Utilization category DC-1, (*L/R* ≤ 1 ms)						
• Rated operational currents I_e (at 60 °C)						
- 1 conducting path	Up to 24 V	A		100		
	60 V	A		60		
	110 V	A		9		
	220 V	A		2		
	440 V	A		0.6		
	600 V	A		0.4		
- 2 conducting paths in series	Up to 24 V	A		100		
	60 V	A		100		
	110 V	A		100		
	220 V	A		10		
	440 V	A		1.8		
	600 V	A		1.0		
- 3 conducting paths in series	Up to 24 V	A		100		
	60 V	A		100		
	110 V	A		100		
	220 V	A		80		
	440 V	A		4.5		
	600 V	A		2.6		
Utilization category DC-3/DC-5, shunt-wound and series-wound motors (*L/R* ≤ 15 ms)						
• Rated operational currents I_e (at 60 °C)						
- 1 conducting path	Up to 24 V	A		40		
	60 V	A		6		
	110 V	A		2.5		
	220 V	A		1		
	440 V	A		0.15		
	600 V	A		0.06		
- 2 conducting paths in series	Up to 24 V	A		100		
	60 V	A		100		
	110 V	A		100		
	220 V	A		7		
	440 V	A		0.42		
	600 V	A		0.16		
- 3 conducting paths in series	Up to 24 V	A		100		
	60 V	A		100		
	110 V	A		100		
	220 V	A		35		
	440 V	A		0.8		
	600 V	A		0.35		
Switching frequency						
Switching frequency *z* in operating cycles/hour						
Contactors without overload relays						
• No-load switching frequency	AC	1/h		5 000		
	DC	1/h		1 000		
	AC/DC	1/h		1 000		
• Switching frequency *z* during rated operation (Dependence of the switching frequency *z'* on operational current *I'* and operational voltage *U'*: $z' = z \cdot (I_e/I') \cdot (U_e/U')^{1.5} \cdot 1/h$)						
- I_e/AC-1 at 400 V		1/h		900		
- I_e/AC-2 at 400 V		1/h		400	350	
- I_e/AC-3 at 400 V		1/h		1 000	850	
- I_e/AC-4 at 400 V		1/h		300	250	200
Contactors with overload relays						
• Mean value		1/h		15		

		Contactors				
Type		3RT1054	3RT1055, 3RT1056	3RT1064 to 3RT1066	3RT1075	3RT1076
Size		S6		S10	S12	
General data						
Dimensions (W x H x D) 						
• Basic unit	mm	120 x 172 x 170		145 x 210 x 202	160 x 214 x 225	
• Basic unit with mounted auxiliary switch	mm	120 x 172 x 217		145 x 210 x 251	160 x 214 x 271	
Permissible mounting position The contactors are designed for operation on a vertical mounting surface.						
Mechanical service life	Operating cycles	10 million				
Electrical endurance		For contact endurance of the main contacts, see page 2/21.				
Rated insulation voltage U_i (pollution degree 3)	V	1 000				
Rated impulse withstand voltage U_{imp}						
• Auxiliary circuit	kV	6				
• Main circuit	kV	8				
Protective separation between the coil and the main contacts acc. to IEC 60947-1, Annex N	V	690				
Mirror contacts A mirror contact is an auxiliary NC contact that cannot be closed simultaneously with an NO main contact.		Yes, acc. to IEC 60947-4-1, Annex F				
Permissible ambient temperature						
• During operation	°C	-25 ... +60				
• During storage	°C	-55 ... +80				
Degree of protection IP on the front according to IEC 60529		IP00 (IP20 with box terminal/cover)				
Touch protection on the front acc. to IEC 60529		Finger-safe for vertical touching from the front with box terminal/cover				
Shock resistance						
• Rectangular pulse	*g*/ms	8.5/5 and 4.2/10				
• Sine pulse	*g*/ms	13.4/5 and 6.5/10				
Electromagnetic compatibility (EMC)		See page 2/14				
Short-circuit protection						
Main circuit Fuse links, operational class gG: LV HRC, type 3NA; DIAZED, type 5SB; NEOZED, type 5SE according to IEC 60947-4-1						
• Type of coordination "1"	A	355		500	630	
• Type of coordination "2"	A	250	315	400	500	
• Weld-free	A	80	160	250		315
Auxiliary circuit						
Short-circuit test						
• With fuse links of operational class gG: DIAZED, type 5SB; NEOZED, type 5SE with short-circuit current I_k = 1 kA acc. to IEC 60947-5-1	A	10				
• With miniature circuit breakers with C characteristic with short-circuit current I_k = 400 A	A	10				
Short-circuit protection for contactors with overload relays		See Configuration Manual for load feeders				

SIRIUS 3RT contactors, 3-pole up to 250 kW

			Contactors		
Type			3RT105.	3RT106.	3RT107.
Size			S6	S10	S12
Control					
Operating range of the solenoid operating mechanism	AC/DC		0.8 x $U_{s\,min}$ ... 1.1 x $U_{s\,max}$		
Power consumption of the solenoid operating mechanism (with cold coil and rated range $U_{s\,min}$ ... $U_{s\,max}$)					
• Standard operating mechanism (3RT10..-.A)					
- AC operation	Closing at $U_{s\,min}$	VA/p.f.	250/0.9	490/0.9	700/0.9
	Closing at $U_{s\,max}$	VA/p.f.	300/0.9	590/0.9	830/0.9
	Closed at $U_{s\,min}$	VA/p.f.	4.8/0.8	5.6/0.9	7.6/0.9
	Closed at $U_{s\,max}$	VA/p.f.	5.8/0.8	6.7/0.9	9.2/0.9
- DC operation	Closing at $U_{s\,min}$	W	300	540	770
	Closing at $U_{s\,max}$	W	360	650	920
	Closed at $U_{s\,min}$	W	4.3	6.1	8.5
	Closed at $U_{s\,max}$	W	5.2	7.4	10
• Solid-state operating mechanism (3RT10..-.N/-.P/-.S)					
- AC operation	Closing at $U_{s\,min}$	VA/p.f.	190/0.8	400/0.8	560/0.8
	Closing at $U_{s\,max}$	VA/p.f.	280/0.8	530/0.8	750/0.8
	Closed at $U_{s\,min}$	VA/p.f.	3.5/0.6	5.5/0.5	5.6/0.5
	Closed at $U_{s\,max}$	VA/p.f.	4.8/0.6	8.5/0.4	9/0.4
- DC operation	Closing at $U_{s\,min}$	W	250	440	600
	Closing at $U_{s\,max}$	W	320	580	800
	Closed at $U_{s\,min}$	W	2.1	2.8	3
	Closed at $U_{s\,max}$	W	2.8	3.4	3.6
PLC control input acc. to IEC 60947-1					
• Solid-state operating mechanism	3RT10..-.N/-.P		Type 2		
	3RT10..-.S		Type 1		
• Rated voltage		V DC	24		
• Operating range		V DC	17 ... 30		
• Power consumption		mA	≤ 30		
• Recovery time after mains failure, typical (applicable only for fail-safe version 3RT10..-.S)		s	2		
Operating times within operating range					
Total break time = Opening delay + Arcing time					
• Standard operating mechanism for AC/DC operation (3RT10..-.A)	Closing delay	ms	20 ... 95	30 ... 95	45 ... 100
	Opening delay	ms	40 ... 60	40 ... 80	60 ... 100
• Solid-state operating mechanism for AC/DC operation					
- Actuated via A1/A2 (3RT10..-.N/-.P)	Closing delay	ms	95 ... 135	105 ... 145	120 ... 150
	Opening delay	ms	80 ... 90	80 ... 100	
- Actuated via PLC input (3RT10..-.N/-.P)	Closing delay	ms	35 ... 75	45 ... 80	60 ... 90
	Opening delay	ms	80 ... 90	80 ... 100	
- Actuated via F-PLC input (3RT10..-.S)	Closing delay	ms	60 ... 75		
	Opening delay	ms	115 ... 130		
• Arcing time		ms	10 ... 20		

		Contactors							
Type		3RT1054	3RT1055	3RT1056	3RT1064	3RT1065	3RT1066	3RT1075	3RT1076
Size		S6			S10			S12	
Rated data of the main contacts									
Load rating with AC									
Utilization category AC-1									
• Rated operational currents I_e									
- At 40 °C up to 690 V	A	160	185	215	275	330		430	610
- At 60 °C up to 690 V	A	140	160	185	250	300		400	550
- At 60 °C up to 1 000 V	A	80	90	100		150		200	
• Rated power for AC loads[1] with p.f. = 0.95 (at 60 °C)									
- At 230 V	kW	53	60	70	94	113		151	208
- At 400 V	kW	92	105	121	164	197		263	362
- At 500 V	kW	115	131	152	205	246		329	452
- At 690 V	kW	159	181	210	283	340		454	624
- At 1 000 V	kW	131	148	165	164	246		329	
• Minimum cross-section in the main circuit for max. AC-1 rated value	mm^2	70	95		150	185		300	370
Utilization categories AC-2 and AC-3									
• Rated operational currents I_e									
- Up to 500 V	A	115	150	185	225	265	300	400	500
- At 690 V	A	115	150	170	225	265	280	400	450
- At 1 000 V	A	53	65		68	95		180	
• Rated power for slip-ring or squirrel-cage motors at 50 Hz and 60 Hz									
- At 230 V	kW	37	50	61	73	85	97	132	164
- At 400 V	kW	64	84	104	128	151	171	231	291
- At 500 V	kW	81	105	132	160	189	215	291	363
- At 690 V	kW	113	146	167	223	265	280	400	453
- At 1 000 V	kW	75	90			132		250	
Thermal load capacity, 10 s current	A	1 100	1 300	1 480	1 800	2 400		3 200	4 000
Power loss per main conducting path At I_e/AC-3/500 V	W	7	9	13	17	18	22	35	55
Utilization category AC-4 (for $I_a = 6 \times I_e$)									
Maximum values:									
• Rated operational current I_e									
- Up to 400 V	A	97	132	160	195	230	280	350	430
• Rated power for squirrel-cage motors at 50 Hz and 60 Hz									
- At 400 V	kW	55	75	90	110	132	160	200	250
The following applies to a contact endurance of about 200 000 operating cycles:									
• Rated operational currents I_e									
- Up to 500 V	A	54	68	81	96	117	125	150	175
- Up to 690 V	A	48	57	65	85	105	115	135	150
• Rated power for squirrel-cage motors at 50 Hz and 60 Hz									
- At 230 V	kW	16	20	25	30	37	40	48	56
- At 400 V	kW	29	38	45	54	66	71	85	98
- At 500 V	kW	37	47	57	67	82	87	105	123
- At 690 V	kW	48	55	65	82	102	112	133	148

[1] Industrial furnaces and electric heaters with resistance heating, etc. (increased power consumption on heating up has been taken into account).

SIRIUS 3RT contactors, 3-pole up to 250 kW

2

			Contactors						
Type			3RT1054	3RT1055, 3RT1056	3RT1064	3RT1065	3RT1066	3RT1075	3RT1076
Size			S6		S10			S12	
Rated data of the main contacts (continued)									
Load rating with DC									
Utilization category DC-1, (*L/R* ≤ 1 ms)									
• Rated operational currents I_e (at 60 °C)									
- 1 conducting path	Up to 24 V	A	160		200	300		400	
	60 V	A	160		200	300		330	
	110 V	A	18			33			
	220 V	A	3.4			3.8			
	440 V	A	0.8			0.9			
	600 V	A	0.5			0.6			
- 2 conducting paths in series	Up to 24 V	A	160		200	300		400	
	60 V	A	160		200	300		400	
	110 V	A	160		200	300		400	
	220 V	A	20			300		400	
	440 V	A	3.2			4			
	600 V	A	1.6			2			
- 3 conducting paths in series	Up to 24 V	A	160		200	300		400	
	60 V	A	160		200	300		400	
	110 V	A	160		200	300		400	
	220 V	A	160		200	300		400	
	440 V	A	11.5			11			
	600 V	A	4			5.2			
Utilization category DC-3/DC-5, shunt-wound and series-wound motors (*L/R* ≤ 15 ms)									
• Rated operational currents I_e (at 60 °C)									
- 1 conducting path	Up to 24 V	A	160		200	300		400	
	60 V	A	7.5			11			
	110 V	A	2.5			3			
	220 V	A	0.6						
	440 V	A	0.17			0.18			
	600 V	A	0.12			0.125			
- 2 conducting paths in series	Up to 24 V	A	160		200	300		400	
	60 V	A	160		200	300		400	
	110 V	A	160		200	300		400	
	220 V	A	2.5						
	440 V	A	0.65						
	600 V	A	0.37						
- 3 conducting paths in series	Up to 24 V	A	160		200	300		400	
	60 V	A	160		200	300		400	
	110 V	A	160		200	300		400	
	220 V	A	160		200	300		400	
	440 V	A	1.4						
	600 V	A	0.75						
Switching frequency									
Switching frequency *z* in operating cycles/hour									
Contactors without overload relays									
• No-load switching frequency									
- Standard operating mechanism	3RT10..-.A	1/h	2 000						
- Solid-state operating mechanism	3RT10..-.N/-.P	1/h	1 000						
	3RT10..-.S	1/h	1 000					500	
• Switching frequency *z* during rated operation (Dependence of the switching frequency *z'* on operational current *I'* and operational voltage *U'*: $z' = z \cdot (I_e/I') \cdot (U_e/U')^{1.5} \cdot 1/h$)									
- 3RT10..-.A standard operating mechanism and 3RT10..-.N/-.P solid-state operating mechanism	I_e/AC-1 at 400 V	1/h	800		750	800	750	700	500
	I_e/AC-2 at 400 V	1/h	400	300	250			200	170
	I_e/AC-3 at 400 V	1/h	1 000	750	500				420
	I_e/AC-4 at 400 V	1/h	130						
- 3RT10..-.S solid-state operating mechanism	I_e/AC-1 at 400 V	1/h	750		500			200	
	I_e/AC-2 at 400 V	1/h	400	300	250			200	170
	I_e/AC-3 at 400 V	1/h	750		500			200	
	I_e/AC-4 at 400 V	1/h	130						
Contactors with mounted overload relay									
• Mean value		1/h	60						

Selection and ordering data

DC operation for direct control by PLC ⎓

- Coupling contactors with adapted power consumption
- Suitable for electronic PLC/F-PLC outputs
- Cannot be expanded with auxiliary switches

3RT201.-2.B4.

Rated data			Auxiliary contacts			Rated control supply voltage U_s	**Spring-loaded terminals**	Weight
AC-2 and AC-3, t_u: 60 °C		AC-1, t_u: 40 °C						
Operational current I_e up to	Ratings of three-phase motors at 50 Hz and	Operational current I_e up to	Ident. No.	Version		DC	Article No.	
400 V	**400 V**	690 V		NO	NC			
A	**kW**	A				V		kg
For screw fixing and snap-on mounting on TH 35 standard mounting rail								
Size S00								
(Cannot be expanded with auxiliary switches)								
Operating range **0.7 ... 1.25 x U_s**, power consumption of the solenoid coils **2.8 W** at 24 V								
7	**3**	18	**10**	1	--	24	**3RT2015-2HB41**	0.317
			01	--	1	24	**3RT2015-2HB42**	0.317
9	**4**	22	**10**	1	--	24	**3RT2016-2HB41**	0.300
			01	--	1	24	**3RT2016-2HB42**	0.315
12	**5.5**[1)]	22	**10**	1	--	24	**3RT2017-2HB41**	0.317
			01	--	1	24	**3RT2017-2HB42**	0.320
Operating range **0.85 ... 1.85 x U_s**, power consumption of the solenoid coils **1.6 W** at 24 V								
7	**3**	18	**10**	1	--	24	**3RT2015-2MB41-0KT0**	0.319
			01	--	1	24	**3RT2015-2MB42-0KT0**	0.330
9	**4**	22	**10**	1	--	24	**3RT2016-2MB41-0KT0**	0.317
			01	--	1	24	**3RT2016-2MB42-0KT0**	0.316
12	**5.5**[1)]	22	**10**	1	--	24	**3RT2017-2MB41-0KT0**	0.310
			01	--	1	24	**3RT2017-2MB42-0KT0**	0.317
With integrated coil circuit (diode integrated at the factory)[1)]								
(Cannot be expanded with auxiliary switches)								
Operating range **0.7 ... 1.25 x U_s**, power consumption of the solenoid coils **2.8 W** at 24 V								
7	**3**	18	**10**	1	--	24	**3RT2015-2JB41**	0.315
			01	--	1	24	**3RT2015-2JB42**	0.316
9	**4**	22	**10**	1	--	24	**3RT2016-2JB41**	0.316
			01	--	1	24	**3RT2016-2JB42**	0.317
12	**5.5**[1)]	22	**10**	1	--	24	**3RT2017-2JB41**	0.316
			01	--	1	24	**3RT2017-2JB42**	0.316
Operating range **0.85 ... 1.85 x U_s**, power consumption of the solenoid coils **1.6 W** at 24 V								
7	**3**	18	**10**	1	--	24	**3RT2015-2VB41**	0.320
			01	--	1	24	**3RT2015-2VB42**	0.323
9	**4**	22	**10**	1	--	24	**3RT2016-2VB41**	0.320
			01	--	1	24	**3RT2016-2VB42**	0.318
12	**5.5**[1)]	22	**10**	1	--	24	**3RT2017-2VB41**	0.320
			01	--	1	24	**3RT2017-2VB42**	0.320

[1)] When using contactors with IE3/IE4 motors, use contactors fitted with varistors instead of diodes. In the case of 5.5 kW coupling contactors of size S00, use 5.5 kW coupling contactors of size S0, see page 2/45.

Accessories and spare parts, see pages 2/52 to 2/75.

*** You can order this quantity or a multiple thereof.**

SIRIUS 3RT contactors, 3-pole up to 250 kW *IE3/IE4* ready

DC operation for direct control by PLC ⎓

- Coupling contactors with adapted power consumption
- Suitable for electronic PLC/F-PLC outputs
- Cannot be expanded with auxiliary switches

3RT201.-2.B4.

Rated data			Auxiliary contacts			Rated control supply voltage U_s	**Spring-loaded terminals**	Weight
AC-2 and AC-3, t_u: 60 °C		AC-1, t_u: 40 °C						
Operational current I_e up to	Ratings of three-phase motors at 50 Hz and	Operational current I_e up to	Ident. No.	Version		DC	Article No.	
400 V	**400 V**	690 V		NO	NC			
A	**kW**	A		NO	NC	V		kg
For screw fixing and snap-on mounting on TH 35 standard mounting rail								
Size S00								
With integrated coil circuit (suppressor diode integrated at the factory)[1)]								
(Cannot be expanded with auxiliary switches)								
Operating range **0.7 ... 1.25 x U_s**, power consumption of the solenoid coils **2.8 W** at 24 V								
7	**3**	18	**10**	1	--	24	**3RT2015-2KB41**	0.315
			01	--	1	24	**3RT2015-2KB42**	0.318
9	**4**	22	**10**	1	--	24	**3RT2016-2KB41**	0.320
			01	--	1	24	**3RT2016-2KB42**	0.316
12	**5.5[1)]**	22	**10**	1	--	24	**3RT2017-2KB41**	0.316
			01	--	1	24	**3RT2017-2KB42**	0.316
Operating range **0.85 ... 1.85 x U_s**, power consumption of the solenoid coils **1.6 W** at 24 V								
7	**3**	18	**10**	1	--	24	**3RT2015-2SB41**	0.320
			01	--	1	24	**3RT2015-2SB42**	0.317
9	**4**	22	**10**	1	--	24	**3RT2016-2SB41**	0.317
			01	--	1	24	**3RT2016-2SB42**	0.320
12	**5.5[1)]**	22	**10**	1	--	24	**3RT2017-2SB41**	0.323
			01	--	1	24	**3RT2017-2SB42**	0.321

[1)] When using contactors with IE3/IE4 motors, use contactors fitted with varistors instead of diodes. In the case of 5.5 kW coupling contactors of size S00, use 5.5 kW coupling contactors of size S0, see page 2/45. For more information about dimensioning and configuring.

Other voltages on request.

Accessories and spare parts, see pages 2/52 to 2/75.

*** You can order this quantity or a multiple thereof.**

DC operation for direct control by PLC ⎓

- Coupling contactors with adapted power consumption
- Suitable for electronic PLC/F-PLC outputs
- Cannot be expanded with auxiliary switches

3RT202.-2KB40

Rated data			Auxiliary contacts			Rated control supply voltage U_s	**Spring-loaded terminals**	Weight
AC-2 and AC-3, t_u: 60 °C		AC-1, t_u: 40 °C						
Operational current I_e up to	Ratings of three-phase motors at 50 Hz and	Operational current I_e up to	Ident. No.	Version		DC	Article No.	
400 V	**400 V**	690 V		NO	NC			
A	**kW**	A				V		kg
For screw fixing and snap-on mounting on TH 35 standard mounting rail								
Size S0								
With integrated coil circuit (varistor integrated in electronics at the factory)								
(Cannot be expanded with auxiliary switches)								
Operating range **0.7 ... 1.25 x U_s**, power consumption of the solenoid coils **4.5 W** at 24 V								
9	**4**	40	**11**	1	1	24	**3RT2023-2KB40**	0.635
12	**5.5**	40	**11**	1	1	24	**3RT2024-2KB40**	0.645
17	**7.5**	40	**11**	1	1	24	**3RT2025-2KB40**	0.643
25	**11**	40	**11**	1	1	24	**3RT2026-2KB40**	0.643
32	**15**	50	**11**	1	1	24	**3RT2027-2KB40**	0.650

Other voltages on request.

Accessories and spare parts, see pages 2/52 to 2/75.

*** You can order this quantity or a multiple thereof.**

SIRIUS 3RT contactors, 3-pole up to 250 kW *IE3/IE4* ready

DC operation for direct control by PLC ⎓

- Coupling contactors with adapted power consumption
- Suitable for electronic PLC/F-PLC outputs with 2 A
- Can be expanded using front or lateral auxiliary switch (1 x left and 1 x right)

3RT203.-3KB40

3RT204.-3KB40

Rated data			Auxiliary contacts			Rated control supply voltage U_s	**Spring-loaded terminals**	Weight
AC-2 and AC-3, t_u: 60 °C		AC-1, t_u: 40 °C						
Operational t I_e up to	Ratings current of three-phase motors at 50 Hz and	Operational current I_e up to	Ident. No.	Version		DC	Article No.	
400 V	**400 V**	690 V						
A	**kW**	A		NO	NC	V		kg
For screw fixing and snap-on mounting on TH 35 standard mounting rail								
Size S2								
With integrated coil circuit (varistor integrated in electronics at the factory)								
Operating range **0.8 ... 1.2 x U_s**, closing power of the solenoid coils **21.5 W** at 24 V								
41	**18.5**	60	**11**	1	1	24	**3RT2035-3KB40**	1.110
50	**22**	70	**11**	1	1	24	**3RT2036-3KB40**	1.113
65	**30**	80	**11**	1	1	24	**3RT2037-3KB40**	1.133
80	**37**	90	**11**	1	1	24	**3RT2038-3KB40**	1.116
For screw fixing and snap-on mounting on TH 35-15 and TH 75-15 standard mounting rails								
Size S3								
With integrated coil circuit (varistor integrated in electronics at the factory)								
Operating range **0.8 ... 1.2 x U_s**, closing power of the solenoid coils **25 W** at 24 V								
80	**37**	125	**11**	1	1	24	**3RT2045-3KB40**	1.843
95	**45**	130	**11**	1	1	24	**3RT2046-3KB40**	1.849

Other voltages on request.

Accessories and spare parts, see pages 2/52 to 2/75.

* You can order this quantity or a multiple thereof.

AC/DC operation

- Extended operating range of the solenoid coil 0.7 to 1.3 x U_s
- Power consumption reduced from closing to closed

3RT202.-2N.30

Rated data			Auxiliary contacts			Rated control supply voltage U_s	Spring-loaded terminals	Weight
AC-2 and AC-3, t_u: 60 °C		AC-1, t_u: 40 °C						
Operational current I_e up to	Ratings of three-phase motors at 50 Hz and	Operational current I_e up to	Ident. No.	Version		50/60 Hz AC or DC	Article No.	
400 V	**400 V**	690 V						
A	**kW**	A		NO	NC	V		kg
For screw fixing and snap-on mounting on TH 35 standard mounting rail								
Size S0								
With integrated coil circuit (varistor integrated in electronics at the factory)								
12	**5.5**	40	**11**	1	1	21 ... 28 95 ... 130 200 ... 280	**3RT2024-2NB30** **3RT2024-2NF30** **3RT2024-2NP30**	0.608 0.581 0.585
17	**7.5**	40	**11**	1	1	21 ... 28 95 ... 130 200 ... 280	**3RT2025-2NB30** **3RT2025-2NF30** **3RT2025-2NP30**	0.609 0.583 0.586
25	**11**	40	**11**	1	1	21 ... 28 95 ... 130 200 ... 280	**3RT2026-2NB30** **3RT2026-2NF30** **3RT2026-2NP30**	0.618 0.582 0.587
32	**15**	50	**11**	1	1	21 ... 28 95 ... 130 200 ... 280	**3RT2027-2NB30** **3RT2027-2NF30** **3RT2027-2NP30**	0.626 0.590 0.595
38	**18.5**	50	**11**	1	1	21 ... 28 95 ... 130 200 ... 280	**3RT2028-2NB30** **3RT2028-2NF30** **3RT2028-2NP30**	0.619 0.585 0.594

Other voltages on request.

Accessories and spare parts, see pages 2/52 to 2/75.

*** You can order this quantity or a multiple thereof.**

SIRIUS 3RT contactors, 3-pole up to 250 kW *IE3/IE4* ready

AC/DC operation

- Extended operating range of the solenoid coil 0.8 to 1.1 x U_s
- Power consumption reduced from closing to closed

3RT203.-3N.30

Rated data			Auxiliary contacts			Rated control supply voltage U_s	Spring-loaded terminals	Weight
AC-2 and AC-3, t_u: 60 °C		AC-1, t_u: 40 °C						
Operational current I_e up to	Ratings of three-phase motors at 50 Hz and	Operational current I_e up to	Ident. No.	Version		50/60 Hz AC or DC	Article No.	
400 V	**400 V**	690 V		NO	NC			
A	**kW**	A				V		kg
For screw fixing and snap-on mounting on TH 35 standard mounting rail								
Size S2								
With integrated coil circuit (varistor integrated in electronics at the factory)								
41	**18.5**	60	**11**	1	1	20 ... 33	**3RT2035-3NB30**	1.112
						83 ... 155	**3RT2035-3NF30**	1.112
						175 ... 280	**3RT2035-3NP30**	1.115
50	**22**	70	**11**	1	1	20 ... 33	**3RT2036-3NB30**	1.100
						83 ... 155	**3RT2036-3NF30**	1.115
						175 ... 280	**3RT2036-3NP30**	1.112
65	**30**	80	**11**	1	1	20 ... 33	**3RT2037-3NB30**	1.130
						83 ... 155	**3RT2037-3NF30**	1.127
						175 ... 280	**3RT2037-3NP30**	1.116
80	**37**	90	**11**	1	1	20 ... 33	**3RT2038-3NB30**	1.114
						83 ... 155	**3RT2038-3NF30**	1.125
						175 ... 280	**3RT2038-3NP30**	1.119
						175 ... 280	**--**	

Other voltages on request.

Accessories and spare parts, see pages 2/52 to 2/75.

*** You can order this quantity or a multiple thereof.**

AC/DC operation

- Extended operating range of the solenoid coil 0.8 to 1.1 x U_s
- Power consumption reduced from closing to closed

3RT204.-3N.30

Rated data			Auxiliary contacts			Rated control supply voltage U_s	**Spring-loaded terminals**	Weight
AC-2 and AC-3, t_u: 60 °C		AC-1, t_u: 40 °C						
Operational current I_e up to	Ratings of three-phase motors at 50 Hz and	Operational current I_e up to	Ident. No.	Version		50/60 Hz AC or DC	Article No.	
400 V	**400 V**	690 V		NO	NC			
A	**kW**	A				V		kg
For screw fixing and snap-on mounting on TH 35-15 and TH 75-15 standard mounting rails								
Size S3								
With integrated coil circuit (varistor integrated in electronics at the factory)								
80	**37**	125	**11**	1	1	20 ... 33	**3RT2045-3NB30**	1.830
						83 ... 155	**3RT2045-3NF30**	1.815
						175 ... 280	**3RT2045-3NP30**	1.820
95	**45**	130	**11**	1	1	20 ... 33	**3RT2046-3NB30**	1.834
						83 ... 155	**3RT2046-3NF30**	1.815
						175 ... 280	**3RT2046-3NP30**	1.804
110	**55**	130	**11**	1	1	20 ... 33	**3RT2047-3NB30**	1.833
						83 ... 155	**3RT2047-3NF30**	1.818
						175 ... 280	**3RT2047-3NP30**	1.818

Other voltages on request.

Accessories and spare parts, see pages 2/52 to 2/75.

*** You can order this quantity or a multiple thereof.**

SIRIUS 3RT contactors, 3-pole up to 250 kW *IE3/IE4 ready*

AC/DC operation

- Solid-state operating mechanism
  - 3RT10..-.N with 24 V DC control signal input
  - 3RT10..-.P with 24 V DC control signal input and with remaining lifetime indicator (RLT)
- For screw fixing
- Auxiliary and control conductors: Screw terminals or spring-loaded terminals
- Main conductors: Busbar connections; a connection kit with screws, spring washers and nuts is enclosed.

3RT106.-2N.36

3RT107.-2N.36

Size	Rated data					Auxiliary contacts, lateral		Rated control supply voltage U_s	**Spring-loaded terminals**	Weight
	AC-2 and AC-3, t_u: 60 °C				AC-1, t_u: 40 °C	Version		50/60 Hz AC or DC	Article No.	
	Operational current I_e up to	Ratings of three-phase motors at 50 Hz and			Operational current I_e up to					
	500 V	**400 V**	500 V	690 V	690 V					
	A	**kW**	kW	kW	A	NO	NC	V		kg
Solid-state operating mechanism										
With 24 V DC control signal input e.g. for control by PLC										
With integrated coil circuit (varistor integrated in electronics at the factory)										
S6	115	**55**	75	110	160	2	2	96 ... 127 200 ... 277	**3RT1054-2NF36** **3RT1054-2NP36**	3.277 3.326
	150	**75**	90	132	185	2	2	96 ... 127 200 ... 277	**3RT1055-2NF36** **3RT1055-2NP36**	3.333 3.350
	185	**90**	110	160	215	2	2	96 ... 127 200 ... 277	**3RT1056-2NF36** **3RT1056-2NP36**	3.353 3.350
S10	225	**110**	160	200	275	2	2	96 ... 127 200 ... 277	**3RT1064-2NF36** **3RT1064-2NP36**	6.610 6.462
	265	**132**	160	250	330	2	2	96 ... 127 200 ... 277	**3RT1065-2NF36** **3RT1065-2NP36**	6.656 6.549
	300	**160**	200	250	330	2	2	96 ... 127 200 ... 277	**3RT1066-2NF36** **3RT1066-2NP36**	6.720 6.599
S12	400	**200**	250	400	430	2	2	96 ... 127 200 ... 277	**3RT1075-2NF36** **3RT1075-2NP36**	10.352 10.095
	500	**250**	355	400	610	2	2	96 ... 127 200 ... 277	**3RT1076-2NF36** **3RT1076-2NP36**	10.501 10.340

Other voltages according to page 2/51 on request.

Accessories and spare parts, see pages 2/52 to 2/75.

* You can order this quantity or a multiple thereof.

Options

Rated control supply voltages for 3RT10 contactors, possible on request (change of the 10th and 11th digits of the Article No.)

Delivery time on request

Rated control supply voltage	**Contactor type**	**3RT105.-.A, 3RT106.-.A, 3RT107.-.A**	Rated control supply voltage	**Contactor type**	**3RT105.-.N, 3RT106.-.N, 3RT107.-.N**	**3RT105.-.P, 3RT105.-.S, 3RT106.-.P, 3RT106.-.S, 3RT107.-.P, 3RT107.-.S**
$U_{s\,min}$ to $U_{s\,max}$	**Sizes**	**S6 to S12**	$U_{s\,min}$ to $U_{s\,max}$	**Sizes**	**S6 to S12**	
Sizes S6 to S12						
AC/DC operation (50/60 Hz AC or DC) and operating range 0.8 x $U_{s\,min}$ to 1.1 x $U_{s\,max}$						
Standard operating mechanism			**Solid-state operating mechanism**			
23 ... 26 V AC/DC		B3	21 ... 27.3 V AC/DC		B3	--
42 ... 48 V AC/DC		D3	96 ... 127 V AC/DC		F3	F3
110 ... 127 V AC/DC		F3	200 ... 277 V AC/DC		P3	P3
200 ... 220 V AC/DC		M3				
220 ... 240 V AC/DC		P3				
240 ... 277 V AC/DC		U3				
380 ... 420 V AC/DC		V3				
440 ... 480 V AC/DC		R3				
500 ... 550 V AC/DC		S3				
575 ... 600 V AC/DC		T3				

2

Overview

Extensive accessories and spare parts are available for SIRIUS 3RT power contactors and SIRIUS 3RH2 contactor relays.

These components are easily fitted to the contactors without the use of any tools according to requirements.

Overview graphics with mountable accessories:

- 3RT2 contactors, see pages 2/6 to 2/9
- 3RT10, 3RT12 and 3RT14 contactors, see pages 2/10 to 2/12
- 3RH2 contactor relays, see page 2/125

More information

TIA Selection Tool Cloud (TST Cloud), see www.siemens.com/tstcloud/?node=Contactor

Version	For contactors 3RT2, sizes S00 to S3; 3RH2, size S00	 3RT105 to 3RT107, 3RT126 and 3RT127, 3RT145 to 3RT147; sizes S6 to S12	Selection and ordering data Page
Accessories for 3RT contactors and 3RH2 contactor relays			
Auxiliary switches			
Instantaneous	3RH29.1	3RH19.1	2/55 ... 2/63
Delayed			
• Pneumatic time-delay auxiliary switches	3RT2927-2P..1	--	1)
• Solid-state time-delay auxiliary switches	3RA2813, 3RA2814, 3RA2815	3RT1926-2E/-2F/-2G	1)
Surge suppressors			
• Without LED	3RT29.6-1B/-1C/-1D/-1E	3RT1956-1C	1)
• With LED	3RT29.6-1J/-1L/-1M	--	1)
Modules for contactor control			
Coupling links for control by PLC	3RH29.4-.GP11	--	1)
3RA28 function modules			
• For direct on-line starting: ON delay or OFF-delay	3RA2811, 3RA2812, 3RA2831, 3RA2832	--	1)
• For star-delta (wye-delta) starting	3RA2816	--	1)
3RA27 function modules for IO-Link or AS-Interface			
• For direct-on-line, reversing or star-delta (wye-delta) starting	3RA271.-.A/-.B/-.C	--	1)
Mechanical latching blocks	3RT2926-3A.31	--	1)
OFF-delay devices for contactors with AC/DC and DC operation	3RT2916-2B.01	--	1)
Link modules			
Link modules from motor starter protector to contactor	3RA.9.1	--	2/203
Safety main current connectors for two contactors	3RA29.6-1A	--	2/64
Assembly kits			
• For reversing contactor assemblies	3RA29.3-2AA.	3RA19.3-2A	2/64
• For contactor assemblies for star-delta (wye-delta) starting	3RA29..-2BB., 3RA29.3-2C	3RA1953-3G, 3RA19.3-2./-3.	2/65, 2/66
Single wiring modules	3RA.9.3-3.A.	3RA19.3-3.	2/67
Star jumpers (links for paralleling), 3-pole	3RT.9.6-4BA3.	3RT19.6-4BA31	2/67
Mechanical interlock kits for two contactors	3RA29.2-2H	--	2/68
Mechanical interlocks for contactor assemblies	3RA2934-2B	3RA1954-2.	2/68
Mechanical connectors for contactor assemblies	3RA29.2-2.	3RA1932-2D	2/68
Connection modules/adapters			
Links for paralleling for main conducting paths	3RT.9.6-4BB.1	--	2/69
1-phase infeed terminals	3RA2943-3L	--	2/70
3-phase infeed terminals	3RA2913-3K, 3RV29.5-5A.	--	2/70
• With increased clearances and creepage distances	3RV2935-5E	--	2/70
3-phase busbars	3RV1915-1AB	--	2/70
Terminal blocks for connecting auxiliary conductors to main terminals			
• Box terminal blocks	3RT2946-4G	3RT19..-4G	2/70
• Box terminal for auxiliary conductor connection, 1-pole	--	3TX7500-0A	2/70
• Auxiliary terminals, 3-pole	3RT2946-4F	--	2/70
Solder pin adapters for mounting contactors on printed circuit boards	3RT1916-4KA.	--	2/71
Coil connection modules for connections from top or from bottom	3RT2926-4R.1.	--	2/71
Connection module (adapter and plug) for contactors with screw terminals			
• Adapters	3RT19.6-4RD01	--	2/71
• Motor feeder connector	3RT1900-4RE01	--	2/71

Version	For contactors		Selection and ordering data
	3RT2, sizes S00 to S3; 3RH2, size S00	3RT105 to 3RT107, 3RT126 and 3RT127, 3RT145 to 3RT147; sizes S6 to S12	Page
Accessories for 3RT contactors and 3RH2 contactor relays (continued)			
Covers			
Terminal covers	3RT1946-4EA1, 3RT29.6-4EA.	3RT1956-4EA., 3RT1966-4EA., 3TX65.6-3B	2/72
Sealable covers	3RT2916-4MA10	3RT1926-4MA10	2/72
Miscellaneous accessories			
Base plates			
• For reversing contactor assemblies	--	3RT19.2-2A	2/73
• For contactor assemblies for star-delta (wye-delta) starting	3RA29.2-2F	3RA19.2-2.	2/73
Adapters for screw fixing	3RT1926-4P	--	2/73
Connection kit for one complete contactor	--	3RT19..-4PA00	2/73
EMC suppression modules	3RT2916-1P . .	--	2/73
Additional load modules	3RT2916-1GA00	--	1)
LED modules for displaying contactor operation	3RT2926-1QT00	3RT1926-1QT00	1)
Control kit	3RT29.6-4MC00	--	1)
Insulation stop for securely holding back the conductor insulation for conductors up to 1 mm²	3RT2916-4JA02	3RT1916-4JA02	1)
Tools for opening spring-loaded terminals	3RA2908-1A	3RA2908-1A	1)
Blank labels	3RT2900-1SB.0	3RT2900-1SB.0	1)
Spare parts for 3RT2 contactors			
Solenoid coils	3RT29..-5...1	--	1)
Withdrawable coils	--	3RT19..-5....	2/74
Contacts with fixing parts	3RT29..-6.	3RT19..-6.	2/75
Arc chutes	--	3RT19..-7.	2/75

1) see Catalog IC 10.

Auxiliary switches

The auxiliary switches can be designed as force-guided contacts in 3RH contactor relays or also as mirror contacts in the case of 3RT power contactors.

For more information on force-guided operation and mirror contacts, see Manuals → "More information", page 2/55 onwards.

Solid-state time-delay auxiliary switches for mounting on 3RT2 contactors and 3RH2 contactor relays

The 3RA28 solid-state time-delay auxiliary switches which can be mounted on the contactor are designed for applications in the range from 24 to 240 V AC/DC (wide voltage range). Both the electrical and mechanical connection are made by simple snapping on and locking.

The time-delay auxiliary switch is supplied with power directly by two plug-in contacts through the coil terminals of the contactor, in parallel with A./A2.

A protection circuit (varistor) is integrated in each module.

A sealable cover is available to protect against careless adjustment of the set times.

Note:

Mounting more auxiliary switches on the contactor is not permitted.

Surge suppressors

- Without LED (also for spring-loaded terminals)
  Sizes S00 to S3
- With LED (also for spring-loaded terminals)
  Sizes S00 to S3

All 3RT2 contactors and 3RH2 contactor relays can be retrofitted with RC elements or varistors for damping opening surges in the coil. Diodes or diode assemblies (combination of interference suppression diode and Zener diode for short break times) can also be used.

The surge suppressors are plugged onto the front of size S00 contactors. Space is provided for them next to a snap-on auxiliary switch.

Varistors, RC elements or diode assemblies can be plugged onto the front of size S0 to S3 contactors. Exception: For size S3, the RC element is inserted on the front into the recesses to the left of the connection block.

Coupling contactors are supplied either without overvoltage damping or with a suppressor diode, varistor or diode connected as standard, according to the version.

Note:

The break times of the contactor, the opening delay times of the NO contacts and the closing delay times of the NC contacts increase if the contactor coils are attenuated against voltage peaks. Different accessories are available for the contactors (time change with: interference suppression diode 6x to 10x; diode assembly 2x to 6x; suppressor diode +1 to 5 ms; varistor +2 to 5 ms).

For details, see Equipment Manual.

Coupling links for control by PLC

- Operation with 24 V DC
- Operating range 17 to 30 V
- Low power consumption of 0.5 W
- An LED indicates the switching state.

The 3RH2924-1GP11 coupling link has an integrated surge suppressor (varistor) for the contactor coil being switched and is mounted on the size S0 contactor coil via a coil connection module.

Overview

Auxiliary switch: Terminal designations and identification numbers for auxiliary contacts

Terminal designations

The terminal designations are 2-digit, e.g. 13, 14, 21, 22:

- Tens digit: Sequence digit
  - Related terminals have the same sequence digit
- Units digit: Function digit
  - 1-2 for normally closed contacts (NC)
  - 3-4 for normally open contacts (NO)

Identification numbers

The identification number indicates the number and type of the auxiliary contacts, e.g. 40, 31, 22, 13:

- 1st digit: number of normally open contacts (NO)
- 2nd digit: number of normally closed contacts (NC)

Examples:

- 31 = 3 NO + 1 NC
- 40 = 4 NO

Selection aid for mountable auxiliary switches for power contactors and contactor relays

The auxiliary switches of the 3RH29 series for mounting on the front and side can be used for 3RT2 power contactors as well as for 3RH2 contactor relays.

The possible combinations of basic unit and mounted auxiliary switch can be found in the tables, see the following pages.

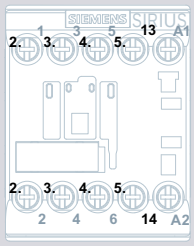
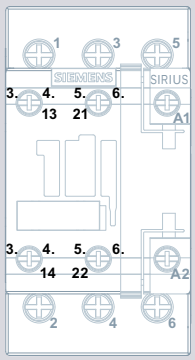
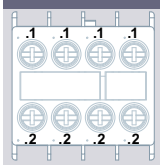
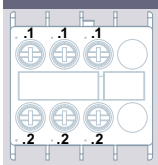
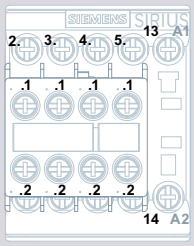
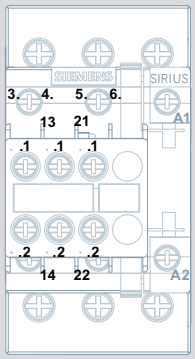
Where the columns and lines intersect (blue and green in the example) you will find the identification number for the combination of basic unit (column) and auxiliary switch (line).

Additional auxiliary switch			3-pole contactors		
Article number	Auxiliary contacts		3RT201	3RT201	3RT202 to 3RT204
	Version		S00	S00	S0 to S3
	NO	NC	10	01	11
			13 / 14	21 / 22	13 / 21 / 14 / 22
			2. 3. 4. 5.	5. 6. 7. 8.	3. 4. 5. 6.
			According to EN 50012[1]		
Auxiliary switches without NO contact					
3RH2911-☐HA01	--	1	11	02	12
3RH2911-☐HA02	--	2	12	03	13
3RH2911-☐HA03	--	3	13	04	14
3RH2911-☐FA04	--	4	14	--	--
Auxiliary switch with 1 NO contact					
3RH2911-☐HA10	1	--	20	11	21

IC01_00716

1 For screw terminals
2 For spring-loaded terminals

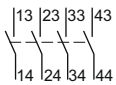
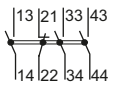
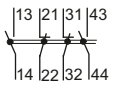
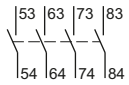
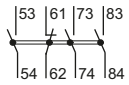
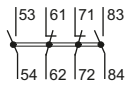
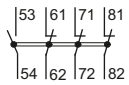
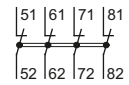
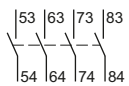
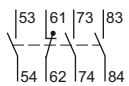
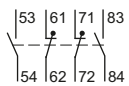
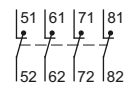
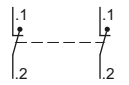
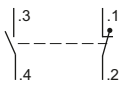
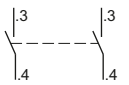
[1] Combinations according to EN 50012, EN 50011 and IEC 60947-5-1 are in **bold** print. All combinations comply with EN 50005.

	Example 1	*Example 2*
Type	3RT20 motor contactor, S00 with 1 NO	3RT20 motor contactor, S00 with 1 NO + 1 NC
		
Sequence digit	2. 3. 4. 5.	3. 4. 5. 6.
Type	Auxiliary switch with 4 NC, 3RH2911-.FA04	Auxiliary switch with 3 NC, 3RH2911-.HA03
		
Function digit	1. 1. 1. 1. 2. 2. 2. 2.	1. 1. 1. 2. 2. 2.
Combi-nation	3RT20 motor contactor, S00 with aux. switch	3RT20 motor contactor, S0 with aux. switch
		
Terminal designation	13 21 31 41 51 14 22 32 42 52	13 21 31 41 51 14 22 32 42 52
Result	Ident. No. 14	Ident. No. 14

IC01_00717a

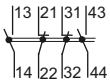
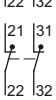
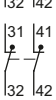
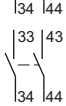
Example 1
Basic unit: 3-pole 3RT2017 motor contactor with 1 NO
Required: 1 NO + 4 NC (Ident. No. 14)
Result: 3RH2911-.FA04 auxiliary switch

Example 2
Basic unit: 3-pole 3RT2023 motor contactor with 1 NO + 1 NC
Required: 1 NO + 4 NC (Ident. No. 14)
Result: 3RH2911-.HA03 auxiliary switch

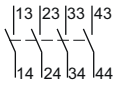
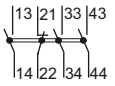
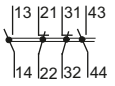
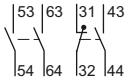
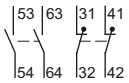
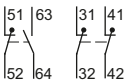
Additional auxiliary switches			3-pole contactors			4-pole contactors				Contactor relays		
Article number	Auxiliary contacts		S00		S0 to S3	S00		S0 to S3		S00		
	Version		3RT201		3RT202, 3RT203, 3RT204, 3RT244	3RT231	3RT251	3RT232, 3RT233, 3RT234	3RT252, 3RT253, 3RT254	3RH21, 3RH24		
	NO	NC	10	01	11	--	--	11	11	40E	31E	22E
												
			2. 3. 4. 5.	5. 6. 7. 8.	3. 4. 5. 6.	1. 2. 3. 4.	1. 2. 3. 4.	3. 4. 5. 6.	3. 4. 5. 6.	5. 6. 7. 8.	5. 6. 7. 8.	5. 6. 7. 8.
			According to EN 50005			According to EN 50005				According to EN 50011[1]		
Auxiliary switches, front (continued)												
With complete inscription (for contactor relays)[2]												
3RH2911-□GA40	4	--		--	--	--	--	--	--	--	**80E**	--	--
3RH2911-□GA31	3	1		--	--	--	--	--	--	--	**71E**	--	--
3RH2911-□GA22	2	2		--	--	--	--	--	--	--	**62E**	--	--
3RH2911-□GA13	1	3		--	--	--	--	--	--	--	**53E**	--	--
3RH2911-□GA04	--	4		--	--	--	--	--	--	--	**44E**	--	--
Complete inscription													
3RH2911-□XA40 -0MA0	4	--		50	41	51	40	40	51	51	**80E**	**71X**	**62X**
3RH2911-□XA31 -0MA0	3	1		41	32	42	31	31	42	42	**71E**	**62X**	53
3RH2911-□XA22 -0MA0	2	2		32	23	33	22	22	33	--	**62E**	53	**44X**
3RH2911-□XA04 -0MA0	--	4		14	--	--	--	--	--	--	**44E**	--	--
Solid-state compatible													
3RH2911-□NF02	--	2		12	03	13	02	02	13	--	42	33	24
3RH2911-□NF11	1	1		21	12	22	11	11	22	22	51	42	33
3RH2911-□NF20	2	--		30	21	31	20	20	31	31	60	51	42

[1] Combinations according to EN 50011 and IEC 60947-5-1 are in **bold** print.
All combinations comply with EN 50005.

[2] For selection and ordering data, see page 2/59.

Additional auxiliary switches			3-pole contactors			4-pole contactors				Contactor relays		
Article number	Auxiliary contacts		S00		S0 to S3	S00		S0 to S3		S00		
	Version		3RT201		3RT202, 3RT203, 3RT204, 3RT244	3RT231	3RT251	3RT232, 3RT233, 3RT234	3RT252, 3RT253, 3RT254	3RH21		
	NO	NC	10	01	11	--	--	11	11	40E	31E	22E
												
			2. 3. 4. 5.	5. 6. 7. 8.	3. 4. 5. 6.	1. 2. 3. 4.	1. 2. 3. 4.	3. 4. 5. 6.	3. 4. 5. 6.	5. 6. 7. 8.	5. 6. 7. 8.	5. 6. 7. 8.
			According to EN 50012[1]			According to EN 50012[1]				According to EN 50011[1]		
Lateral auxiliary switches												
For size S00			Left	Right								
3RH2911-□DA02	--	2	--		**12**	--	--	02	02	--	--	--	--
3RH2911-□DA02 + **3RH2911-□DA02**	--	2			14	--	--	--	--	--	--	--	--	--
	--	2												
3RH2911-□DA11	1	1	--		**21**	--	--	11	11	--	--	--	--	--
3RH2911-□DA11 + **3RH2911-□DA11**	1	1			32	--	--	22	22	--	--	--	--	--
	1	1												
3RH2911-□DA20	2	--	--		30	--	--	20	20	--	--	--	--	--
3RH2911-□DA20 + **3RH2911-□DA20**	2	--			50	--	--	40	40	--	--	--	--	--
	2	--												
3RH2911-□DA20 + **3RH2911-□DA11**	2	--			**41**	--	--	31	31	--	--	--	--	--
	1	1												
3RH2911-□DA20 + **3RH2911-□DA02**	2	--			**32**	--	--	22	22	--	--	--	--	--
	--	2												
3RH2911-□DA11 + **3RH2911-□DA02**	1	1			**23**	--	--	13	--	--	--	--	--	--
	--	2												
For sizes S0 to S3			Left	Right										
3RH2921-□DA02	--	2	--		12	03	**13**	02	02	**13**	--	--	--	--
3RH2921-□DA02 + **3RH2921-□DA02**	--	2			14	--	--	--	--	--	--	--	--	--
	--	2												
3RH2921-□DA11	1	1	--		21	12	**22**	11	11	**22**	**22**	--	--	--
3RH2921-□DA11 + **3RH2921-□DA11**	1	1			32	23	33	22	22	--	--	--	--	--
	1	1												
3RH2921-□DA20	2	--	--		30	21	**31**	20	20	**31**	**31**	--	--	--
3RH2921-□DA20 + **3RH2921-□DA20**	2	--			50	41	51	40	40	--	--	--	--	--
	2	--												

[1] Combinations according to EN 50012, EN 50011 and IEC 60947-5-1 are in **bold** print. All combinations comply with EN 50005.

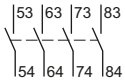
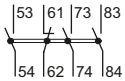
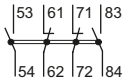
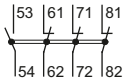
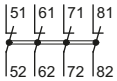
Additional auxiliary switches			3-pole contactors			4-pole contactors				Contactor relays		
Article number	Auxiliary contacts		S00		S0 to S3	S00		S0 to S3		S00		
	Version		3RT201		3RT202, 3RT203, 3RT204, 3RT244	3RT231	3RT251	3RT232, 3RT233, 3RT234	3RT252, 3RT253, 3RT254	3RH21		
	NO	NC	10	01	11	--	--	11	11	40E	31E	22E
												
			2. 3. 4. 5.	5. 6. 7. 8.	3. 4. 5. 6.	1. 2. 3. 4.	1. 2. 3. 4.	3. 4. 5. 6.	3. 4. 5. 6.	5. 6. 7. 8.	5. 6. 7. 8.	5. 6. 7. 8.
			According to EN 50012[1]			According to EN 50012[1]				According to EN 50011[1]		
Lateral auxiliary switches (continued)												
For sizes S00 to S3			Left	Right								
3RH2921-☐DA20 + **3RH2921-☐DA11**	2	--			41	32	42	31	31	--	--	--	--	--
	1	1												
3RH2921-☐DA20 + **3RH2921-☐DA02**	2	--			32	23	33	22	22	--	--	--	--	--
	--	2												
3RH2921-☐DA11 + **3RH2921-☐DA02**	1	1			23	14	24	13	--	--	--	--	--	--
	--	2												
For contactor relays[2]			Left											
3RH2921-☐DA02	--	2			--	--	--	--	--	--	--	--	**42Z**	**33X**	24
3RH2921-☐DA11	1	1			--	--	--	--	--	--	--	--	**51X**	**42X**	**33X**
3RH2921-☐DA20	2	--			--	--	--	--	--	--	--	--	**60Z**	**51X**	**42X**
Solid-state compatible															
For size S00			Left	Right											
3RH2911-2DE11	1	1	--		21	--	--	11	11	--	--	--	--	--	--
3RH2911-2DE11 + **3RH2911-2DE11**	1	1			32	--	--	22	22	--	--	--	--	--	--
	1	1													
For sizes S00 to S3			Left	Right											
3RH2921-☐DE11	1	1	--		21	12	22	11	11	22	22	--	--	--	--
3RH2921-☐DE11 + **3RH2921-☐DE11**	1	1			32	23	33	22	22	--	--	--	--	--	--
	1	1													
For contactor relays[2]			Left												
3RH2921-2DE11	1	1			--	--	--	--	--	--	--	--	**51X**	**42X**	**33X**

[1] Combinations according to EN 50012, EN 50011 and IEC 60947-5-1 are in **bold** print. All combinations comply with EN 50005.

[2] Without force-guided operation.

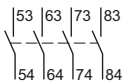
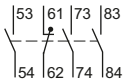
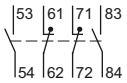
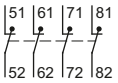
Selection and ordering data

3RH2911-2GA22

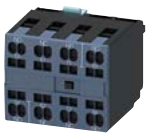
For contactor relays[1] Type	Contactor relay with auxiliary switch Ident. No.	Auxiliary contacts Version NO	NC		Spring-loaded terminals Article No.	Weight kg
Auxiliary switches for snapping onto the front						
Size S00						
Blocks for the assembly of contactor relays with 8 contacts						
3RH2140, 3RH2440, Ident. No. 40E	**80E**	4	--		**3RH2911-2GA40**	0.049
	71E	3	1		**3RH2911-2GA31**	0.049
	62E	2	2		**3RH2911-2GA22**	0.064
	53E	1	3		**3RH2911-2GA13**	0.049
	44E	--	4		**3RH2911-2GA04**	0.064

[1] For detailed information on use, see page 2/56.

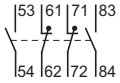
3RH2911-2XA22-0MA0

For contactors/ contactor relays[1]	Auxiliary contacts Version			Spring-loaded terminals Article No.	Weight
Type	NO	NC			kg
Auxiliary switches for snapping onto the front					
Sizes S00 to S3					
3RT2.1, 3RT2.2, 3RT2.3, 3RT2.4, 3RH21, 3RH24	4	--		**3RH2911-2XA40-0MA0**	0.049
	3	1		**3RH2911-2XA31-0MA0**	0.049
	2	2		**3RH2911-2XA22-0MA0**	0.049
	--	4		**3RH2911-2XA04-0MA0**	0.049

[1] For detailed information on use, see page 2/56.



3RH1921-2XA22-0MA0

For contactors	Auxiliary contacts Ident. No.	Version					Spring-loaded terminals Article No.	Weight
Type		NO	NC	NO	NC			kg
Auxiliary switches for snapping onto the front								
Sizes S6 to S12								
	4-pole auxiliary switches							
	• **According to EN 50012**							
3RT1.5 ... 3RT1.7	**22**	2	2	--	--		**3RH1921-2XA22-0MA0**	0.060

* You can order this quantity or a multiple thereof.

3RH2911-2DA02

For contactors[1]	Auxiliary contacts Version				Spring-loaded terminals	Weight
					Article No.	
Type	NO	NC				kg
Laterally mountable auxiliary switches, mounting on the right and/or the left, 2-pole						
Size S00			Left	Right		
3RT2.1	--	2	41 51 / 42 52	21 31 / 22 32	**3RH2911-2DA02**	0.050
	1	1	41 53 / 42 54	21 33 / 22 34	**3RH2911-2DA11**	0.050
	2	--	43 53 / 44 54	23 33 / 24 34	**3RH2911-2DA20**	0.050
3RH21, 3RH24	--	2	51 61 / 52 62	--	**3RH2921-2DA02**	0.051
	1	1	51 63 / 52 64	--	**3RH2921-2DA11**	0.049
	2	--	53 63 / 54 64	--	**3RH2921-2DA20**	0.050
Sizes S0 to S3			Left	Right		
3RT2.2[2], 3RT2.3[3], 3RT2.4[3]	--	2	51 61 / 52 62	31 43 / 32 44	**3RH2921-2DA02**	0.051
	1	1	51 63 / 52 64	31 43 / 32 44	**3RH2921-2DA11**	0.049
	2	--	53 63 / 54 64	33 43 / 34 44	**3RH2921-2DA20**	0.050

[1] For detailed information on use, see pages 2/57 and 2/58.

[2] With 3RT232. and 3RT252. contactors, mountable only on the right.

[3] 3RH2921-1DA.. lateral auxiliary switches can only be mounted on 3RT26 capacitor contactors of sizes S2 and S3.

*** You can order this quantity or a multiple thereof.**

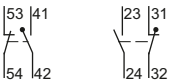
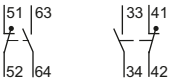
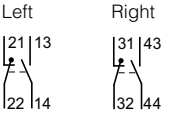
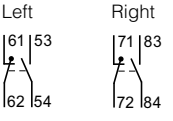
3RH1921-2DA11

For contactors	Auxiliary contacts Version				Spring-loaded terminals	Weight
					Article No.	
Type	NO	NC				kg
Lateral auxiliary switches, mounting on right or left, 2-pole						
Sizes S6 to S12			Left	Right		
	First auxiliary switch					
	• According to EN 50012					
3RT1.5 ... 3RT1.7	1	1			**3RH1921-2DA11**	0.051
	• According to EN 50005					
3RT1.5 ... 3RT1.7	2	--			**3RH1921-2EA20**	0.050
	1	1			**--**	
	--	2			**3RH1921-2EA02**	0.051
	Second auxiliary switch					
	• According to EN 50012					
3RT1.5 ... 3RT1.7	1	1			**3RH1921-2JA11**	0.051
	• According to EN 50005					
3RT1.5 ... 3RT1.7	2	--			**3RH1921-2KA20**	0.050
	1	1			**--**	
	--	2			**3RH1921-2KA02**	0.051

* You can order this quantity or a multiple thereof.

3RH2911-2NF..

3RH1921-2JE11

For contactors/ contactor relays[1]	Size	Contacts Version			Spring-loaded terminals	Weight
					Article No.	
Type		NO	NC			kg
Solid-state compatible auxiliary switches, 2-pole						
• For operation in dusty atmospheres • For solid-state circuits with rated operational currents I_e/AC-14 and DC-13 from 1 to 300 mA at 3 to 60 V • Hard gold-plated contacts • Laterally mountable auxiliary switches and auxiliary switches for snapping onto the front for 3RT2 contactors, sizes S0 to S3, are designed as mirror contacts according to IEC 60947-4-1, Annex F.						
Auxiliary switches for snapping onto the front						
				S00 / S0 ... S3		
3RT2.1, 3RT2.2, 3RT2.3, 3RT2.4, 3RH21, 3RH24	**S00 ... S3**	--	2		**3RH2911-2NF02**	0.046
		1	1		**3RH2911-2NF11**	0.047
		2	--		**3RH2911-2NF20**	0.047
Lateral auxiliary switches, mounting on the right and/or the left, acc. to EN 50012						
		Auxiliary switches				
				Left / Right		
3RT2.1	**S00**	1	1		**3RH2911-2DE11**	0.047
3RH21, 3RH24	**S00**	1	1	 --	**3RH2921-2DE11**	0.049
3RT2.2, 3RT2.3, 3RT2.4	**S0 ... S3**	1	1		**3RH2921-2DE11**	0.049
		First auxiliary switch				
				Left / Right		
3RT1.5 ... 3RT1.7	**S6 ... S12**	1	1		**3RH1921-2DE11**	0.050
		Second auxiliary switch				
				Left / Right		
3RT1.5 ... 3RT1.7	**S6 ... S12**	1	1		**3RH1921-2JE11**	0.050

[1] For detailed information on use, see pages 2/56 and 2/58.

*** You can order this quantity or a multiple thereof.**

2

Selection and ordering data

For contactors Type	Size	Version	Article No.	Weight kg
Safety main circuit connectors for two contactors				
3RT2.1	**S00**	For series connection of two contactors	**3RA2916-1A**	0.051
3RT2.2	**S0**		**3RA2926-1A**	0.099
3RT2.3	**S2**		**3RA2936-1A**	0.207


3RA2926-1A

For contactors Type	Size	Version	Article No. Screw terminals	Article No. Spring-loaded terminals	Weight kg
Assembly kits for reversing contactor assemblies for making 3-pole contactor assemblies					
3RT201	**S00-S00**	The assembly kit contains: Mechanical interlock, two connecting clips for two contactors, wiring modules on the top and bottom			
		• For main, auxiliary and control circuits	**3RA2913-2AA1**	**3RA2913-2AA2**	0.075
3RT202	**S0-S0**	The assembly kit contains: Mechanical interlock,two connecting clips for two contactors, wiring modules on the top and bottom			
		• For main, auxiliary and control circuits[1]	**3RA2923-2AA1**	--	0.090
		• Only for main circuit[2]	--	**3RA2923-2AA2**	0.112
3RT203	**S2-S2**	The assembly kit contains: Two connectors for two contactors, wiring modules on the top and bottom (The 3RA2934-2B mechanical interlock must be ordered separately, see page 2/68)			
		• For main and auxiliary circuits	**3RA2933-2AA1**	--	0.159
		• Only for main circuit[3]	--	**3RA2933-2AA2**	0.160
3RT204	**S3-S3**	The assembly kit contains: Two connectors for two contactors, wiring modules on the top and bottom (3RA2934-2B mechanical interlock must be ordered separately, see page 2/68)			
		• For main and auxiliary circuits	**3RA2943-2AA1**	--	0.335
		• Only for main circuit[3]	--	**3RA2943-2AA2**	0.337
3RT1.5	**S6-S6**	The assembly kit contains: Wiring modules on the top and bottom	**3RA1953-2A**	**3RA1953-2A**	1.232
3RT1.6	**S10-S10**		**3RA1963-2A**	**3RA1963-2A**	2.400
3RT1.7	**S12-S12**		**3RA1973-2A**	**3RA1973-2A**	3.075


3RA2923-2AA1


3RA2923-2AA2


3RA2933-2AA1


3RA2943-2AA1


3RA2943-2AA2


3RA1953-2A

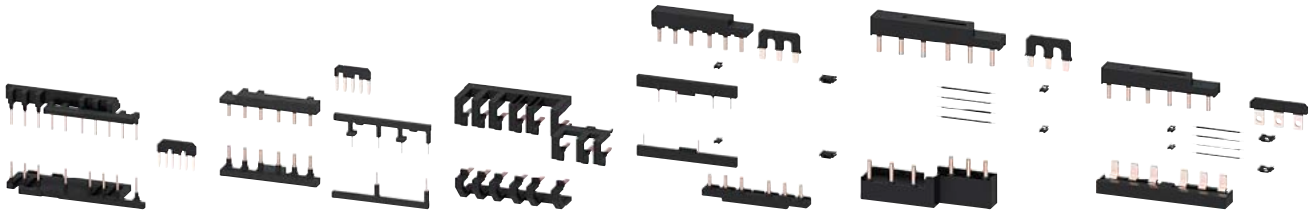

3RA1963-2A

[1] Use of the 3RA2923-2AA1 assembly kit in conjunction with the 3RT202.-.....-3MA0 contactors is limited because the auxiliary switches in the basic unit are not allowed to be used on account of the permanently mounted auxiliary switch.

[2] Version in size S0 with spring-loaded terminals:
Only the wiring modules for the main circuit are included.
No connecting clips are included for the auxiliary and control circuit.

[3] Version in sizes S2 and S3 with spring-loaded terminals in the auxiliary and control circuits: Only the wiring modules for the main circuit are included.
A cable set is included for the auxiliary circuit.

*** You can order this quantity or a multiple thereof.**



3RA2913-2BB1 | 3RA2923-2BB1 | 3RA2923-2BB2 | 3RA2933-2BB1 | 3RA2943-2C | 3RA2943-2BB2

For contactors Type	Size	Version	Screw terminals Article No.	Spring-loaded terminals Article No.	Weight kg
Assembly kits[1] for contactor assemblies for star-delta (wye-delta) starting for making 3-pole contactor assemblies					
3RT201	**S00-S00-S00**	The assembly kit contains: Mechanical interlock, four connecting clips for three contactors, a star jumper, wiring modules on the top and bottom			
		• For main, auxiliary and control circuits	**3RA2913-2BB1**	**3RA2913-2BB2**	0.084
3RT202	**S0-S0-S0**	The assembly kit contains: Mechanical interlock, four connecting clips for three contactors, a star jumper, wiring modules on the top and bottom			
		• For main, auxiliary and control circuits	**3RA2923-2BB1**	**--**	0.099
		• Only for main circuit	**--**	**3RA2923-2BB2**	0.133
3RT202	**S0-S0-S0**	The assembly kit contains: Mechanical interlock, four connecting clips for three contactors, a star jumper, wiring modules on the top and bottom, 3-phase infeed terminal			
		• For main, auxiliary and control circuits	**3RA2924-2BB1**	**--**	0.159
3RT203	**S2-S2-S0**	The assembly kit[2] contains: Two connectors for three contactors, an S0 star jumper, a spacer, wiring modules on the top and bottom (S2-S0) for the main circuit, a cable set for the auxiliary circuit, a cable for connecting the A2 coil contact of the line contactor to the A2 coil contact of the delta contactor	**3RA2933-2C**	**3RA2933-2C**	0.180
3RT203	**S2-S2-S2**	The assembly kit[2] contains: Four connectors for three contactors, an S2 star jumper, a cable for connecting the A2 coil contact of the line contactor to the A2 coil contact of the delta contactor and			
		• Wiring modules on the top and bottom for the main circuit and the auxiliary circuit	**3RA2933-2BB1**	**--**	0.194
		• Wiring modules on the top and bottom for the main circuit, a cable set for the auxiliary circuit	**--**	**3RA2933-2BB2**	0.180
3RT204	**S3-S3-S2**	The assembly kit[2] contains: Two connectors for three contactors, an S2 star jumper, a spacer, wiring modules on the top and bottom (S3-S2) for the main circuit, a cable set for the auxiliary circuit, a cable for connecting the A2 coil contact of the line contactor to the A2 coil contact of the delta contactor	**3RA2943-2C**	**3RA2943-2C**	0.260
3RT204	**S3-S3-S3**	The assembly kit[2] contains: Four connectors for three contactors, an S3 star jumper, a cable for connecting the A2 coil contact of the line contactor to the A2 coil contact of the delta contactor and			
		• Wiring modules on the top and bottom for the main circuit and the auxiliary circuit	**3RA2943-2BB1**	**--**	0.315
		• Wiring modules on the top and bottom for the main circuit, a cable set for the auxiliary circuit	**--**	**3RA2943-2BB2**	0.320

[1] When using the function modules for contactor assemblies for star-delta (wye-delta) starting, the wiring modules for the auxiliary current are not required.

[2] The 3RA2934-2B mechanical interlock for sizes S2 and S3 must be ordered separately, see page 2/68.

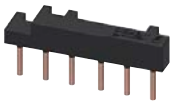
*** You can order this quantity or a multiple thereof.**

	For contactors Type	Size	Version	Article No.	Weight kg
Assembly kits for contactor assemblies for star-delta (wye-delta) starting for making 3-pole contactor assemblies					
			The assembly kit contains: link rails at bottom (a double infeed between the line contactor and the delta contactor is recommended.)		
 3RA1953-3G	3RT1.5, 3RT204	**S6-S6-S3** For connection with box terminal only	The S3 star jumper must be ordered separately, see page 2/67.	**3RA1953-3G**	0.297
  3RA1953-2B	3RT1.5	**S6-S6-S6** For connection with box terminal only	--	**3RA1953-2B**	0.867
  3RA1953-2N	3RT1.5	**S6-S6-S6** For connection without box terminal	--	**3RA1953-2N**	0.711
 3RA1963-3E	3RT1.6, 3RT1.5	**S10-S10-S6** For connection with box terminal only	The S6 star jumper must be ordered separately, see page 2/67.	**3RA1963-3E**	0.435
  3RA1963-2B	3RT1.6	**S10-S10-S10** For connection without box terminal	--	**3RA1963-2B**	1.813
 3RA1973-3E	3RT1.7, 3RT1.6	**S12-S12-S10** For connection with box terminal only	The S10 star jumper must be ordered separately, see page 2/67.	**3RA1973-3E**	1.404
  3RA1973-2B	3RT1.7	**S12-S12-S12** For connection without box terminal	--	**3RA1973-2B**	2.098

* You can order this quantity or a multiple thereof.

For contactors Type	Size	Version		Article No.	Article No.	Weight kg
Single wiring modules for making 3-pole contactor assemblies				**Screw terminals**	**Spring-loaded terminals**	
3RT201	**S00-S00**	• Top (in-phase)	PS = 5 units	**3RA2913-3DA1**	**3RA2913-3DA2**	0.026
		• Bottom (with phase reversal)	PS = 5 units	**3RA2913-3EA1**	**3RA2913-3EA2**	0.027
3RT202	**S0-S0**	• Top (in-phase)	PS = 5 units	**3RA2923-3DA1**	**3RA2923-3DA2**	0.054
		• Bottom (with phase reversal)	PS = 5 units	**3RA2923-3EA1**	**3RA2923-3EA2**	0.044
3RT203	**S2-S2**	• Top (in-phase), contactor clearance 10 mm		**3RA1933-3D**	**3RA1933-3D**	0.079
		• Bottom (with phase reversal), contactor clearance 10 mm		**3RA1933-3E**	**3RA1933-3E**	0.068
3RT204	**S3-S3**	• Top (in-phase), contactor clearance 10 mm		**3RA1943-3D**	**3RA1943-3D**	0.178
		• Bottom (with phase reversal), contactor clearance 10 mm		**3RA1943-3E**	**3RA1943-3E**	0.155
3RT1.5	**S6-S6**	• Top (in-phase, for connection with box terminal), contactor clearance 10 mm		**3RA1953-3D**	**3RA1953-3D**	0.616
		• Top (with phase reversal, for connection without box terminal), contactor clearance 10 mm		**3RA1953-3P**	**3RA1953-3P**	0.556
Star jumpers (links for paralleling), 3-pole				**Screw terminals**	**Spring-loaded terminals**	
3RT201	**S00**	**With through-hole** The links for paralleling can be reduced by one pole.		**3RT1916-4BA31**	**3RT2916-4BA32**	0.018
3RT202	**S0**	Without connecting terminal		**3RT1926-4BA31**	**3RT2926-4BA32**	0.032
3RT203	**S2**			**3RT1936-4BA31**	**3RT1936-4BA31**	0.015
3RT204	**S3**			**3RT1946-4BA31**	**3RT1946-4BA31**	0.028
3RT1.5	**S6**			**3RT1956-4BA31**	**3RT1956-4BA31**	0.150
3RT1.6, 3RT1.7	**S10, S12**			**3RT1966-4BA31**	**3RT1966-4BA31**	0.540


3RA2913-3DA1


3RA2923-3DA1


3RA1933-3D


3RA1943-3E


3RA1953-3D


3RT1916-4BA31


3RT2926-4BA32


3RT1936-4BA31


3RT1946-4BA31


3RT1956-4BA31


3RT1966-4BA31

* You can order this quantity or a multiple thereof.

	For contactors Type	Size	Version	Article No.	Weight kg
Mechanical interlock assembly kits for two contactors for making 3- or 4-pole contactor assemblies					
 3RA29.2-2H	3RT201, 3RT231	**S00-S00**	The interlocking assembly kits can be used without a contactor clearance. One assembly kit consists of a mechanical interlock and two connecting clips.	**3RA2912-2H**	0.001
	3RT202, 3RT232	**S0-S0**		**3RA2922-2H**	0.001

	For contac-tors Type	Size	Version	Article No.	Weight kg
Mechanical interlocks for contactor assemblies					
			A contactor clearance of 10 mm must be considered when using the following mechanical interlocks.		
 3RA2934-2B	3RT202, 3RT203, 3RT204	**S2-S2-S0, S2-S2-S2, S3-S3-S2, S3-S3-S3**	**Mechanical interlocks** Note: The mechanical interlock for sizes S2 and S3 must be ordered separately.	**3RA2934-2B**	0.038
 3RA1954-2G	3RT1.5 with 3RT204[1]	**S6 (3RT1)-S6 (3RT1)-S3 (3RT2)[1]**	**Adapter in addition to the mechanical interlock** The mechanical interlock is only possible together with this 3RA1954-2G adapter and the 3RA1954-2A mechanical interlock. Two connectors are included with the adapter, the interlock must be ordered separately.	**3RA1954-2G**	0.050
 3RA1954-2A	3RT1.5 3RT1.6 3RT1.7	**S6 S10 S12**	**Mechanical interlocks** Without auxiliary contacts; contactors in sizes S6, S10 and S12 can be interlocked with each other as required. No adaption of mounting depth is necessary.	**3RA1954-2A**	0.044
Mechanical connectors for contactor assemblies					
			Two connectors are required for each assembly. The contactor clearance must be considered when selecting the connectors.		
 3RA1932-2D			**3-pole version**		
	3RT203, 3RT204	**S2-S2, S3-S3**	• Without contactor clearance	**3RA2932-2C**	0.001
			• With 10 mm contactor clearance	**3RA2932-2D**	0.002
	3RT105	**S6-S6**	• With 10 mm contactor clearance (1 unit corresponds to 2 parts for 1 assembly)	**3RA1932-2D**	0.003
			4-pole version		
	3RT233	**S2-S2**	• With 20 mm contactor clearance	**3RA2932-2G**	0.003
	3RT234.	**S3-S3**	• With 10 mm contactor clearance	**3RA2942-2G**	0.004
 3RA2942-2G					

[1] The 3RA1954-2G adapter cannot be used in conjunction with 3RT204..-.KB coupling contactors, size S3.

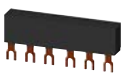
* You can order this quantity or a multiple thereof.

Selection and ordering data

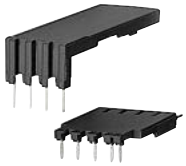
	For contactors Type	Size	Version	Screw terminals Article No.	Weight kg
Links for paralleling for main conducting paths					
			The links for paralleling (insulated) can be reduced by one pole. With connecting terminal		
			3-pole		
 3RT1916-4BB31	3RT201	**S00**	• Max. conductor cross-section: 25 mm^2, stranded	**3RT1916-4BB31**	0.017
 3RT2926-4BB31	3RT202	**S0**	• Max. conductor cross-section: 50 mm^2, stranded	**3RT2926-4BB31**	0.043
 3RT1936-4BB31	3RT203	**S2**	• Max. conductor cross-section: 120 mm^2, stranded	**3RT1936-4BB31**	0.140
 3RT1946-4BB31	3RT204, 3RT244	**S3**	• Max. conductor cross-section: 185 mm^2, stranded A cover plate is included for touch protection (can only be used when box terminal is removed).	**3RT1946-4BB31**	0.178
			4-pole		
 3RT1916-4BB41	3RT231, 3RT251	**S00**	• Max. conductor cross-section: 25 mm^2, stranded	**3RT1916-4BB41**	0.018

*** You can order this quantity or a multiple thereof.**

Accessories for SIRIUS 3RT contactors and SIRIUS 3RH2 contactor relays > Connection modules/adapters

	For contactors Type	Size	Version	Article No.	Weight kg
1-phase infeed terminals					
 3RA2943-3L	3RT204, 3RT244, 3RT264	**S3**	Conductor cross-section: 95 mm^2	**3RA2943-3L**	0.105
3-phase infeed terminals					
 3RA2913-3K	3RT201	**S00**	Max. conductor cross-section: up to 10 mm^2, AWG 12 ... 8	**3RA2913-3K**	0.023
 3RV2925-5AB	3RT202, 3RT262	**S0**	Max. conductor cross-section: up to 25 mm^2, AWG 10 ... 2/0	**3RV2925-5AB**	0.044
 3RV2935-5A	3RT203, 3RT263	**S2**	Max. conductor cross-section: up to 70 mm^2, AWG 10 ... 2/0	**3RV2935-5A**	0.181
3-phase infeed terminals with increased clearances and creepage distances					
 3RV2935-5E	3RT203	**S2**	Max. conductor cross-section: up to 70 mm^2, AWG 10 ... 2/0	**3RV2935-5E**	0.193
3-phase busbars					
 3RV1915-1AB	3RT202	**S0**	Bridging phase-by-phase of all input terminals of the line contactor (Q11) and delta contactor (Q13)	**3RV1915-1AB**	0.043
Terminal blocks for connecting auxiliary conductors to main terminals					
			Box terminal blocks For round and ribbon cables (Connectable cross-sections of the contactors for size S3, and for sizes 6 to S12		
 3RT2946-4G	3RT204	**S3**	• 3-pole, for connection of main contacts, 2.5 to 70 mm^2	**3RT2946-4G**	0.124
 3RT1956-4G	3RT1.5	**S6**	• Up to 70 mm^2, as standard on 3RT1054-1 contactor (55 kW)	**3RT1955-4G**	0.240
			• Up to 120 mm^2	**3RT1956-4G**	0.265
 3RT1966-4G	3RT1.6, 3RT1.7	**S10, S12**	• Up to 240 mm^2, with auxiliary conductor connection up to 2.5 mm^2	**3RT1966-4G**	0.694
 3TX7500-0A	3RT1.5	**S6**	**Box terminal for auxiliary conductor connection, 1-pole** For connection of auxiliary and control cables (0.5 ... 2.5 mm^2) to the main conductor terminals	**3TX7500-0A**	0.009
 3RT2946-4F	3RT204	**S3**	**Auxiliary terminals, 3-pole** For connection of auxiliary and control cables (0.5 ... 2.5 mm^2) to the main conductor terminals	**3RT2946-4F**	0.032

* You can order this quantity or a multiple thereof.

	For contactors Type	Size	Version	Article No.	Weight kg
Solder pin adapters for mounting contactors on printed circuit boards up to 5.5 kW / 12 A					
				Screw terminals	
	3RT2.1, 3RH21	**S00**	Assembly kit for soldering contactors with an integrated auxiliary contact onto a printed circuit board Note: For 1 contactor, 1 set is required.	**3RT1916-4KA1**	0.030
 3RT1916-4KA1					
	3RT2.1, 3RH21	**S00**	Assembly kit for soldering contactors with 4-pole mounted auxiliary switch onto a printed circuit board Note: For 1 contactor, 1 set is required.	**3RT1916-4KA2**	0.068
					
 3RT1916-4KA2					
Coil connection modules for connections from top or from below					
	3RT2.2, 3RT2.3, 3RT2.4	**S0 to S3**	• Connection from top	**3RT2926-4RA11**	0.027
			• Connection from below	**3RT2926-4RB11**	0.027
			• Connection diagonally	**3RT2926-4RC11**	0.030
3RT2926-4RA11				**Spring-loaded terminals**	
	3RT2.2	**S0**	• Connection from top	**3RT2926-4RA12**	0.026
			• Connection from below	**3RT2926-4RB12**	0.025
3RT2926-4RA12					

	For contactors Type	Size	Version	**Screw terminals** Article No.	Weight kg
Connection module (adapter and plug) for contactors with screw terminals					
			The connection module comprises an adapter and a motor feeder connector.		
			Adapters		
			Ambient temperature $t_{u\ max.}$ = 60 °C		
3RT1926-4RD01	3RT201, 3RH2	**S00**	• Rated operational current I_e at AC-3/400 V: 20 A	**3RT1916-4RD01**	0.032
	3RT202	**S0**	• Rated operational current I_e at AC-3/400 V: 25 A	**3RT1926-4RD01**	0.035
	3RT201, 3RT202, 3RH2	**S00, S0**	**Motor feeder connector**	**3RT1900-4RE01**	0.042
3RT1900-4RE01					

*** You can order this quantity or a multiple thereof.**

2

Selection and ordering data

	For contactors Type	Size	Version	Article No.	Weight kg
Terminal covers					
			Covers for contactors with screw terminals (box terminals) (2 units required per contactor)		
 3RT2936-4EA2  3RT2946-4EA2	3RT203	**S2**	• For 3-pole contactors	**3RT2936-4EA2**	0.014
	3RT204, 3RT244	**S3**		**3RT2946-4EA2**	0.019
 3RT1956-4EA2  3RT1966-4EA2	3RT1.5	**S6**[1]		**3RT1956-4EA2**	0.022
	3RT1.6, 3RT1.7	**S10**[1], **S12**[1]		**3RT1966-4EA2**	0.038
 3RT2936-4EA4  3RT2946-4EA4	3RT233, 3RT253	**S2**	• For 4-pole contactors (Scope of supply: one 3-pole and two 1-pole terminal covers are supplied)	**3RT2936-4EA4**	0.027
	3RT234, 3RT254	**S3**		**3RT2946-4EA4**	0.035
			Covers for contactors with cable lugs and busbar connections		
 3RT1946-4EA1			• For complying with the phase clearances and as touch protection if box terminal is removed (2 units required per contactor)		
	3RT2.4	**S3**	- Length: 100 mm	**3RT1946-4EA1**	0.037
 3RT1956-4EA1  3RT1966-4EA1	3RT1.5	**S6**[1]	- Length: 100 mm	**3RT1956-4EA1**	0.069
	3RT1.6, 3RT1.7	**S10**[1], **S12**[1]	- Length: 120 mm	**3RT1966-4EA1**	0.121
			• For the assembly kits for 3RA1953-.. contactor assemblies for star-delta (wye-delta) starting (see page 2/66) or for the 3RA1953-3. single wiring modules (see page 2/67)		
 3RT1956-4EA4	3RT1.5	**S6**	- Length: 38 mm	**3RT1956-4EA4**	0.028
			• For the assembly kits for reversing contactor assemblies and contactor assemblies for star-delta (wye-delta) starting		
 3RT1966-4EA3	3RT1.6, 3RT1.7	**S10, S12**	- Length: 42 mm	**3RT1966-4EA3**	0.080
			Terminal covers for busbar connections		
 3RT1956-4EA3  3RT1966-4EA3			• Cover the three busbar connections, between the contactor and 3RB2 overload relay		
	3RT1.5	**S6**	- Length: 27 mm	**3RT1956-4EA3**	0.022
	3RT1.6, 3RT1.7	**S10, S12**	- Length: 42 mm	**3RT1966-4EA3**	0.080
			• Can be screwed on free screw end; covers one busbar connection (1 set = 6 units)		
 3TX6526-3B  3TX6546-3B	3RT1.5	**S6**	- M8	**3TX6526-3B**	0.174
	3RT1.6, 3RT1.7	**S10, S12**	- M10	**3TX6546-3B**	0.278
Sealable covers					
 3RT2916-4MA10  3RT1926-4MA10	3RT2.1, 3RT2.2, 3RT2.3, 3RT2.4, 3RH2[2]	**S00 ... S3**	For preventing manual operation (Not suitable for coupling contactors)	**3RT2916-4MA10**	0.002
	3RT1.5 ... 3RT1.7[2]	**S6 ... S12**		**3RT1926-4MA10**	0.004

[1] Also fits on contactors of sizes S6 to S12 with box terminals.

[2] Exception: Contactors and contactor relays with auxiliary switch mounted on the front.

* You can order this quantity or a multiple thereof.

Selection and ordering data

For contactors Type	Size	Version	Article No.	Weight kg
Base plates				
For reversing contactor assemblies				
3RT1.5	**S6**	For customer assembly of reversing contactor assemblies	**3RA1952-2A**	1.255
3RT1.6	**S10**		**3RA1962-2A**	2.213
3RT1.7	**S12**		**3RA1972-2A**	2.322
For contactor assemblies for star-delta (wye-delta) starting				
3RT2/ 3RT2/ 3RT2	**S2-S2-S0, S2-S2-S2**	For configuring contactor assemblies for star-delta (wye-delta) starting	**3RA2932-2F**	0.217
	S3-S3-S2, S3-S3-S3		**3RA2942-2F**	0.261
3RT1/ 3RT1/ 3RT2	**S6-S6-S3**	For customer assembly of contactor assemblies for star-delta (wye-delta) starting with a **laterally mounted** timing relay	**3RA1952-2E**	1.830
3RT1/ 3RT1/ 3RT1	**S6-S6-S6**	10 mm distance between the contactors	**3RA1952-2F**	1.945
	S10-S10-S6		**3RA1962-2E**	3.136
	S10-S10-S10		**3RA1962-2F**	3.392
	S12-S12-S10		**3RA1972-2E**	3.644
	S12-S12-S12		**3RA1972-2F**	3.681
Adapters for screw fixing				
3RT2.2	**S0**	Screw adapters for securing the contactors, two units required per contactor (1 pack = 10 sets for 10 contactors)	**3RT1926-4P**	0.002
Connection kit for one complete contactor				
		Each set includes 6 screws, spring washers and nuts.		
3RT105	**S6**	M 8 x 25	**3RT1955-4PA00**	0.130
3RT106, 3RT107	**S10, S12**	M 10 x 30	**3RT1966-4PA00**	0.260
EMC suppression modules; 3-phase, up to 7.5 kW				
For contactors with AC or DC operation				
			Screw terminals ⊕	
3RT201	**S00**	**RC elements** (3 x 220 Ω/0.22 µF)		
		• Up to 400 V	**3RT2916-1PA1**	0.072
		• Up to 575 V	**3RT2916-1PA2**	0.072
		• Up to 690 V	**3RT2916-1PA3**	0.074
3RT201	**S00**	**Varistors**		
		• Up to 400 V	**3RT2916-1PB1**	0.079
		• Up to 575 V	**3RT2916-1PB2**	0.079
		• Up to 690 V	**3RT2916-1PB3**	0.079


3RA1952-2A


3RA2932-2F


3RA2942-2F


3RA1952-2E


3RA1952-2F


3RT1926-4P


3RT1955-4PA00


3RT2916-1PA.

1)

Selection and ordering data

For contactors		Rated control supply voltage U_s	Screw terminals	Spring-loaded terminals	Weight
			Article No.	Article No.	
Size	Type	V			kg
Withdrawable coils					
		200 ... 277 AC/DC	**3RT1975-5PP31**	**--**	0.156
Solid-state operating mechanism for DC with 24 ... 110 V DC control signal input e.g. for control by PLC with extended application range					
(see also contactors for railway applications on page 2/107)					
S6	3RT105..-.X...-0LA2	24 DC	--	**3RT1955-5XB42**	0.610
		72 DC	--	**3RT1955-5XJ42**	0.609
		110 DC	--	**3RT1955-5XF42**	0.538
S10	3RT106..-.X...-0LA2	24 DC	--	**3RT1965-5XB42**	0.805
		72 DC	--	**3RT1965-5XJ42**	0.959
		110 DC	--	**3RT1965-5XF42**	0.925
S12	3RT107..-.X...-0LA2	24 DC	--	**3RT1975-5XB42**	1.335
		72 DC	--	**3RT1975-5XJ42**	1.425
		110 DC	--	**3RT1975-5XF42**	1.314

3RT1955-5X.42

Note:

In the case of 3RT10..-.S contactors with fail-safe control inputs, removing and replacing the operating mechanism are not permitted.

* You can order this quantity or a multiple thereof.

Selection and ordering data

For contactors		Version	Article No.	Weight
Size	Type			kg
Contacts with fixing parts				
For contactors with 3 main contacts				
 3RT294.-6A				
S2	3RT2035 3RT2036 3RT2037 3RT2038	Main contacts (3 NO contacts) for utilization category AC-3 (1 set = 3 movable and 6 fixed switching elements with fixing parts)	**3RT2935-6A** **3RT2936-6A** **3RT2937-6A** **3RT2938-6A**	0.088 0.089 0.096 0.096
S3	3RT2045 3RT2046 3RT2047		**3RT2945-6A** **3RT2946-6A** **3RT2947-6A**	0.240 0.238 0.239
S6	3RT1054 3RT1055 3RT1056		**3RT1954-6A** **3RT1955-6A** **3RT1956-6A**	0.248 0.288 0.300
S10	3RT1064 3RT1065 3RT1066		**3RT1964-6A** **3RT1965-6A** **3RT1966-6A**	0.470 0.540 0.559
S12	3RT1075 3RT1076		**3RT1975-6A** **3RT1976-6A**	0.755 0.920
 3RT1954-6A				
S3	3RT2446 3RT2448	Main contacts (3 NO contacts) for utilization category AC-1 (1 set = 3 movable and 6 fixed switching elements with fixing parts)	**3RT2946-6D** **3RT2948-6D**	0.237 0.238
S6	3RT1456		**3RT1956-6D**	0.290
S10	3RT1466 3RT1467		**3RT1966-6D** **3RT1967-6D**	0.550 0.555
S12	3RT1476		**3RT1976-6D**	0.915
 3RT197.-6A, 3RT1976-6D				
For contactors with 4 main contacts				
S2	3RT2336 3RT2337	Main contacts (4 NO contacts) for utilization category AC-1 (1 set = 3 movable and 6 fixed switching elements and replacement pole with fixing parts)	**3RT2936-6E** **3RT2937-6E**	0.310 0.272
 3RT2936-6E				
Arc chutes				
For contactors with 3 main contacts				
 3RT195.-7.				
S6	3RT1054 3RT1055 3RT1056 3RT1456	Only for contactors with AC/DC coil	**3RT1954-7A** **3RT1955-7A** **3RT1956-7A** **3RT1956-7B**	0.760 0.765 0.800 0.780
 3RT196.-7.				
S10	3RT1064 3RT1065 3RT1066 3RT1466		**3RT1964-7A** **3RT1965-7A** **3RT1966-7A** **3RT1966-7B**	1.290 1.320 1.280 1.358
 3RT197.-7.				
S12	3RT1075 3RT1076 3RT1476		**3RT1975-7A** **3RT1976-7A** **3RT1976-7B**	1.646 1.642 1.654

*** You can order this quantity or a multiple thereof.**

Introduction

Overview

More information	
Homepage, see www.siemens.com/sirius	Conversion tool, see www.siemens.com/conversion-tool
Industry Mall, see www.siemens.com/product?3RT_3TK_3TC	TIA Selection Tool Cloud (TST Cloud), see www.siemens.com/tstcloud/?node=Contactor




Size	S3	S6	S10	S12
Type	3RT244.	3RT1456	3RT146.	3RT1476
3-pole 3RT244 and 3RT145 to 3RT147 contactors				
Type	**3RT2446** **3RT2448**	**3RT1456**	**3RT1466** **3RT1467**	**3RT1476**
Number of main contacts	3 NO	3 NO	3 NO	3 NO
AC, AC/DC operation	(p. 2/86)	(p. 2/87)	(p. 2/87)	(p. 2/87)
AC-1				
U_i V	1 000			
U_e V	690			
I_e up to 690 V **40 °C A**	**140** **160**	**275**	**400** **500**	**690**
60 °C A	130 140	250	380 450	Standard operating mechanism: 650, solid-state operating mechanism: 600
Accessories for contactors				
Auxiliary switches	**3RH29** (p. 2/59)	**3RH19** (p. 2/60, 2/62, 2/63)		
Function modules (direct-on-line starting, star-delta (wye-delta) starting)	**3RA281.**[1)]	**--**		
Terminal covers	**3RT2946-4EA4** (p. 2/72)	**3RT1956-4EA.**[1)]		
Box terminal blocks	**--**	**3RT1955/56-4G**[1)]		
Surge suppressors	**3RT2936, 3RT2946**[1)]	**3RT1956-1C**[1)] (RC element)		

[1)] see Catalog IC 10.




Size		**S00**		**S0**			**S2**		**S3**		
Type		3RT231.		3RT232.			3RT233.		3RT234.		
4-pole 3RT23 contactors											
Type		**3RT2316** [1]	**3RT2317** [1]	**3RT2325** [1]	**3RT2326** [1]	**3RT2327** [1]	**3RT2336**	**3RT2337**	**3RT2344**	**3RT2346**	**3RT2348**
Number of main contacts AC, DC and AC/DC operation		4 NO		4 NO			4 NO		4 NO		
AC-1											
U_i	V	690									
U_e	V	690									
I_e **up to 690 V**	**40 °C** **A**	**18**	**22**	**35**	**40**	**50**	**60**	**110**	**110**	**140**	**160**
	60 °C A	16	20	30	35	42	55	95	100	130	140
AC-2 and AC-3											
I_e **up to 400 V**	A	9	12	15.5	15.5	15.5	--	--	--	--	--
***P* at 400 V**	**kW**	**4**	**5.5**	**7.5**	**7.5**	**7.5**	**--**	**--**	**--**	**--**	**--**
Accessories for contactors											
Auxiliary switches		**3RH29**									(p. 2/59)
Function modules (direct-on-line starting, star-delta (wye-delta) starting)		**3RA281.** [1)1)]									
Terminal covers		**--**					**3RT2936-4EA4** (p. 2/72)		**3RT2946-4EA4**		(p. 2/72)
Surge suppressors		**3RT2916** [1)]					**3RT2936** [1)]		**3RT2936, 3RT2946** [1)]		

[1] see Catalog IC 10.

Introduction




Size			**S00**			**S0**	**S2**		**S3**	
Type			3RT251.			3RT252.	3RT253.		3RT254.	
4-pole 3RT25 contactors										
Type			**3RT2516** [1)]	**3RT2517** [1)]	**3RT2518** [1)]	**3RT2526** [1)]	**3RT2535**	**3RT2536**	**3RT2544**	**3RT2545**
Number of main contacts AC, DC and AC/DC operation			2 NO + 2 NC			2 NO + 2 NC	2 NO + 2 NC (p. 2/100)		2 NO + 2 NC (p. 2/100)	
AC-1										
U_i		V	690							
U_e		V	690							
I_e **up to 690 V**	**40 °C**	**A**	**18**	**22**	**22**	**40**	**60**	**70**	**100**	**125**
	60 °C	A	16	20	20	35	55	60	90	105
AC-2 and AC-3										
I_e **up to 400 V**	NO	A	9	12	16	25	35	41	65	80
	NC	A	9	9	9	25 (20)[2)]	35	41	65	80
P										
at 400 V	**NO**	**kW**	**4**	**5.5**	**7.5**	**11**	**18.5**	**22**	**30**	**37**
	NC	**kW**	**4**	**4**	**4**	**11 (7.5)[2)]**	**18.5**	**22**	**30**	**37**
At 230 V	NO	kW	2.2	3 / 2.2	4 / 2.2	5.5	11	11	18.5	22
	NC	kW	2.2	3 / 2.2	4 / 2.2	5.5	11	11	18.5	22

Accessories for contactors					
Auxiliary switches	**3RH29**				(p. 2/59)
Function modules (direct-on-line starting, star-delta (wye-delta) starting)	**3RA281.** [1)]				
Terminal covers	**--**		**3RT2936-4EA4** (p. 2/72)		**3RT2946-4EA4** (p. 2/72)
Surge suppressors	**3RT2916** [1)]	**3RT2926** [1)]	**3RT2936** [1)]		**3RT2936, 3RT2946** [1)]

1) see Catalog IC 10.
2) The value in brackets applies to the NC for DC operation.

Connection methods

The following connection options are available for 3RT contactors depending on the size and version:

- 3RT2 contactors
  - Sizes S00 and S0: screw terminals or spring-loaded terminals both for the main as well as for the auxiliary and control circuits
  - Sizes S2 and S3: screw terminals (complete devices) or spring-loaded terminals (auxiliary circuit only)
- 3RT13 contactors, sizes S6 to S12: Busbar connections (partly with bus connectors offset), auxiliary and control circuits with screw terminals
- 3RT14 contactors: Busbar connections

Screw terminals

Spring-loaded terminals

Busbar connections

The terminals are indicated in the corresponding tables by the symbols shown on orange backgrounds.

Further contactors

- For SIRIUS 3RT26 contactors for capacitive loads (AC-6b), 3-pole
- For 3TC contactors for switching DC voltage, 1- and 2-pole, see page 2/113
- Contactors for railway applications
  - For SIRIUS 3RT contactors with extended operating range, 3-pole, see page 2/101
  - For SIRIUS 3RH2 contactor relays with extended operating range, see page 2/109
  - For 3TH4 contactor relays, 8-pole, see page 2/135

Overview

3-pole AC-1 contactors
top row: 3RT148 contactors
bottom row: 3RT244, 3RT145 to 3RT147 contactors

3RT.4 power contactors

Standards

IEC 60947-1, IEC 60947-4-1, IEC 60947-5-1 (auxiliary switches)

Ambient conditions

If the devices are used in ambient conditions which deviate from common industrial conditions (IEC 60721-3-3 "Stationary Use, Weather-Protected"), information must be obtained about possible restrictions with regard to the reliability and endurance of the device and possible protective measures. In this case, contact our Technical Support:
www.siemens.com/support-request

Contactors in safety-related applications

Contactors are a significant part of safety-related applications. They are generally the actuators that perform the switching operation leading to the safe disconnection of the corresponding application or system.

Contactors with mirror contacts according to IEC 60947-4-1 are generally required for use in safety-related applications. Most of our contactors meet this requirement; a corresponding note can be found in the technical product data sheet.

Contactors with increased tamper protection

Increased tamper protection is ensured either by using our contactor versions with factory-installed, permanently mounted auxiliary switches which are protected against mechanical external actuation (e.g. 3RT14..-.....-3PA0), or by using the 3RT1926-4MA10 sealable cover as an accessory.

Surge suppression

Contactors supplied without a coil circuit can be retrofitted with RC elements, varistors, diodes or diode assemblies (combination of diode and Zener diode for short break times) for damping opening surges in the coil.

Note:

The break times of the contactor, the opening delay times of the NO contacts and the closing delay times of the NC contacts increase if the contactor coils are damped against voltage peaks. Different accessories are available for the contactors (time change with: interference suppression diode 6x to 10x; diode assembly 2x to 6x; suppressor diode +1 to 5 ms; varistor +2 to 5 ms).

For details, see Equipment Manual.

Accessories and spare parts

- 3RT244 and 3RT145 to 3RT147 contactors, see also basic units, page 2/52 onwards
- For 3RT148 contactors, see Catalog IC 10

SIRIUS 3RT.4 contactors for weak or non-inductive loads (AC-1), 3-pole up to 2 650 A

3RT244 contactors

Main circuit

Connection methods

Screw terminals with box terminal;
direct connection to the connecting bar possible with cable lugs when the box terminal is removed.

Surge suppression

The varistors and diode assemblies are plugged into the front of the contactors. The RC element is plugged into the two recesses on the front of the contactor to the left of the terminal block for the auxiliary switches.

Short-circuit protection

For short-circuit protection without overload relays,
see page 2/82.

Control circuit

Operating mechanism types

These contactors are available as versions with conventional AC or DC operating mechanisms or as versions with a wide-range solid-state operating mechanism and a universal actuating voltage (AC or DC operation).

With an operating range from 0.8 to 1.1 x U_s, control takes place via the control supply voltage connection A1 - A2.

Solenoid coils/operating mechanisms

Coil replacement is possible.

Auxiliary circuit

Auxiliary contact complement

The contactors contain two integrated auxiliary contacts (1 NO + 1 NC).

For detailed information about the fitting of auxiliary switches,
see pages 2/55 to 2/58.

3RT14 contactors

Main circuit

Connection methods

- 3RT145 to 3RT147 contactors:
  Screw terminals with connecting bars that the cables can be connected to using either cable lugs or flexible or rigid busbars. Alternatively, box terminals are available as accessories.
- 3RT148 contactors:
  Busbar connections

Short-circuit protection

Short-circuit protection of contactors without overload relays

- For 3RT145 to 3RT147 contactors, see page 2/82
- For 3RT148 contactors, see Catalog IC 10

Control circuit

Operating mechanism types

The operating mechanisms for contactors 3RT145 to 3RT147 are powered via a supply voltage with an operating range from 0.8 to 1.1 x U_s, optionally also controlled depending on the chosen mode of operation. Alternatively, control is via the separate 24 V DC control signal input. Various rated voltage ranges for AC/DC control are available.

The following control and/or operating mechanism versions are available:

- 3RT14..-.A:
  Standard operating mechanism for AC and DC operation (power consumption reduced from closing to closed)
- Solid-state operating mechanisms
  Overvoltage damping of the operating mechanism coil is already integrated in the electronics for contactors with solid-state operating mechanisms.
  The following versions are available:
  - 3RT14..-.N:
    With two operating modes: direct control or via PLC input (24 V DC)
  - 3RT14..-.P:
    Control via PLC input (24 V DC) only, but with additional remaining lifetime indicator (RLT)
  - 3RT14..-.S:
    Control via fail-safe PLC input (24 V DC) only, for simplification of safety applications

The 3RT148 contactors are equipped with a solid-state operating mechanism for AC/DC control; coil damping is integrated. The operating range is 0.85 to 1.1 x U_s.

Solenoid coils/operating mechanisms

- 3RT145 to 3RT147 contactors:
  The 3RT14..-.A/-.N/-.P operating mechanisms are removable and can be replaced simply by unlocking and pulling them out.

  NOTICE: Removal or changing of the operating mechanism is not permitted for 3RT14..-.S contactors with fail-safe control.
- 3RT148 contactors:
  The operating mechanisms are removable and can be replaced simply by unlocking and pulling them out.

Surge suppression

Exchangeable operating mechanisms with integrated coil circuit (varistor) are available.

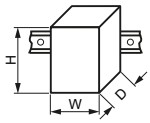
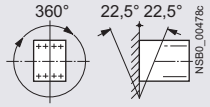
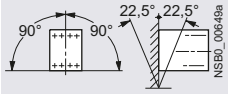
Auxiliary circuit

Auxiliary contact complement

These contactors are supplied with two laterally mounted auxiliary switches. The fitting of auxiliary switches is possible on the front and on the side.

Technical specifications

More information	
Technical specifications, see https://support.industry.siemens.com/cs/ww/en/ps/24229/td FAQs, see https://support.industry.siemens.com/cs/ww/en/ps/24229/faq	Manuals, see https://support.industry.siemens.com/cs/ww/en/ps/24229/man

Type		3RT2446, 3RT2448	3RT1456	3RT1466	3RT1467	3RT1476
Size		S3	S6	S10		S12
General data						
Dimensions (W x H x D) 						
• Basic units - Screw/spring-loaded terminals	mm	70 x 140 x 152	120 x 172 x 170	145 x 210 x 202		160 x 214 x 225
• Basic unit with mounted auxiliary switch - Screw terminals - Spring-loaded terminals	mm mm	70 x 140 x 196 70 x 140 x 200	120 x 172 x 217 --	145 x 210 x 251		160 x 214 x 271
• Basic unit with mounted function module or solid-state time-delayed auxiliary switch - Screw/spring-loaded terminals	mm	70 x 140 x 226	--			
Permissible mounting position The contactors are designed for operation on a vertical mounting surface.						
Upright mounting position		 Special version required	--			
Mechanical service life						
• Basic units and basic units with mounted auxiliary switch	Operating cycles	10 million				
• Basic units with solid-state compatible auxiliary switch	Operating cycles	5 million	--			
Electrical endurance for utilization category AC-1, at U_e = 400 V	Operating cycles	0.5 million			On request	0.5 million
Rated insulation voltage U_i (pollution degree 3)	V	1 000				
Rated impulse withstand voltage U_{imp}	kV	6	8			
Protective separation between the coil and the main contacts acc. to IEC 60947-1, Annex N	V	690				
Mirror contacts according to IEC 60947-4-1, Annex F A mirror contact is an auxiliary NC contact that cannot be closed simultaneously with an NO main contact.						
• Integrated auxiliary switches • Removable auxiliary switch		Yes --	-- Yes			
Permissible ambient temperature						
• During operation • During storage	°C °C	-25 ... +60 -55 ... +80				
Degree of protection IP on the front acc. to IEC 60529		IP20 (screw terminals and spring-loaded terminals with box terminal/cover)	IP00 (IP20 with box terminal/cover)			
Touch protection on the front acc. to IEC 60529		Finger-safe for vertical touching from the front (screw terminals and spring-loaded terminals with box terminal/cover)	Finger-safe for vertical touching from the front with box terminal/cover			
Shock resistance						
• Rectangular pulse - AC operation - DC operation	 *g*/ms *g*/ms	 10.3/5 and 10.5/10 6.7/5 and 4.0/10	 8.5/5 and 4.2/10 8.5/5 and 4.2/10			
• Sine pulse - AC operation - DC operation	 *g*/ms *g*/ms	 16.3/5 and 10.5/10 10.6/5 and 6.3/10	 13.4/5 and 6.5/10 13.4/5 and 6.5/10			

SIRIUS 3RT.4 contactors for weak or non-inductive loads (AC-1), 3-pole up to 2 650 A

Type			3RT2446, 3RT2448	3RT1456	3RT1466	3RT1467	3RT1476
Size			S3	S6	S10		S12
Short-circuit protection							
Main circuit							
• Version of the fuse link required for short-circuit protection of the main circuit							
- for type of coordination 1			gG: 250 A (690 V, 100 kA)	gG: 355 A (690 V, 100 kA)	gG: 500 A (690 V, 100 kA)		gG: 800 A (690 V, 50 kA)
- for type of coordination 2			gG: 250 A (690 V, 100 kA)	gG: 350 A (690 V, 100 kA)	gG: 500 A (690 V, 100 kA)		gG: 710 A (690 V, 100 kA)
Auxiliary circuit							
• Version of the fuse link required for short-circuit protection of the auxiliary switch		A	Fuse gG: 10				
• Miniature circuit breaker version required for short-circuit protection of the auxiliary switch		A	On request				
Short-circuit protection for contactors with overload relays			See Configuration Manual for load feeders				
Short-circuit protection for fuseless load feeders			See • 3RA2 load feeders • Configuration Manual for load feeders				

Type			3RT2446, 3RT2448		3RT1456		3RT1466, 3RT1467		3RT1476	
			-.A	-.N	-.A	-.N/-.P/-.S	-.A	-.N/-.P/-.S	-.A	-.N/-.P/-.S
Size			S3		S6		S10		S12	
Control										
Solenoid coil operating range (AC/DC)			0.8 ... 1.1 x U_s	0.8 x $U_{s\,min}$ ... 1.1 x $U_{s\,max}$						
Power consumption of the solenoid coils (for cold coil and 1.0 x U_s)										
• AC operation, 50 Hz, standard version	Closing	VA	296	--						
	P.f.		0.61	--						
	Closed	VA	19	--						
	P.f.		0.38	--						
• AC operation, 50/60 Hz, standard version	Closing	VA	348/296	--						
	P.f.		0.62/0.55	--						
	Closed	VA	25/18	--						
	P.f.		0.35/0.41	--						
• AC operation, 50/60 Hz, for USA/Canada	Closing	VA	326/326	--						
	P.f.		0.62/0.55	--						
	Closed	VA	22/22	--						
	P.f.		0.38/0.4	--						
• AC/DC operation	Closing for AC operation	VA	--	163	300	280	590	530	830	750
	P.f.		--		0.9	0.8	0.9	0.8	0.9	0.8
	Closed for AC operation	VA	--	3.1	5.8	4.8	6.7	8.5	9.2	9
	P.f.		--		0.8	0.6	0.9	0.4	0.9	0.4
	Closing for DC operation	W	--	76	360	320	650	580	920	800
	Closed for DC operation	W	--	1.8	5.2	2.8	7.4	3.4	10	3.6
Type of PLC control input according to IEC 60947-1										
• Solid-state operating mechanism	3RT14..-.N/-.P		--		Type 2					
	3RT14..-.S		--		Type 1					
• Rated voltage		V DC	--		24					
• Operating range		V DC	--		17 ... 30					
• Power consumption		mA	--		≤ 30					
• Recovery time after mains failure, typical (applicable only for fail-safe version 3RT14..-.S)		s	--		2					
Operating times within operating range										
Total break time = Opening delay + Arcing time										
• Standard operating mechanism for AC operation (3RT.4..-.A)	Closing delay	ms	13 ... 50		20 ... 95		30 ... 95		45 ... 100	
	Opening delay	ms	10 ... 21		40 ... 60		40 ... 80		60 ... 100	
• Solid-state operating mechanism for AC/DC operation										
- Actuated via A1/A2 (3RT.4..-.N/-.P)	Closing delay	ms	50 ... 70		95 ... 135		105 ... 145		120 ... 150	
	Opening delay	ms	38 ... 57		80 ... 90		80 ... 100			
- Actuated via PLC input (3RT14..-.N/-.P)	Closing delay	ms	--		35 ... 75		45 ... 80		60 ... 90	
	Opening delay	ms	--		80 ... 90		80 ... 100			
- Actuated via F-PLC input (3RT14..-.S)	Closing delay	ms	--		60 ... 75					
	Opening delay	ms	--		115 ... 130					
• Arcing time		ms	10 ... 20							

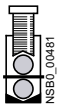
SIRIUS 3RT.4 contactors for weak or non-inductive loads (AC-1), 3-pole up to 2 650 A

Type			3RT2446	3RT2448	3RT1456	3RT1466	3RT1467	3RT1476
Size			S3		S6	S10		S12
Rated data of the main contacts								
Load rating with AC								
Utilization category AC-1								
• Rated operational currents I_e	At 40 °C up to 690 V	A	140	160	275	400	500	690
	At 60 °C up to 690 V	A	130	140	250	380	450	Standard operating mechanism: 650, solid-state operating mechanism: 600
	At 40 °C up to 1 000 V	A	60	80	--	--	--	--
	At 60 °C up to 1 000 V	A	60	80	--	--	--	--
• Minimum cross-section in the main circuit at maximum AC-1 rated value		mm^2	50	70	140	240	300	480
Utilization categories AC-2 and AC-3 With an electrical endurance of 1.3 million operating cycles								
• Rated operational currents I_e	Up to 400 V	A	44		97	138		170
	Up to 690 V	A	44		97	138		170
• Rated power for slip-ring or squirrel-cage motors at 50 and 60 Hz	At 230 V	kW	12.7		30	37		55
	400 V	kW	22		55	75		90
	500 V	kW	29.9		55	90		110
	690 V	kW	38.2		90	132		160
Power loss per conducting path	At I_e/AC-1	W	--		20	27	42	55
Load rating with DC								
Utilization category DC-1, (*L/R* ≤ 1 ms)								
• Rated operational currents I_e (at 60 °C)								
- 1 conducting path	Up to 24 V	A	130	140	250	380		500
	60 V	A	80		250	380		500
	110 V	A	12		18	33		
	220 V	A	2.5		3.4	3.8		
	440 V	A	0.8		0.8	0.9		
	600 V	A	0.48		0.5	0.6		
- 2 conducting paths in series	Up to 24 V	A	130	140	250	380		500
	60 V	A	130	140	250	380		500
	110 V	A	130	140	250	380		500
	220 V	A	13		20	380		500
	440 V	A	2.4		3.2	4		
	600 V	A	1.3		1.6	2		
- 3 conducting paths in series	Up to 24 V	A	130	140	250	380		500
	60 V	A	130	140	250	380		500
	110 V	A	130	140	250	380		500
	220 V	A	130	140	250	380		500
	440 V	A	6		11.5	11		
	600 V	A	3.4		4	5.2		
Utilization category DC-3/DC-5, shunt-wound and series-wound motors (*L/R* ≤ 15 ms)								
• Rated operational currents I_e (at 60 °C)								
- 1 conducting path	Up to 24 V	A	6		250	380		500
	60 V	A	3		7.5	11		
	110 V	A	1.25		2.5	3		
	220 V	A	0.35		0.6			
	440 V	A	0.15		0.17	0.18		
	600 V	A	0.1		0.12	0.125		
- 2 conducting paths in series	Up to 24 V	A	130	140	250	380		500
	60 V	A	130	140	250	380		500
	110 V	A	130	140	250	380		500
	220 V	A	1.75		2.5			
	440 V	A	0.42		0.65			
	600 V	A	0.27		0.37			
- 3 conducting paths in series	Up to 24 V	A	130	140	250	380		500
	60 V	A	130	140	250	380		500
	110 V	A	130	140	250	380		500
	220 V	A	4		250	380		500
	440 V	A	0.8		1.4			
	600 V	A	0.45		0.75			

SIRIUS 3RT.4 contactors for weak or non-inductive loads (AC-1), 3-pole up to 2 650 A

Type			3RT2446	3RT2448	3RT1456	3RT1466, 3RT1467	3RT1476
Size			S3		S6	S10	S12
Rated data of main contacts (continued)							
Switching frequency							
Switching frequency *z* in operating cycles/hour							
Contactors without overload relays							
• No-load switching frequency							
- Standard operating mechanism	3RT244.-.A	1/h	5 000	1 000	--		
	3RT14..-.A	1/h	--		2 000		
- Solid-state operating mechanism	3RT14..-.N/-.P	1/h	--		1 000		
	3RT14..-.S	1/h	--		1 000		500
• Switching frequency *z* during rated operation (Dependence of the switching frequency *z'* on operational current *I'* and operational voltage *U'*: $z' = z \cdot (I_e/I') \cdot (U_e/U')^{1.5} \cdot 1/h$)							
- Standard operating mechanism 3RT244.-.A	I_e/AC-1 at 400 V	1/h	650		--		
- Standard operating mechanism 3RT14..-.A and solid-state operating mechanism 3RT14..-.N/-.P	I_e/AC-1 at 400 V	1/h	--		600		
- Solid-state operating mechanism 3RT14..-.S	I_e/AC-1 at 400 V	1/h	--		350		

SIRIUS 3RT.4 contactors for weak or non-inductive loads (AC-1), 3-pole up to 2 650 A

Type		3RT1456		3RT1466, 3RT1467	3RT1476
Size		S6		S10	S12
Conductor cross-sections					
Main conductors (1 or 2 conductors can be connected)		Screw terminals			
With mounted box terminals	Type	3RT1955-4G	3RT1956-4G	3RT1966-4G	
Terminal screws		M10 (hexagon socket, A/F 4)	M10 (hexagon socket, A/F 4)	M12 (hexagon socket, A/F 5)	
• Tightening torque	Nm lb.in	10 ... 12 90 ... 110	10 ... 12 90 ... 110	20 ... 22 180 ... 195	
Front clamping point connected					
					
• Finely stranded with end sleeve (DIN 46228)	mm^2	16 ... 70	16 ... 120	70 ... 240	
• Finely stranded without end sleeve	mm^2	16 ... 70	16 ... 120	70 ... 240	
• Stranded	mm^2	16 ... 70	16 ... 120	95 ... 300	
• AWG cables, solid or stranded	AWG	6 ... 2/0	6 ... 250 kcmil	3/0 ... 600 kcmil	
• Ribbon cable conductors (Number x Width x Thickness)	mm	Min. 3 x 9 x 0.8, max. 6 x 15.5 x 0.8	Min. 3 x 9 x 0.8, max. 10 x 15.5 x 0.8	Min. 6 x 9 x 0.8, max. 20 x 24 x 0.5	
Rear clamping point connected					
					
• Finely stranded with end sleeve (DIN 46228)	mm^2	16 ... 70	16 ... 120	120 ... 185	
• Finely stranded without end sleeve	mm^2	16 ... 70	16 ... 120	120 ... 185	
• Stranded	mm^2	16 ... 70	16 ... 120	120 ... 240	
• AWG cables, solid or stranded	AWG	6 ... 2/0	6 ... 250 kcmil	250 ... 500 kcmil	
• Ribbon cable conductors (Number x Width x Thickness)	mm	Min. 3 x 9 x 0.8, max. 6 x 15.5 x 0.8	Min. 3 x 9 x 0.8, max. 10 x 15.5 x 0.8	Min. 6 x 9 x 0.8, max. 20 x 24 x 0.5	
Both clamping points connected (minimum cross-section 16 mm^2)					
					
• Finely stranded with end sleeve (DIN 46228)	mm^2	Max. 1 x 50, 1 x 70	Max. 1 x 95, 1 x 120	Min. 2 x 50, max. 2 x 185	
• Finely stranded without end sleeve	mm^2	Max. 1 x 50, 1 x 70	Max. 1 x 95, 1 x 120	Min. 2 x 50, max. 2 x 185	
• Stranded	mm^2	Max. 1 x 50, 1 x 70	Max. 1 x 95, 1 x 120	Min. 2 x 70, max. 2 x 240	
• AWG cables, solid or stranded	AWG	Max. 2 x 1/0	Max. 2 x 3/0	Min. 2 x 2/0, max. 2 x 500 kcmil	
• Ribbon cable conductors (Number x Width x Thickness)	mm	Max. 2 x (6 x 15.5 x 0.8)	Max. 2 x (10 x 15.5 x 0.8)	Max. 2 x (20 x 24 x 0.5)	
Busbar connections					
• Connecting bar (max. width)	mm	17		25	
- Bore diameter	mm	9		11	
Cable lug connection		1)		2)	
• Finely stranded with cable lug	mm^2	16 ... 95		50 ... 240	
• Stranded with cable lug	mm^2	25 ... 120		70 ... 240	
• AWG cables, solid or stranded	AWG	4 ... 250 kcmil		2/0 ... 500 kcmil	
• Terminal screws		M8 x 25 (A/F 13)		M10 x 30 (A/F 17)	
- Tightening torque	Nm lb.in	10 ... 14 90 ... 124		14 ... 24 124 ... 210	
Auxiliary conductors (1 or 2 conductors can be connected)					
• Solid	mm^2	2 x (0.5 ... 1.5)[3]; 2 x (0.75 ... 2.5)[3] acc. to IEC 60947; max. 2 x (0.75 ... 4)[3]			
• Finely stranded with end sleeve (DIN 46228)	mm^2	2 x (0.5 ... 1.5)[3]; 2 x (0.75 ... 2.5)[3]			
• AWG cables, solid or stranded	AWG	2 x (18 ... 14)			
• Terminal screws		M3 (Pozidriv size 2)			
- Tightening torque	Nm lb.in	0.8 ... 1.2 7 ... 10.3			
Auxiliary conductors[4] (1 or 2 conductors can be connected)		Spring-loaded terminals			
• Operating devices		3.0 x 0.5; 3.5 x 0.5			
• Solid	mm^2	2 x (0.25 ... 2.5)			
• Finely stranded with end sleeve (DIN 46228)	mm^2	2 x (0.25 ... 1.5)			
• Finely stranded without end sleeve	mm^2	2 x (0.25 ... 2.5)			
• AWG cables, solid or stranded	AWG	2 x (24 ... 14)			

SIRIUS 3RT.4 contactors for weak or non-inductive loads (AC-1), 3-pole up to 2 650 A

Selection and ordering data

Size S3: AC operation or AC/DC operation

- Coil circuits (varistors, diodes, etc.) retrofittable
- Auxiliary switches can be retrofitted
- Main and control conductors: Screw terminals

3RT244.-1...0

Size	Rated data AC-1, I_u: 40 °C	60 °C	Auxiliary contacts Ident. No.	Version		Rated control supply voltage U_s 50 Hz AC	50 Hz AC or DC	Screw terminals Article No.	Weight
	Operational current I_e up to **690 V**	690 V		NO	NC	V	V		kg
	A								
For screw fixing and snap-on mounting on TH 35-15 and TH 75-15 standard mounting rails									
AC/DC operation									
With integrated coil circuit (varistor integrated in electronics at the factory)									
S3	**140**	130	**11**	1	1	--	20 ... 33	**3RT2446-1NB30**	1.833
						--	83 ... 155	**3RT2446-1NF30**	1.823
						--	175 ... 280	**3RT2446-1NP30**	1.805
	160	140	**11**	1	1	--	20 ... 33	**3RT2448-1NB30**	1.843
						--	83 ... 155	**3RT2448-1NF30**	1.825
						--	175 ... 280	**3RT2448-1NP30**	1.808

Other voltages on request.

Accessories and spare parts, see page 2/52 onwards.

*** You can order this quantity or a multiple thereof.**

SIRIUS 3RT.4 contactors for weak or non-inductive loads (AC-1), 3-pole up to 2 650 A

Sizes S6 to S12: AC/DC operation ≂

- 3RT14..-.A standard operating mechanism
- Solid-state operating mechanism
  - 3RT14..-.N with 24 V DC control signal input
  - 3RT14..-.P with 24 V DC control signal input and remaining lifetime indicator (RLT)
- For screw fixing
- Auxiliary and control conductors: Screw terminals
- Main conductors: Busbar connections; a connection kit with screws, spring washers and nuts is enclosed.

3RT1476-6N.36

3RT1476-6P.35

Size	Rated data		Auxiliary contacts, lateral		Rated control supply voltage U_s	**Screw terminals**	Weight
	AC-1, t_u:						
	40 °C	60 °C					
	Operational current I_e up to		Version		50/60 Hz AC or DC		
	690 V	690 V				Article No.	
	A	A	NO	NC	V		kg
Solid-state operating mechanism							
With 24 V DC control signal input e.g. for control by PLC							
With integrated coil circuit (varistor integrated in electronics at the factory)							
S6	**275**	250	2	2	96 ... 127	**3RT1456-6NF36**	3.327
					200 ... 277	**3RT1456-6NP36**	3.400
S10	**400**	380	2	2	96 ... 127	**3RT1466-6NF36**	6.707
					200 ... 277	**3RT1466-6NP36**	6.531
	500	450	2	2	96 ... 127	**3RT1467-6NF36**	6.707
					200 ... 277	**3RT1467-6NP36**	6.520
S12	**690**	650	2	2	96 ... 127	**3RT1476-6NF36**	10.438
					200 ... 277	**3RT1476-6NP36**	10.199
					200 ... 277	**3RT1476-6PP35**	10.710

Other voltages on request.

Accessories and spare parts, see page 2/52 onwards.

*** You can order this quantity or a multiple thereof.**

Overview

3RT231 to 3RT234 and 3RT135 to 3RT137 contactors, with screw terminals

3RT.3 contactors, 4-pole

Standards

IEC 60947-1, IEC 60947-4-1, IEC 60947-5-1 (auxiliary switches)

Surge suppression

Contactors supplied without a coil circuit can be retrofitted with RC elements, varistors, diodes or diode assemblies (combination of diode and Zener diode for short break times) for damping opening surges in the coil.

Note:

The break times of the contactor, the opening delay times of the NO contacts and the closing delay times of the NC contacts increase if the contactor coils are damped against voltage peaks. Different accessories are available for the contactors (time change with: Interference suppression diode 6x to 10x; diode assembly 2x to 6x; suppressor diode +1 to 5 ms; varistor +2 to 5 ms).

For details, see Equipment Manual.

Accessories and spare parts

- 3RT231 to 3RT234 contactors, see page 2/52 onwards
- 3RT135 to 3RT137 contactors,

3RT23 contactors

Main circuit

Connection methods

- 3RT231 and 3RT232 contactors:
  Screw or spring-loaded terminals, spring-loaded terminals with convenient plug-in design for device connectors
- 3RT233 and 3RT234 contactors:
  Screw terminals with box terminal; direct connection to the connecting bar possible with cable lugs for 3RT234 when the box terminal is removed.

Short-circuit protection

For short-circuit protection of 3RT23 contactors without overload relays, see page 2/90.

Surge suppression

- 3RT231 contactor:
  The surge suppressors are plugged onto the front of the contactors here. Space is provided for them next to a snap-on auxiliary switch.
- 3RT232 and 3RT233 contactors:
  The surge suppressors (varistors, RC elements or diode combinations) can be plugged into the front of the contactors.
- 3RT234 contactors:
  The varistors and diode assemblies are plugged into the front of the contactors. The RC element is plugged into the two recesses on the front of the contactor to the left of the terminal block for the auxiliary switches.

Control circuit

Connection methods

Screw or spring-loaded terminals

Operating mechanism types

The contactors are available as versions with conventional AC or DC operating mechanisms or as versions with a wide-range solid-state operating mechanism and a universal actuating voltage (AC or DC operation possible).

Control takes place via the control supply voltage connection A1 - A2 with varying operating ranges (see relevant product data sheet for further details).

Auxiliary circuit

Auxiliary contact complement

- 3RT231 contactor: An auxiliary contact is integrated in the basic unit.
- 3RT232 to 3RT234 contactors: The basic units contain two integrated auxiliary contacts (1 NO + 1 NC).

All basic units can be expanded with auxiliary switches.

For detailed information about the fitting of auxiliary switches, see pages 2/55 to 2/58.

3RT13 contactors

Main circuit

Connection methods

- 3RT135 to 3RT137 contactors:
  Screw terminals with connecting bars that the cables can be connected to using either cable lugs or flexible or rigid busbars.
- 3RT136 and 3RT137 contactors:
  These can be fitted with bus connectors offset.

Short-circuit protection

For short-circuit protection of 3RT13 contactors, see page 2/93.

Control circuit

Connection methods

Screw terminals

Operating mechanism types

The contactors are fitted with a wide-range solid-state operating mechanism that can be controlled with both 50/60 Hz AC and DC.

The operating range of the DC control is 0.8 x $U_{s\ min}$ and 1.1 x $U_{s\ max}$, and for AC operation 0.85 x $U_{s\ min}$ and 1.1 x $U_{s\ max}$.

It is not possible to change the operating mechanism.

Auxiliary circuit

Auxiliary contact complement

The contactors have two auxiliary contacts with 2 NO + 2 NC.

One additional auxiliary switch with 1 NO + 1 NC can be mounted on each side.

Application

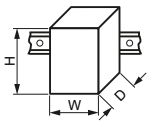
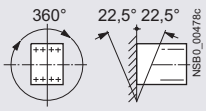
The 3RT.3 contactors can be used for the following applications:

- 4-pole switching of weak or non-inductive loads (AC-1)
- Disconnecting loads or power generation plants from the grid
- For system transfers

We additionally offer special versions of the 3RT23 contactors for switching motor-driven loads (AC-3).

Technical specifications

More information	
Technical specifications, see https://support.industry.siemens.com/cs/ww/en/ps/16165/td FAQs, see https://support.industry.siemens.com/cs/ww/en/ps/16165/faq	Manuals, see https://support.industry.siemens.com/cs/ww/en/ps/16165/man

Type		3RT2316, 3RT2317	3RT2325 to 3RT2327	3RT2336, 3RT2337	3RT2344, 3RT2346, 3RT2348
Size		S00	S0	S2	S3
General data					
Dimensions (W x H x D) AC or DC operation			(The values in brackets apply for DC operation)		
• Basic units					
- Screw terminals	mm	45 x 58 x 73	60 x 85 x 97 (107)	75 x 114 x 130	96 x 140 x 152
- Spring-loaded terminals	mm	45 x 70 x 73	61 x 102 x 97 (107)	--	--
• Basic unit with mounted auxiliary switch					
- Screw terminals	mm	45 x 58 x 117	60 x 85 x 141 (151)	75 x 114 x 174	96 x 140 x 196
- Spring-loaded terminals	mm	45 x 70 x 121	61 x 102 x 145 (155)	--	--
• Basic unit with mounted function module or solid-state time-delayed auxiliary switch					
- Screw terminals	mm	45 x 58 x 147	60 x 85 x 171 (181)	75 x 114 x 204	96 x 140 x 226
- Spring-loaded terminals	mm	45 x 70 x 147	61 x 102 x 171 (181)	--	--
Permissible mounting position The contactors are designed for operation on a vertical mounting surface.					
Upright mounting position		 Special version required			
Mechanical service life	Operating cycles	30 million	10 million		
Electrical endurance at I_e/AC-1	Operating cycles	Approx. 0.5 million			
Rated insulation voltage U_i (pollution degree 3)	V	690			
Protective separation between the coil and the main contacts acc. to IEC 60947-1, Annex N	V	400			690
Permissible ambient temperature					
• During operation	°C	-25 ... +60			
• During storage	°C	-55 ... +80			
Degree of protection IP on the front according to IEC 60529		IP20 (screw terminals and spring-loaded terminals)			
Touch protection on the front acc. to IEC 60529		Finger-safe for vertical touching from the front (screw terminals and spring-loaded terminals)			

SIRIUS 3RT.3 contactors, 4-pole, up to 525 A

Type	3RT2316, 3RT2317	3RT2325, 3RT2326	3RT2326-1...0-4AA0	3RT2327
Size	S00	S0		
Short-circuit protection				
Main circuit				
• Version of the fuse link required for short-circuit protection of the main circuit				
- for type of coordination 1	gG: 35 A (690 V, 100 kA)	gG: 63 A (690 V, 100 kA)	gG: 100 A (690 V, 100 kA), aM: 50 A (690 V, 100 kA), BS88: 100 A (415 V, 80 kA)	gG: 63 A (690 V, 100 kA)
- for type of coordination 2	gG: 20 A (690 V, 100 kA)		gG: 35 A (690 V, 100 kA), aM: 20 A (690 V, 100 kA), BS88: 35 A (415 V, 80 kA)	gG: 20 A (690 V, 100 kA)
Auxiliary circuit				
• Version of the fuse link required for short-circuit protection of the auxiliary switch	Fuse gG: 10 A (690 V, 1 kA)			
• Miniature circuit breaker version required for short-circuit protection of the auxiliary switch	6 A (230 V, 400 A, C characteristic)			

Type	3RT2336, 3RT2337		3RT2344, 3RT2346	3RT2346-1...0-4AA0	3RT2348
Size	S2		S3		
Short-circuit protection					
Main circuit					
• Version of the fuse link required for short-circuit protection of the main circuit					
- for type of coordination 1	gG: 160 A (690 V, 100 kA)		gG: 250 A (690 V, 100 kA)	gG: 250 A (690 V, 100 kA), aM: 160 A (690 V, 100 kA), BS88: 200 A (415 V, 80 kA)	gG: 250 A (690 V, 100 kA)
- for type of coordination 2	gG: 63 A (690 V, 100 kA)	gR: 80 A (690 V, 100 kA)	gR: 250 A (690 V, 100 kA)	gG: 160 A (690 V, 100 kA), aM: 100 A (690 V, 100 kA), BS88: 125 A (415 V, 80 kA)	gR: 250 A (690 V, 100 kA)
Auxiliary circuit					
• Version of the fuse link required for short-circuit protection of the auxiliary switch	Fuse gG: 10 A (690 V, 1 kA)				
• Miniature circuit breaker version required for short-circuit protection of the auxiliary switch	6 A (230 V, 400 A, C characteristic)				

Type			3RT2316	3RT2317	3RT2325	3RT2326, 3RT2327	3RT2336, 3RT2337	3RT2344, 3RT2346, 3RT2348
Size			S00		S0		S2	S3
Control								
Solenoid coil operating range								
• AC operation	At 50 Hz		0.8 ... 1.1 x U_s					
	At 60 Hz		0.85 ... 1.1 x U_s		0.8 ... 1.1 x U_s			
• DC operation	At 50 °C		0.8 ... 1.1 x U_s				--	
	At 60 °C		0.85 ... 1.1 x U_s				--	
• AC/DC operation			--				0.8 ... 1.1 x U_s	
Power consumption of the solenoid coils (for cold coil and 1.0 x U_s)								
• AC operation, 50 Hz, standard version								
- Closing		VA	--		77		190	296
- P.f.			--		0.82		0.72	0.61
- Closed		VA	--		9.8		16	19
- P.f.			--		0.25		0.37	0.38
• AC operation, 50/60 Hz, standard version								
- Closing		VA	27/24.3	37/33	81/79		210/188	348/296
- P.f.			0.8/0.75		0.72/0.74		0.69/0.65	0.62/0.55
- Closed		VA	4.2/3.3	5.7/4.4	10.5/8.5		17.2/16.5	25/18
- P.f.			0.25/0.25		0.25/0.28		0.36/0.39	0.35/0.41
• AC operation, 60 Hz, USA, Canada								
- Closing		VA	31.7	43	87		188	326
- P.f.			0.77		0.76		0.67	0.55
- Closed		VA	4.8	6.5	9.4		16.5	22
- P.f.			0.25		0.28		0.37	0.4
• AC/DC operation								
- Closing for AC operation		VA	--				40	151
- P.f.			--				0.95	0.95
- Closed for AC operation		VA	--				2	3.5
- P.f.			--				0.95	0.95
- Closing for DC operation		W	--				23	76
- Closed for DC operation		W	--				1	2.7
• DC operation (closing = closed)		W	4		5.9		--	--[1]
Operating times within operating range								
Total break time = Opening delay + Arcing time								
• AC operation								
- Closing delay		ms	9 ... 35		8 ... 40		10 ... 80	13 ... 50
- Opening delay		ms	4 ... 15		4 ... 16		10 ... 18	10 ... 21
• DC operation								
- Closing delay		ms	30 ... 100		50 ... 170		--	
- Opening delay		ms	7 ... 13		15 ... 18		--	
• AC/DC operation								
- Closing delay		ms	--				35 ... 110	50 ... 70
- Opening delay		ms	--				30 ... 55	38 ... 57
• Arcing time		ms	10 ... 15		10		10 ... 20	

[1] In the case of AC/DC coils, increased pickup currents (6.5 A on average) arise during the first 200 ms.

SIRIUS 3RT.3 contactors, 4-pole, up to 525 A

Type			3RT2316	3RT2317	3RT2325	3RT2326	3RT2327	3RT2336	3RT2337	3RT2344	3RT2346	3RT2348
Size			S00		S0			S2		S3		
Rated data of the main contacts												
Load rating with AC												
Utilization category AC-1												
• Rated operational currents I_e	At 40 °C, up to 690 V	A	18	22	35	40	50	60	110	110	140 (110)[2]	160
	At 60 °C, up to 690 V	A	16	20	30	35	42	55	95	100	130 (100)[2]	140
• Rated power for AC loads P.f. = 0.95 (at 60 °C)	At 230 V	kW	6	7.5	11	13	16	21	36	38	49	53
	400 V	kW	10.5	13	20	23	28	36	63	72	92	105
• Minimum cross-section in the main circuit at maximum AC-1 rated value		mm^2	2.5	4	10			16	35		50 (35)[2]	70
Utilization categories AC-2 and AC-3												
• Rated operational currents I_e (at 60 °C)	At 400 V	A	9	12	15.5	15.5 (32)[1]	15.5	38 (51[1])	38		-- (95)[1]	--
	At 690 V	A	--			-- (21)[1]	--	-- (24)[1]	--		-- (58)[1]	--
• Rated power for slip-ring or squirrel-cage motors at 50 and 60 Hz	At 230 V	kW	2.2	3	4	4 (7.5)[1]	4	-- (15)[1]	--		-- (22)[1]	--
	400 V	kW	4	5.5	7.5	7.5 (15)[1]	7.5	-- (22)[1]	--		-- (45)[1]	--
	690 V	kW	--			-- (18.5)[1]	--	-- (22)[1]	--		-- (55)[1]	--
Load rating with DC												
Utilization category DC-1 ($L/R \leq 1$ ms)												
• Rated operational currents I_e (at 60 °C)												
- 1 conducting path	Up to 24 V	A	16	20	30	35	42	55		70	80	
	60 V	A	16	20				23			60	
	110 V	A	2.1		4.5						9	
	220 V	A	0.8		1						2	
	440 V	A	0.6		0.4						0.6	
- 2 conducting paths in series	Up to 24 V	A	16	20	30	35	42	55		70	80	
	60 V	A	16	20	30	35	42	55		70	80	
	110 V	A	12		30	35	42	45		70	80	
	220 V	A	1.6		1			5			10	
	440 V	A	0.8		1						1.8	
- 3 conducting paths in series	Up to 24 V	A	16	20	30	35	42	55		70	80	
	60 V	A	16	20	30	35	42	55		70	80	
	110 V	A	16	20	30	35	42	55		70	80	
	220 V	A	16	20	30	35	42	45		70	80	
	440 V	A	1.3		2.9						4.5	
- 4 conducting paths in series	Up to 24 V	A	16	20	30	35	42	55	65	70	80	
	60 V	A	16	20	30	35	42	55	65	70	80	
	110 V	A	16	20	30	35	42	55		70	80	
	220 V	A	16	20	30	35	42	45	55	70	80	
	440 V	A	1.3		2.9				3.5	2.9	4.5	
Utilization category DC-3/DC-5, shunt-wound and series-wound motors ($L/R \leq 15$ ms)												
• Rated operational currents I_e (at 60 °C)												
- 1 conducting path	Up to 24 V	A	16	20								
	60 V	A	0.5		5					6	6.5	
	110 V	A	0.15		2.5							
	220 V	A	--		1							
	440 V	A	--		0.09			0.1		0.15		
- 2 conducting paths in series	Up to 24 V	A	16	20	30	35	42	45		70	80	
	60 V	A	5		30	35	42	45		70	80	
	110 V	A	0.35		15			25		70	80	
	220 V	A	--		3			5		7		
	440 V	A	--		0.27					0.42		
- 3 conducting paths in series	Up to 24 V	A	16	20	30	35	42	45		70	80	
	60 V	A	16	20	30	35	42	45		70	80	
	110 V	A	16	20	30	35	42	45		70	80	
	220 V	A	1.5		10			25		35		
	440 V	A	0.2		0.6					0.8		
- 4 conducting paths in series	Up to 24 V	A	16	20	30	35	42	45		70	80	
	60 V	A	16	20	30	35	42	45		70	80	
	110 V	A	16	20	30	35	42	45		70	80	
	220 V	A	1.5		30	35	42	25		70	80	
	440 V	A	0.2		0.6					0.8		

[1] The values in brackets apply for 3RT23.6-1...0-4AA0 versions.

Data for North America

For technical specifications of 3RT contactors.

Type		3RT1355-6A.36	3RT1363-6A.36	3RT1364-6A.36	3RT1373-6A.36, 3RT1374-6A.36, 3RT1375-6A.36
Size		S6	S10		S12
General data					
Dimensions					
• Width	mm	120	140		184
• Height	mm	150	196		225
• Depth	mm	128	153		180
Mounting position		For vertical mounting surface can be rotated ± 180°, and with 0° rotation can be tilted forward or backward ± 30°, or standing			
Installation altitude at height above sea level, maximum	m	2 000			
Insulation voltage at pollution degree 3					
• Of the main circuit	V	1 000			
• Of the auxiliary circuit	V	690			
Impulse withstand voltage					
• Of the main circuit	kV	8			
• Of the auxiliary circuit	kV	6			
Product function, mirror contact according to IEC 60947-4-1		Yes			
Ambient temperature					
• During operation	°C	-40 ... +60			
• During storage	°C	-40 ... +70			
Degree of protection IP on the front according to IEC 60529		IP00 (IP20 with cover)			
Touch protection on the front acc. to IEC 60529		Finger-safe for vertical touching from the front with cover			
Short-circuit protection					
Version of the fuse link required					
• For short-circuit protection of the main circuit for type of coordination 2		gG: 250 A (500 V, 100 kA)	gG: 355 A (500 V, 100 kA)	gG: 400 A (500 V, 100 kA)	gG: 630 A (500 V, 100 kA)
• For short-circuit protection of the auxiliary switch		gG: 10 A (690 V, 1 kA)			

Type		3RT1355-				3RT1363-				3RT1364-			
		6AE36	6AF36	6AP36	6AR36	6AE36	6AF36	6AP36	6AR36	6AE36	6AF36	6AP36	6AR36
Size		S6				S10							
Control circuit/control													
Operating range factor of the control supply voltage, rated value of the solenoid coil													
• At AC at 50 Hz		0.85 ... 1.1											
• At AC at 60 Hz		0.85 ... 1.1											
• At DC		0.8 ... 1.1											
Solenoid coil closing for DC	W	210	130	135	205		130	190		205	130	190	
Closing apparent power of the solenoid coil for AC													
• At 50 Hz	VA	225	170	130	205	165	175	220	185	165	175	220	185
• At 60 Hz	VA	225	170	130	205	165	175	220	185	165	175	220	185
Solenoid coil closed for DC	W	2.5		3	4	2.5			4	2.5			4
Closed apparent power of the solenoid coil for AC													
• At 50 Hz	VA	5.5	4	6	16	6	4	7	16	6	4	7	16
• At 60 Hz	VA	5.5	4	6	16	6	4	7	16	6	4	7	16
Closing delay													
• At AC	ms	20 ... 55				25 ... 60							
• At DC	ms	20 ... 55				25 ... 60							
Opening delay													
• At AC	ms	40 ... 70				45 ... 80							
• At DC	ms	40 ... 70				45 ... 80							
Main circuit													
Operational current at AC-1													
• Up to 690 V													
- At an ambient temperature of 40 °C	A	200				275				350			
- At an ambient temperature of 60 °C	A	175				250				300			
• Up to 1 000 V													
- At an ambient temperature of 40 °C	A	--				250				275			
- At an ambient temperature of 60 °C	A	--				225				250			
No-load switching frequency													
• At AC	1/h	300											
• At DC	1/h	300											

SIRIUS 3RT.3 contactors, 4-pole, up to 525 A

Type		3RT1373-				3RT1374-				3RT1375-			
		6AE36	6AF36	6AP36	6AR36	6AE36	6AF36	6AP36	6AR36	6AE36	6AF36	6AP36	6AR36
Size		S12											
Control circuit/control													
Operating range factor of the control supply voltage, rated value of the solenoid coil													
• At AC at 50 Hz		0.85 ... 1.1											
• At AC at 60 Hz		0.85 ... 1.1											
• At DC		0.8 ... 1.1											
Solenoid coil closing for DC	W	400	360	410	600	400	360	410	600	400	360	410	600
Closing apparent power of the solenoid coil for AC													
• At 50 Hz	VA	475	340	385	420	475	340	385	420	475	340	385	420
• At 60 Hz	VA	475	340	385	420	475	340	385	420	475	340	385	420
Solenoid coil closed for DC	W	3.5	2.5	4.5	4.7	3.5	2.5	4.5	4.7	3.5	2.5	4.5	4.7
Closed apparent power of the solenoid coil for AC													
• At 50 Hz	VA	8.5	17	17.5	21	8.5	17	17.5	21	8.5	17	17.5	21
• At 60 Hz	VA	8.5	17	17.5	21	8.5	17	17.5	21	8.5	17	17.5	21
Closing delay													
• At AC	ms	30 ... 60											
• At DC	ms	30 ... 60											
Opening delay													
• At AC	ms	45 ... 80											
• At DC	ms	45 ... 80											
Main circuit													
Operational current at AC-1													
• Up to 690 V													
- At an ambient temperature of 40 °C	A	400				500				525			
- At an ambient temperature of 60 °C	A	350				400				425			
• Up to 1 000 V													
- At an ambient temperature of 40 °C	A	350				375				400			
- At an ambient temperature of 60 °C	A	300				325				350			
No-load switching frequency													
• At AC	1/h	300											
• At DC	1/h	300											

Type		3RT1355-6A.36	3RT1363-6A.36	3RT1364-6A.36	3RT1373-6A.36	3RT1374-6A.36	3RT1375-6A.36
Size		S8	S10		S12		
Conductor cross-sections							
Type of electrical connection for the main circuit		Connecting bar		Connecting bar, bus connectors offset > 275 A required	Connecting bar	Connecting bar, bus connectors offset > 450 A required	
Minimum cross-section in the main circuit at maximum AC-1 rated value	mm^2	95	150	240		300	370

Selection and ordering data

AC/DC operation

3RT233.-1N.30

3RT234.-1N.30

Rated data AC-1, t_u: 40 / 60 °C	Auxiliary contacts			Rated control supply voltage U_s	**Screw terminals**	Weight
Operational current I_e up to	Ident. No.	Version		50/60 Hz AC or DC	Article No.	
690 V						
A		NO	NC	V		kg
For screw fixing and snap-on mounting on TH 35 standard mounting rail						
Size S2						
With integrated coil circuit (varistor integrated in electronics at the factory)						
60 / 55	**11**	1	1	20 ... 33 175 ... 280	**3RT2336-1NB30** **3RT2336-1NP30**	1.255 1.266
110 / 95	**11**	1	1	20 ... 33 175 ... 280	**3RT2337-1NB30** **3RT2337-1NP30**	1.279 1.260
For screw fixing and snap-on mounting on TH 35-15 and TH 75-15 standard mounting rails						
Size S3						
With integrated coil circuit (varistor integrated in electronics at the factory)						
110 / 100	**11**	1	1	20 ... 33 175 ... 280	**3RT2344-1NB30** **3RT2344-1NP30**	2.180 2.239
140 / 130	**11**	1	1	20 ... 33 175 ... 280	**3RT2346-1NB30** **3RT2346-1NP30**	2.160 2.155
160 / 140	**11**	1	1	20 ... 33 175 ... 280	**3RT2348-1NB30** **3RT2348-1NP30**	2.180 2.260

Other voltages on request.

Accessories and spare parts, see page 2/52 onwards.

*** You can order this quantity or a multiple thereof.**

SIRIUS 3RT.3 contactors, 4-pole, up to 525 A

AC/DC operation ≂

Version for AC-3 motor loads

3RT2336-1NB30-4AA0

3RT2346-1NB30-4AA0

Rated data		Auxiliary contacts			Rated control supply voltage U_s	**Screw terminals** ⏚	Weight
AC-2/AC-3, t_u: up to 60 °C	AC-1, t_u: 40 / 60 °C	Ident. No.	Version		50/60 Hz AC or DC		
Operational current I_e up to 400 V	Operational current I_e up to 690 V					Article No.	
A	A		NO	NC	V		kg
For screw fixing and snap-on mounting on TH 35 standard mounting rail							
Size S2							
With integrated coil circuit (varistor integrated in electronics at the factory)							
50	60 / 55	**11**	1	1	20 ... 33	**3RT2336-1NB30-4AA0**	1.270
For screw fixing and snap-on mounting on TH 35-15 and TH 75-15 standard mounting rails							
Size S3							
With integrated coil circuit (varistor integrated in electronics at the factory)							
95	110 / 100	**11**	1	1	20 ... 33	**3RT2346-1NB30-4AA0**	2.210

Other voltages on request.

Accessories and spare parts, see page 2/52 onwards.

* You can order this quantity or a multiple thereof.

Overview

Standards

IEC 60947-1, IEC 60947-4-1, IEC 60947-5-1 (auxiliary switches)

The contactors are suitable for use in any climate. They are finger-safe according to IEC 60529.

Surge suppression

Contactors supplied without a coil circuit can be retrofitted with RC elements, varistors, diodes or diode assemblies (combination of diode and Zener diode for short break times) for damping opening surges in the coil.

Note:

The break times of the contactor, the opening delay times of the NO contacts and the closing delay times of the NC contacts increase if the contactor coils are damped against voltage peaks. Different accessories are available for the contactors (time change with: Interference suppression diode 6x to 10x; diode assembly 2x to 6x; suppressor diode +1 to 5 ms; varistor +2 to 5 ms).

For details, see Equipment Manual.

Auxiliary contacts

Size S0 to S3 contactors have two auxiliary contacts 1 NO + 1 NC integrated in the basic version.

With sizes S00 to S3, four additional auxiliary contacts can be fitted, including no more than two NC contacts.

For a general description of sizes S00 to S3 of 3RT2 contactors.

Accessories

The accessories for the 3-pole SIRIUS 3RT2 contactors can also be used for the 4-pole versions.

Use of 3RT contactors with IE3/IE4 motors

Note:

For the use of 3RT25 contactors in conjunction with highly energy-efficient IE3/IE4 motors, please observe the information on dimensioning and configuring, see Application Manual.

Application

The contactors are suitable:

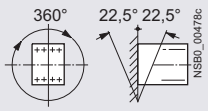
- For changing the polarity of hoisting gear motors
- For switching two separate loads

Note:

Single device for pole reversal; not suitable for reversing duty. 3RT25 contactors are not suitable for switching a load between two current sources.

Technical specifications

More information	
Technical specifications, see https://support.industry.siemens.com/cs/ww/en/ps/16169/td	Manuals, see https://support.industry.siemens.com/cs/ww/en/ps/16169/man
FAQs, see https://support.industry.siemens.com/cs/ww/en/ps/16169/faq	

Type		3RT2516 to 3RT2518	3RT2526	3RT2535	3RT2536	3RT2544, 3RT2545
Size		S00	S0	S2		S3
General data						
Dimensions (W x H x D)		See 3RT231., page 2/89	See 3RT232., page 2/89	See 3RT233., page 2/89		See 3RT234., page 2/89
Permissible mounting position						
The contactors are designed for operation on a vertical mounting surface.						
Upright mounting position		 Special version required				
Mechanical service life	Operating cycles	30 million	10 million			
Electrical endurance at I_e/AC-1	Operating cycles	Approx. 0.5 million				
Rated insulation voltage U_i (pollution degree 3)	V	690				
Protective separation between the coil and the main contacts acc. to IEC 60947-1, Annex N	V	400				690
Permissible ambient temperature						
• During operation	°C	-25 ... +60				
• During storage	°C	-55 ... +80				
Degree of protection IP on the front according to IEC 60529		IP20 (screw terminals and spring-loaded terminals)				
Touch protection on the front acc. to IEC 60529		Finger-safe for vertical touching from the front (screw terminals and spring-loaded terminals)				

SIRIUS 3RT25 contactors, 4-pole, 2 NO + 2 NC

Type	3RT2516 to 3RT2518	3RT2526	3RT2535	3RT2536	3RT2544, 3RT2545
Size	S00	S0	S2		S3
Short-circuit protection					
Main circuit					
• Version of the fuse link required for short-circuit protection of the main circuit					
- for type of coordination 1	gG: 35 A (690 V, 100 kA)	gG: 63 A (690 V, 100 kA)	gG: 125 A (690 V, 100 kA)	gG: 160 A (690 V, 100 kA)	gG: 250 A (690 V, 100 kA)
- for type of coordination 2	gG: 20 A (690 V, 100 kA)	gG: 35 A (690 V, 50 kA)	gG: 63 A (690 V, 100 kA)	gG: 80 A (690 V, 100 kA)	gR: 250 A (690 V, 100 kA)
Auxiliary circuit					
• Version of the fuse link required for short-circuit protection of the auxiliary switch	Fuse gG: 10 A (690 V, 1 kA)				
• Miniature circuit breaker version required for short-circuit protection of the auxiliary switch	6 A (230 V, 400 A, C characteristic)				

Type		3RT2516-1A	3RT2517-1A, 3RT2518-1A	3RT2516-1B, 3RT2517-1B, 3RT2518-1B	3RT2526-1A	3RT2526-1B	3RT253.-1A	3RT253.-1N	3RT254.-1A	3RT254.-1N
Size		S00			S0		S2		S3	
Control										
Type of operating mechanism		AC		DC	AC	DC	AC	AC/DC	AC	AC/DC
Solenoid coil operating range										
• AC operation	At 50 Hz	0.8 ... 1.1 x U_s		--	0.8 ... 1.1 x U_s	--	0.8 ... 1.1 x U_s	--	0.8 ... 1.1 x U_s	--
	At 60 Hz	0.85 ... 1.1 x U_s		--	0.8 ... 1.1 x U_s	--	0.8 ... 1.1 x U_s	--	0.8 ... 1.1 x U_s	--
• DC operation	Up to 50 °C	--		0.8 ... 1.1 x U_s	--	0.8 ... 1.1 x U_s	--			
	Up to 60 °C	--		0.85 ... 1.1 x U_s	--	0.8 ... 1.1 x U_s	--			
• AC/DC operation		--						0.8 x $U_{s\,min}$ ... 1.1 x $U_{s\,max}$	--	0.8 x $U_{s\,min}$ ... 1.1 x $U_{s\,max}$
Power consumption of the solenoid coils (for cold coil and 1.0 x U_s)										
• AC operation, 50/60 Hz, standard version										
- Closing	VA	27/24.3	37/33	--	81/79	--	210/188	110	348/296	--
- P.f.		0.8/0.75		--	0.72/0.74	--	0.69/0.65	0.95	0.62/0.55	--
- Closed	VA	4.2/3.3	5.7/4.4	--	10.5/8.5	--	17.2/16.5	2.5	25/18	--
- P.f.		0.25/0.25		--	0.25/0.28	--	0.36/0.39	0.95	0.35/0.41	--
• DC operation										
- Closing	W	--		4	--	5.9	23	70	--	76
- Closed	W	--		4	--	5.9	1	1.5	--	1.8
Operating times within operating range										
Total break time = Opening delay + Arcing time										
• AC operation										
- Closing delay	ms	9 ... 35		--	8 ... 40	--	10 ... 80	30 ... 110	13 ... 50	50 ... 70
- Opening delay	ms	4 ... 15		--	4 ... 16	--	10 ... 18	30 ... 55	10 ... 21	38 ... 57
• DC operation										
- Closing delay	ms	30 ... 100			--	50 ... 170	--	30 ... 110	--	50 ... 70
- Opening delay	ms	38 ... 65		7 ... 13	--	15 ... 18	--	30 ... 55	--	38 ... 57
• Arcing time	ms	10 ... 15			10		10 ... 20			

Type				3RT2516	3RT2517	3RT2518	3RT2526		3RT2535	3RT2536	3RT2544	3RT2545
Size				S00			S0		S2		S3	
Rated data of the main contacts												
Load rating with AC												
Utilization category AC-1												
• Rated operational currents I_e	At 40 °C up to 690 V		A	18	22		40		60	70	100	125
	At 60 °C up to 690 V		A	16	20		35		55	60	90	105
• Rated power for AC loads P.f. = 0.95 (at 60 °C)	At 230 V		kW	6	7.5		13.3		21	23	34	59
	400 V		kW	10.5	13		23		36	39	40	69
• Minimum cross-section in the main circuit at maximum AC-1 rated value			mm^2	2.5	4		10		16	25	35	50
Utilization categories AC-2 and AC-3							AC[1]	DC[1]				
• Rated operational currents I_e (at 60 °C)	NO up to 400 V		A	9	12	16	25		35	41	65	80
	NC up to 400 V		A	9			25	20	35	41	65	80
• Rated power for slip-ring or squirrel-cage motors at 50 and 60 Hz	NO at 230 V		kW	2.2	3	4	5.5		11		18.5	22
	NC at 230 V		kW	2.2			5.5		11		18.5	22
	NO at 400 V		kW	4	5.5	7.5	11		18.5	22	30	37
	NC at 400 V		kW	4			11	7.5	18.5	22	30	37
Load rating with DC												
Utilization category DC-1, ($L/R \leq 1$ ms)												
• Rated operational currents I_e (at 60 °C)												
- 1 conducting path	Up to 24 V		A	16	20		35		55	60	100	
	60 V		A	16	20		20		23		60	
	110 V		A	2.1			4.5				9	
	220 V		A	0.8			1				2	
	440 V		A	0.6			0.4				0.6	
- 2 conducting paths in series	Up to 24 V		A	16	20		35		55		100	
	60 V		A	16	20		35		45		100	
	110 V		A	12			35		45		100	
	220 V		A	1.6			5				10	
	440 V		A	0.8			1				1.8	
Utilization category DC-3/DC-5[2], shunt-wound and series-wound motors ($L/R \leq 15$ ms)												
• Rated operational currents I_e (at 60 °C)												
- 1 conducting path	Up to 24 V		A	16	20				35		40	
	60 V		A	0.5			5		6			
	110 V		A	0.15			2.5					
	220 V		A	0.75			1					
	440 V		A	--			0.09		0.1		0.15	
- 2 conducting paths in series	Up to 24 V		A	16	20		35		55		100	
	60 V		A	5			35		45		100	
	110 V		A	0.35			15		25		100	
	220 V		A	--			3		5		7	
	440 V		A	--			0.27				0.42	
Switching frequency												
Switching frequency *z* in operating cycles/hour												
Contactors without overload relays												
• No-load switching frequency		AC	1/h	--			5 000	--	5 000			
		DC	1/h	--				1 500	--			
		AC/DC	1/h	10 000			1 500		500		1 000	
• Switching frequency z during rated operation (Dependence of the switching frequency z' on operational current I' and operational voltage U': $z' = z \cdot (I_e/I') \cdot (U_e/U')^{1.5} \cdot 1/h$)	I_e/AC-1 at 400 V		1/h	1 000					1 200 (350)[3]	1 000 (350)[3]	900	

1) Values for devices with AC and DC operation: For 3RT2526 with DC operation, different values apply to AC-2 and AC-3 for the NC.

2) For $U_e > 24$ V, the rated operational currents I_e for the NC contact conducting paths are equal to 50% of the values for the NO contact conducting paths.

3) The values in brackets apply for 3RT253.-.N.

SIRIUS 3RT25 contactors, 4-pole, 2 NO + 2 NC

Selection and ordering data

AC/DC operation

Single device for pole reversal (not suitable for reversing duty)

3RT253.-1N.30

3RT254.-1N.30

Rated data			Auxiliary contacts			Rated control supply voltage U_s	**Screw terminals**	Weight
AC-2/AC-3, t_u: up to 60 °C		AC-1, t_u: 40 / 60 °C	Ident. No.	Version		50/60 Hz AC or DC		
Operational current I_e up to	Ratings of three-phase motors at 50 Hz and	Operational current I_e up to					Article No.	
400 V	**400 V**	690						
A	**kW**	A		NO	NC	V		kg
For screw fixing and snap-on mounting on TH 35 standard mounting rail								
Size S2								
With integrated coil circuit (varistor integrated in electronics at the factory)								
35	**18.5**	60 / 55	**11**	1	1	20 ... 33	**3RT2535-1NB30**	1.192
						83 ... 155	**3RT2535-1NF30**	1.179
						175 ... 280	**3RT2535-1NP30**	1.185
41	**22**	70 / 60	**11**	1	1	20 ... 33	**3RT2536-1NB30**	1.176
						83 ... 155	**3RT2536-1NF30**	1.191
						175 ... 280	**3RT2536-1NP30**	1.180
For screw fixing and snap-on mounting on TH 35-15 and TH 75-15 standard mounting rails								
Size S3								
With integrated coil circuit (varistor integrated in electronics at the factory)								
65	**30**	100 / 90	**11**	1	1	20 ... 33	**3RT2544-1NB30**	2.150
						175 ... 280	**3RT2544-1NP30**	2.180
80	**37**	125 / 105	**11**	1	1	20 ... 33	**3RT2545-1NB30**	2.150
						175 ... 280	**3RT2545-1NP30**	2.125

Other voltages on request.

Accessories and spare parts, see page 2/52 onwards.

*** You can order this quantity or a multiple thereof.**

Overview

Standards

IEC 60947-4-1, IEC 60077-2, EN 50155

Performance range

Sizes S00 to S3

- 3RT20 contactors for motor loads (AC-3) up to 110 A / 55 kW

Sizes S6 to S12

- 3RT10 contactors for motor loads (AC-3) from 55 kW to 500 A / 250 kW
- 3RT14 contactors for weak or non-inductive loads (AC-1) up to 690 A

Application

Besides standard approval in compliance with IEC 60947-4-1, the contactors with an extended operating range are also approved in compliance with the relevant parts of IEC 60077-2, thus fulfilling the requirement for use in railway applications.

Thus, their suitability for increased requirements such as an

- extended temperature range compared to the IEC 60947-4-1 product standard or
- extended operating range of the contactor operating mechanisms or also
- increased resistance to mechanical oscillations and vibrations is warranted. The design of the terminals in the spring-loaded connection system also contributes toward vibration resistance.

Versions

In addition to the complete motor contactor series (AC-3) up to 250 kW of sizes S00 to S12 (3RT.0), as from size S6, new variants of the 3RT14 contactors optimized for AC-1 operation up to 525 kW with extended operating conditions are also available.

Operating range of contactor operating mechanisms

The contactors with extended operating range and railway approval are available with a solid-state DC operating mechanism in all sizes from S00 to S12.

This operating mechanism version has an operating range from 0.7 to 1.25 x U_s in the temperature range -40 to 70 °C. Overvoltage damping of the contactor coil with a varistor circuit is already integrated.

As from size S6, the operating mechanisms are equipped with an additional control input that can be operated between 24 DC and 110 V. This function can optionally be switched on or off via a selector switch.

Auxiliary switches

These devices can be equipped with auxiliary switches in the same way as their corresponding versions of the standard motor contactors (see overview diagrams of the contactors, page 2/6 onwards).

Ambient temperature

The permissible ambient temperature for operation of the contactors (across the full operating range of the operating mechanisms) is -40 to +70 °C.

Side-by-side mounting

Contactors with conventional operating mechanism

- Sizes S00 and S0:
  Side-by-side mounting is permissible at ambient temperatures up to 60 °C. At > 60 to 70 °C, a clearance of at least 10 mm shall be provided.

Contactors with series resistor

- Size S00:
  Side-by-side mounting is permissible at ambient temperatures up to 70 °C.

Contactors with solid-state operating mechanism (version: 3RT....-.....-0LA2)

- Sizes S00 to S3:
  Side-by-side mounting is permissible at ambient temperatures up to 70 °C.
- Sizes S6 to S12:
  Side-by-side mounting is permissible at ambient temperatures up to 60 °C. At > 60 to 70 °C, a clearance of at least 10 mm shall be provided.

2

Technical specifications

More information	
Technical specifications, see https://support.industry.siemens.com/cs/ww/en/ps/16177/td FAQs, see https://support.industry.siemens.com/cs/ww/en/ps/16177/faq	Manuals, see https://support.industry.siemens.com/cs/ww/en/ps/16177/man

Type			3RT2017	3RT2017-2XB4.-0LA2	2XF4.-0LA2	3RT2018-2XB4.-0LA2	2XF4.-0LA2	3RT202.	3RT202.-2XB40-0LA2	2XF40-0LA2
Size			S00					S0		
General data										
Upright mounting position										
• Contactors with series resistor			Special version (on request)							
• Contactors with conventional coil			Special version (on request)							
Ambient temperature										
• During operation		°C	-40 ... +70[1]	-40 ... +70						
• During storage		°C	-55 ... +80							
Control										
Solenoid coil operating range	DC		0.7 ... 1.25 x U_s							
Power consumption of the solenoid coils			For cold coil and 1.0 x U_s							
• Contactors with series resistor	Closing	W	13	--						
	Closed	W	4.0	--						
• Contactors with conventional coil	Closing	W	2.8	--				4.5	--	
	Closed	W	2.8	--				4.5	--	
• Contactors with solid-state operating mechanism	Closing	W	--	4.0	4.5	4.0	4.5	--	6.7	13.2
	Closed	W	--	0.95	0.75	0.95	0.75	--	1.4	1.3
Rated data of the main contacts										
Load rating with AC										
Minimum cross-section in the main circuit										
• At maximum AC-1 rated value		mm^2	4					10		
• At maximum I_{th} rated value		mm^2	--	4				--	10	

[1] 3RT20..-.K contactors without the article number suffix "-0LA2" are coupling contactors that are certified for the -25 to +60 °C standard temperature range. For railway applications, an additional certification approves these contactors with a minimum clearance of 10 mm for the extended temperature range from -40 to +70 °C.

All details and technical specifications not mentioned here are identical to those of the basic units, see page 2/18 onwards.

Type			3RT2035-3XB40-0LA2	3XF40-0LA2	3RT2036-3XB40-0LA2	3XF40-0LA2	3RT2037-3XB40-0LA2	3XF40-0LA2	3RT2038-3XB40-0LA2	3XF40-0LA2	3RT204.-3XB40-0LA2	3XF40-0LA2
Size			S2								S3	
General data												
Ambient temperature												
• During operation		°C	-40 ... +70									
• During storage		°C	-55 ... +80									
Control												
Solenoid coil operating range	DC		0.7 ... 1.25 x U_s									
Power consumption of the solenoid coils			For cold coil and 1.0 x U_s									
• Contactors with solid-state operating mechanism	Closing	W	23								76	64
	Closed	W	1								1.8	1.0
Rated data of the main contacts												
Load rating with AC												
Minimum cross-section in the main circuit												
• At maximum AC-1 rated value		mm^2	16		25				35		50	
• At maximum I_{th} rated value		mm^2	16		25				35		50	

All details and technical specifications not mentioned here are identical to those of the basic units, see page 2/18 onwards.

Type		3RT1054-.X.46-0LA2	3RT1055-.X.46-0LA2	3RT1056-.X.46-0LA2	3RT1064-.X.46-0LA2	3RT1065-.X.46-0LA2	3RT1066-.X.46-0LA2	3RT1075-.X.46-0LA2	3RT1076-.X.46-0LA2
Size		S6			S10			S12	
General data									
Ambient temperature									
• During operation	°C	-40 ... +70							
• During storage	°C	-55 ... +80							
Control									
• Solenoid coil closing for DC	W	320			580			800	
• Solenoid coil closed for DC	W	2.8			3.4			3.6	
• Control version of the switch operating mechanism		PLC-IN or standard A1 - A2 (can be set)							
Actuated via A1/A2									
• Rated control supply voltage	V DC	24, 72 or 110							
• Operating range		0.7 ... 1.25							
Actuated via PLC input									
• Rated voltage	V DC	24 ... 110							
• Operating range		0.7 ... 1.25							
• Consumed current at PLC control input according to IEC 60947-1, maximum	mA	2							
Rated data of the main contacts									
Load rating with AC									
Minimum cross-section in the main circuit									
• At maximum AC-1 rated value	mm^2	70	95		150	185		300	370
• At maximum I_{th} rated value	mm^2	70	95		150	185		300	370
Switching frequency									
Switching frequency *z* in operating cycles/hour									
Contactors without overload relays									
• No-load switching frequency									
- Contactors with solid-state operating mechanism	1/h	1 000			700			500	
• Switching frequency *z* during rated operation (Dependence of the switching frequency *z'* on operational current *I'* and operational voltage *U'*: $z' = z \cdot (I_e/I') \cdot (U_e/U')^{1.5} \cdot 1/h$)									
- Contactors with solid-state operating mechanism I_e/AC-1 at 400 V	h^{-1}	800			700			500	
I_e/AC-2 at 400 V	h^{-1}	400	300		250	300	250	200	170
I_e/AC-3 at 400 V	h^{-1}	1 000	750		500	700	500		420
I_e/AC-4 at 400 V	h^{-1}	130							

For all details and technical specifications not mentioned here, see https://support.industry.siemens.com/cs/ww/en/ps/16177/td.

Type		3RT1456-.X.46-0LA2	3RT1466-.X.46-0LA2	3RT1467-.X.46-0LA2	3RT1476-.X.46-0LA2
Size		S6	S10		S12
General data					
Ambient temperature					
• During operation	°C	-40 ... +70			
• During storage	°C	-55 ... +80			
Control					
• Solenoid coil closing for DC		320	580		800
• Solenoid coil closed for DC		2.8	3.4		3.6
• Control version of the switch operating mechanism		PLC-IN or standard A1 - A2 (can be set)			
Actuated via A1/A2					
• Rated control supply voltage	V DC	24, 72 or 110			
• Operating range		0.7 ... 1.25			
Actuated via PLC input					
• Rated voltage	V DC	24 ... 110			
• Operating range		0.7 ... 1.25			
• Consumed current at PLC control input according to IEC 60947-1, maximum	mA	2			
Rated data of the main contacts					
Load rating with AC					
Minimum cross-section in the main circuit					
• At maximum AC-1 rated value	mm^2	140	240	300	480
• At maximum I_{th} rated value	mm^2	140	240		480

For all details and technical specifications not mentioned here, see https://support.industry.siemens.com/cs/ww/en/ps/16177/td.

2

Selection and ordering data

DC operation

3RT201.-2K.4.

3RT201.-2K.42-0LA0

Rated data according to IEC 60947-4-1 AC-2 and AC-3, t_u: 70 °C					Auxiliary contacts			Rated control supply voltage U_s	**Spring-loaded terminals**	Weight
Operational current I_e up to	Ratings of three-phase motors at				Ident. No.	Version			Article No.	
400 V	230 V	**400 V**	500 V	690 V		NO	NC			
A	kW	**kW**	kW	kW				V DC		kg
For screw fixing and snap-on mounting on TH 35 standard mounting rail										
Size S00										
Coupling contactors with integrated coil circuit										
• Suppressor diode integrated at the factory										
12	3	**5.5**	5.5	5.5	**10**[1]	1	--	24	**3RT2017-2KB41**	0.316
								110	**3RT2017-2KF41**	0.316
12	3	**5.5**	5.5	5.5	**01**[1]	--	1	24	**3RT2017-2KB42**	0.316
								110	**3RT2017-2KF42**	0.316
• Varistor integrated at the factory										
12	3	**5.5**	5.5	5.5	**10**[1]	1	--	24	**3RT2017-2LB41**	0.317
								110	**3RT2017-2LF41**	0.318
12	3	**5.5**	5.5	5.5	**01**[1]	--	1	24	**3RT2017-2LB42**	0.319
								110	**3RT2017-2LF42**	0.319
With plug-on series resistor and integrated coil circuit										
• Suppressor diode integrated at the factory										
12	3	**5.5**	5.5	5.5	**--**[2]	--	1[3]	24	**3RT2017-2KB42-0LA0**	0.347
								110	**3RT2017-2KF42-0LA0**	0.322
16	4	**7.5**	10	11	**--**[2]	--	1[3]	24	**3RT2018-2KB42-0LA0**	0.350
								110	**3RT2018-2KF42-0LA0**	0.325
• Varistor integrated at the factory										
12	3	**5.5**	5.5	5.5	**--**[2]	--	1[3]	24	**3RT2017-2LB42-0LA0**	0.332
								110	**3RT2017-2LF42-0LA0**	0.340
16	4	**7.5**	10	11	**--**[2]	--	1[3]	24	**3RT2018-2LB42-0LA0**	0.333
								110	**3RT2018-2LF42-0LA0**	0.327

1) It is not possible to mount an auxiliary switch. A clearance of 10 mm is required for side-by-side mounting at ambient temperatures > 60 °C.

2) One 4-pole auxiliary switch according to EN 50005 can be mounted from -40 to 70 °C; no clearance required.

3) NC contact cannot be used because it is used for switching of the series resistor.

Accessories and spare parts, see page 2/52 onwards.

*** You can order this quantity or a multiple thereof.**

IE3/IE4 ready **Contactors for railway applications > SIRIUS 3RT contactors with extended operating range, 3-pole**

DC operation

3RT201.-2X.41-0LA2

3RT201.-2X.42-0LA2

3RT202.-2K.40

3RT202.-2X.40-0LA2

Rated data acc. to IEC 60077-2 t_u: 70 °C	Rated data acc. to IEC 60947-4-1 AC-3 t_u: 60 °C					Auxiliary contacts			Rated control supply voltage U_s	**Spring-loaded terminals**	Weight
Conventional thermal current I_{th} up to	Operational current I_e up to	Ratings of three-phase motors at				Ident. No.	Version			Article No.	
690 V	400 V	230 V	**400 V**	500 V	690 V		NO	NC			
A	A	kW	**kW**	kW	kW				V DC		kg
For screw fixing and snap-on mounting on TH 35 standard mounting rail											
Size S00											
With integrated coil circuit (varistor integrated in electronics at the factory)											
18	12	3	**5.5**	5.5	5.5	**10**	1	--	24 ... 34 72 ... 125	**3RT2017-2XB41-0LA2** **3RT2017-2XF41-0LA2**	0.310 0.313
18	12	3	**5.5**	5.5	5.5	**01**	--	1	24 ... 34 72 ... 125	**3RT2017-2XB42-0LA2** **3RT2017-2XF42-0LA2**	0.310 0.310
18	16	4	**7.5**	10	11	**10**	1	--	24 ... 34 72 ... 125	**3RT2018-2XB41-0LA2** **3RT2018-2XF41-0LA2**	0.310 0.300
18	16	4	**7.5**	10	11	**01**	--	1	24 ... 34 72 ... 125	**3RT2018-2XB42-0LA2** **3RT2018-2XF42-0LA2**	0.320 0.310
Size S0											
With integrated coil circuit											
• Coupling contactors with varistor integrated at the factory											
--	17	4	**7.5**	10	11	**11**[1)]	1	1	24 110	**3RT2025-2KB40** **3RT2025-2KF40**	0.643 0.627
--	25	5.5	**11**	11	11	**11**[1)]	1	1	24 110	**3RT2026-2KB40** **3RT2026-2KF40**	0.643 0.629
--	32	7.5	**15**	18.5	18.5	**11**[1)]	1	1	24 110	**3RT2027-2KB40** **3RT2027-2KF40**	0.650 0.639
• Varistor integrated in electronics at the factory											
30	17	4	**7.5**	10	11	**11**	1	1	24 110	**3RT2025-2XB40-0LA2** **3RT2025-2XF40-0LA2**	0.612 0.578
30	25	5.5	**11**	11	11	**11**	1	1	24 110	**3RT2026-2XB40-0LA2** **3RT2026-2XF40-0LA2**	0.613 0.583
36	32	7.5	**15**	18.5	18.5	**11**	1	1	24 110	**3RT2027-2XB40-0LA2** **3RT2027-2XF40-0LA2**	0.617 0.591
38	38	7.5	**18.5**	18.5	18.5	**11**	1	1	24 110	**3RT2028-2XB40-0LA2** **3RT2028-2XF40-0LA2**	0.620 0.594

[1)] It is not possible to mount an auxiliary switch. A clearance of 10 mm is required for side-by-side mounting at ambient temperatures > 60 °C.

Accessories and spare parts, see page 2/52 onwards.

*** You can order this quantity or a multiple thereof.**

Contactors for railway applications > SIRIUS 3RT contactors with extended operating range, 3-pole

IE3/IE4 ready

DC operation

3RT203.-3X.40-0LA2

3RT204.-3X.40-0LA2

Rated data acc. to						Auxiliary contacts			Rated control supply voltage U_s	**Spring-loaded terminals** for auxiliary and control circuits	Weight
IEC 60077-2	IEC 60947-4-1 AC-3					Ident. No.	Version			Article No.	
t_u: 70 °C	t_u: 60 °C										
Conventional thermal current I_{th} up to	Operational current I_e up to	Ratings of three-phase motors at					NO	NC			
690 V	400 V	230 V	**400 V**	500 V	690 V						
A	A	kW	**kW**	kW	kW				V DC		kg
For screw fixing and snap-on mounting on TH 35 standard mounting rail											
Size S2											
With integrated coil circuit (varistor integrated in electronics at the factory)											
50	40	11	**18.5**	22	22	**11**	1	1	24	**3RT2035-3XB40-0LA2**	1.109
									110	**3RT2035-3XF40-0LA2**	1.115
55	50	15	**22**	30	22	**11**	1	1	24	**3RT2036-3XB40-0LA2**	1.110
									110	**3RT2036-3XF40-0LA2**	1.115
60	65	18.5	**30**	37	37	**11**	1	1	24	**3RT2037-3XB40-0LA2**	1.113
									110	**3RT2037-3XF40-0LA2**	1.117
75	80	22	**37**	37	45	**11**	1	1	24	**3RT2038-3XB40-0LA2**	1.109
									110	**3RT2038-3XF40-0LA2**	1.128
For screw fixing and snap-on mounting on TH 35-15 and TH 75-15 standard mounting rails											
Size S3											
With integrated coil circuit (varistor integrated in electronics at the factory)											
90	80	22	**37**	45	55	**11**	1	1	24	**3RT2045-3XB40-0LA2**	1.824
									110	**3RT2045-3XF40-0LA2**	1.817
95	95	22	**45**	55	75	**11**	1	1	24	**3RT2046-3XB40-0LA2**	1.826
									110	**3RT2046-3XF40-0LA2**	1.820
95	110	30	**55**	75	75	**11**	1	1	24	**3RT2047-3XB40-0LA2**	1.828
									110	**3RT2047-3XF40-0LA2**	1.827

Accessories and spare parts, see page 2/52 onwards.

* You can order this quantity or a multiple thereof.

IE3/IE4 ready **Contactors for railway applications > SIRIUS 3RT contactors with extended operating range, 3-pole**

DC operation ⎓

- Solid-state operating mechanism with 24 to 110 V DC control signal input
- For screw fixing
- Auxiliary and control conductors: Spring-loaded terminals
- Main conductors: Busbar connections; a connection kit with screws, spring washers and nuts is enclosed.

3RT105.-2X.46-0LA2

3RT106.-2X.46-0LA2

3RT107.-2X.46-0LA2

Size	Rated data acc. to IEC 60077-2 t_u: 70 °C Conventional thermal current I_{th} up to 690 V	Rated data acc. to IEC 60947-4-1 AC-3 t_u: 60 °C Operational current I_e up to 400 V	Auxiliary contacts, lateral Version NO	Auxiliary contacts, lateral Version NC	Rated control supply voltage U_s	Spring-loaded terminals Article No.	Weight
	A	A			V DC		kg
Solid-state operating mechanism							
With control signal input 24 ... 110 V DC e. g. for control by PLC							
With integrated coil circuit (varistor integrated in electronics at the factory)							
S6	120	115	2	2	24	**3RT1054-2XB46-0LA2**	3.336
					72	**3RT1054-2XJ46-0LA2**	3.355
					110	**3RT1054-2XF46-0LA2**	3.278
	140	150	2	2	24	**3RT1055-2XB46-0LA2**	3.411
					72	**3RT1055-2XJ46-0LA2**	3.265
					110	**3RT1055-2XF46-0LA2**	3.350
	145	185	2	2	24	**3RT1056-2XB46-0LA2**	3.420
					72	**3RT1056-2XJ46-0LA2**	3.259
					110	**3RT1056-2XF46-0LA2**	3.403
S10	215	225	2	2	24	**3RT1064-2XB46-0LA2**	6.461
					72	**3RT1064-2XJ46-0LA2**	6.462
					110	**3RT1064-2XF46-0LA2**	6.530
	265	265	2	2	24	**3RT1065-2XB46-0LA2**	6.482
					72	**3RT1065-2XJ46-0LA2**	6.700
					110	**3RT1065-2XF46-0LA2**	6.610
	265	300	2	2	24	**3RT1066-2XB46-0LA2**	6.654
					72	**3RT1066-2XJ46-0LA2**	6.800
					110	**3RT1066-2XF46-0LA2**	6.618
S12	350	400	2	2	24	**3RT1075-2XB46-0LA2**	10.340
					72	**3RT1075-2XJ46-0LA2**	10.497
					110	**3RT1075-2XF46-0LA2**	10.283
	475	500	2	2	24	**3RT1076-2XB46-0LA2**	10.496
					72	**3RT1076-2XJ46-0LA2**	1.034
					110	**3RT1076-2XF46-0LA2**	10.411

Accessories and spare parts, see page 2/52 onwards.

*** You can order this quantity or a multiple thereof.**

Contactors for railway applications > SIRIUS 3RT contactors with extended operating range, 3-pole

DC operation ⎓

- Solid-state operating mechanism with 24 to 110 V DC control signal input
- For screw fixing
- Auxiliary and control conductors: Spring-loaded terminals
- Main conductors: Busbar connections; a connection kit with screws, spring washers and nuts is enclosed.

3RT1456-2X.46-0LA2

3RT146.-2X.46-0LA2

3RT1476-2X.46-0LA2

Size	Rated data acc. to IEC 60077-2 t_u: 70 °C Conventional thermal current I_{th} up to 690 V	Rated data acc. to IEC 60947-4-1 AC-1 t_u: 40 °C Operational current I_e up to 400 V	Auxiliary contacts, lateral Version NO	NC	Rated control supply voltage U_s	Spring-loaded terminals Article No.	Weight
	A	A			V DC		kg
Solid-state operating mechanism							
With control signal input 24 ... 110 V DC e. g. for control by PLC							
With integrated coil circuit (varistor integrated in electronics at the factory)							
S6	190	275	2	2	24	**3RT1456-2XB46-0LA2**	3.400
					72	**3RT1456-2XJ46-0LA2**	3.400
					110	**3RT1456-2XF46-0LA2**	3.342
S10	330	400	2	2	24	**3RT1466-2XB46-0LA2**	6.561
					72	**3RT1466-2XJ46-0LA2**	6.580
					110	**3RT1466-2XF46-0LA2**	6.707
	330	500	2	2	24	**3RT1467-2XB46-0LA2**	6.535
					72	**3RT1467-2XJ46-0LA2**	6.580
					110	**3RT1467-2XF46-0LA2**	6.707
S12	520	690	2	2	24	**3RT1476-2XB46-0LA2**	10.415
					72	**3RT1476-2XJ46-0LA2**	10.199
					110	**3RT1476-2XF46-0LA2**	10.085

Accessories and spare parts, see page 2/52 onwards.

* You can order this quantity or a multiple thereof.

Overview

Standards

IEC 60947-5-1

The contactor relays are finger-safe according to IEC 60529. The size S00 contactor relays have spring-loaded connections for all terminals.

Ambient temperature

The permissible ambient temperature for operation of the contactor relays (across the full coil operating range) is -40 to +70 °C.

Uninterrupted duty at temperatures > +60 °C reduces the mechanical service life, the current carrying capacity of the conducting paths and the switching frequency.

Control and auxiliary circuits

The solenoid coils of the contactor relays have an extended coil operating range from 0.7 to 1.25 x U_s and are fitted as standard with surge suppressors. The opening delay is consequently 2 to 5 ms longer than for standard contactors.

Application

For operation in installations that are subject both to considerable variations in the control voltage and to high ambient temperatures, e. g. railway applications under extreme climatic conditions, rolling mills, etc.

Also for control supply voltages with battery buffering to extend the operating time in the event of battery charge failure.

Contactor relays with conventional coil

Control and auxiliary circuits

These contactor relays have an extended operating range from 0.7 to 1.25 x U_s; the solenoid coils are fitted with suppressor diodes as standard. An additional series resistor is not required.

Note:

An additional auxiliary switch cannot be mounted.

Side-by-side mounting

A clearance of 10 mm is required for side-by-side mounting at ambient temperatures > 60 °C ≤ 70 °C.

Contactor relays with series resistor

Control and auxiliary circuits

The DC solenoid systems of the contactor relays are modified (to holding coil) by means of a series resistor.

The size S00 contactor relays are supplied prewired with a plug-on module containing the series resistor. A surge suppressor (a suppressor diode or varistor as preferred) is integrated.

A 4-pole auxiliary switch (according to EN 50005) can be mounted additionally.

Side-by-side mounting

Side-by-side mounting is permissible at ambient temperatures up to 70 °C.

Contactor relays with solid-state operating mechanism

Control and auxiliary circuits

The solenoid coils of these contactor relays have an extended coil operating range from 0.7 to 1.25 x U_s and are fitted as standard with varistors to provide protection against overvoltage.

The contactor relays are energized via upstream control electronics which ensure the coil operating range of 0.7 to 1.25 x U_s at an ambient temperature of 70 °C. They are supplied as complete units with integrated coil electronics. A varistor is integrated for damping opening surges in the coil.

Side-by-side mounting

Side-by-side mounting is permissible at ambient temperatures up to 70 °C.

Technical specifications

More information	
Technical specifications, see https://support.industry.siemens.com/cs/ww/en/ps/16174/td FAQs, see https://support.industry.siemens.com/cs/ww/en/ps/16174/faq	Manuals, see https://support.industry.siemens.com/cs/ww/en/ps/16174/man

Contactor relays		Type	3RH21..-2K, -2L	3RH2122-2XB40-0LA2	3RH2122-2XF40-0LA2
General data					
Upright mounting position					
• Contactors with series resistor			Special version (on request)		
• Contactors with conventional coil			Special version (on request)		
Ambient temperature					
• During operation		°C	-40 ... +70[1)]		
• During storage		°C	-55 ... +80		
Control					
Solenoid coil operating range	DC		0.7 ... 1.25 x U_s		
Power consumption of the solenoid coils			For cold coil and 1.0 x U_s		
• Contactors with series resistor	- Closing	W	13	--	--
	- Closed	W	4	--	--
• Contactors with conventional coil	- Closing	W	2.8	--	--
	- Closed	W	2.8	--	--
• Contactors with solid-state operating mechanism	- Closing	W	--	4	4.5
	- Closed	W	--	0.95	0.75

1) 3RH21..-.K contactor relays without article number suffix "-0LA." are coupling contactor relays that are certified for the temperature range -25 to +60 °C. For railway applications, an additional certification approves these contactors with a minimum clearance of 10 mm for the extended temperature range from -40 to +70 °C.

All details and technical specifications not mentioned here are identical to those of the 3RH2 basic units, see page 2/125 onwards.

2

Selection and ordering data

DC operation

3RH2122-2K.40

3RH2122-2K.40-0LA0

Rated operational current I_e/AC-15/AC-14 t_u: 70 °C at				Contacts			Rated control supply voltage U_s	**Spring-loaded terminals**	Weight
230 V	400 V	500 V	690 V	Ident. No. acc. to EN 50011	Version			Article No.	
					NO	NC			
A	A	A	A				V DC		kg
For screw fixing and snap-on mounting on TH 35 standard mounting rail									
Size S00									
With integrated coil circuit									
• Suppressor diode integrated at the factory									
10	3	2	1	**22E**	2	2[1]	24	**3RH2122-2KB40**	0.316
							110	**3RH2122-2KF40**	0.309
				31E	3	1[1]	24	**3RH2131-2KB40**	0.316
				40E	4	0[1]	24	**3RH2140-2KB40**	0.315
• Varistor integrated at the factory									
10	3	2	1	**22E**	2	2[1]	24	**3RH2122-2LB40**	0.320
							110	**3RH2122-2LF40**	0.317
With plug-on series resistor and integrated coil circuit									
• Suppressor diode integrated at the factory									
10	3	2	1	**21X**	2	1[2]	24	**3RH2122-2KB40-0LA0**	0.331
							110	**3RH2122-2KF40-0LA0**	0.322
• Varistor integrated at the factory									
10	3	2	1	**21X**	2	1[2]	24	**3RH2122-2LB40-0LA0**	0.332
							110	**3RH2122-2LF40-0LA0**	0.323
With integrated coil circuit (varistor integrated in electronics at the factory)									
10	3	2	1	**22E**	2	2[2]	24 ... 34	**3RH2122-2XB40-0LA2**	0.310
							72 ... 125	**3RH2122-2XF40-0LA2**	0.310

[1] It is not possible to mount an auxiliary switch.
[2] 4-pole auxiliary switch according to EN 50005 can be mounted.

Accessories, see page 2/52 onwards.

Other voltages on request.

*** You can order this quantity or a multiple thereof.**

Overview

Standards

IEC 60947-4-1

The contactors are finger-safe according to IEC 60529 (exception: series resistor). Terminal covers may have to be fitted onto the connecting bars, depending on the configuration with other devices.

All details and technical specifications not mentioned here are identical to those of the standard 3TC contactors, see page 2/114.

Ambient temperature

The permissible ambient temperature for operation of the contactors (across the full coil operating range) is -50 to +70 °C. Uninterrupted duty at temperatures < -25 °C and > +55 °C reduces the mechanical service life, the current carrying capacity of the conducting paths and the switching frequency.

A clearance of 10 mm is required for side-by-side mounting of size 2 contactors at ambient temperatures > 55 °C. There is no need to reduce the technical specifications.

Series resistor

The DC solenoid systems of the 3TC contactors must be modified (to holding coil) by means of a series resistor. This series resistor is supplied separately packed with the contactors.

With types 3TC48, the series resistor must be attached onto the right-hand side of the auxiliary switch by means of the enclosed mounting parts and sets of links provided, while in the case of the 3TC44 it must be mounted and wired between the contactor poles. With types 3TC52 and 3TC56, the series resistor must be attached separately next to the contactors.

Auxiliary contacts

The contactors are equipped with two lateral auxiliary switches each with 1 NO + 1 NC contact. Further auxiliary switches cannot be mounted on the DC-operated contactors.

One NC contact is required for the series resistor function. Two NO contacts and one NC contact are thus unassigned.

Reversing contactors

With the 3TC52 and 3TC56 contactors, the series resistor must be connected using an additional K2 reversing contactor. This contactor is automatically included in the scope of supply.

Dimensions

Attaching resistors and varistors increases the width of the contactors.

Application

For operation in installations which are subject both to considerable variations in the control voltage and to high ambient temperatures, e.g. in railway applications.

Control and auxiliary circuits

The solenoid coils of the contactors have an extended coil operating range from 0.7 to 1.25 x U_s and are fitted as standard with varistors to provide protection against overvoltage. The opening delay is consequently 2 to 5 ms longer than for standard contactors.

Technical specifications

More information	
Technical specifications, see https://support.industry.siemens.com/cs/ww/en/ps/16180/td	Manuals, see https://support.industry.siemens.com/cs/ww/en/ps/16180/man

Type		**3TC44**	**3TC48**	**3TC52**	**3TC56**
Size		**2**	**4**	**8**	**12**
General data					
Ambient temperature					
• During operation	°C	-40 ... +70			
Control					
Solenoid coil operating range		0.7 ... 1.25 x U_s			
Power consumption of the solenoid coils		For cold coil and 1.0 x U_s			
• Closing	W	48	26	40	130
• Closed	W	13	14	21	59

All details and technical specifications not mentioned here are identical to those of the basic units of the 3TC contactors, see page 2/114.

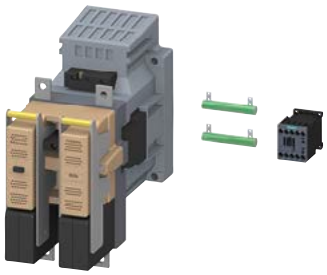
2

Selection and ordering data

DC operation ⎓

3TC44: For screw fixing and snap-on mounting on 35 mm standard mounting rail
3TC48 to 3TC56: For screw fixing

3TC48



3TC56 with reversing contactor

Size	Utilization category	Rated operational current I_e at 750 V	Rated power of loads at 220 V	440 V	600 V	750 V	Auxiliary contacts[1] Version NO	NC	Rated control supply voltage U_s V DC	Screw terminals Article No.	Weight kg
		A	kW	kW	kW	kW					
Contactors for switching DC voltage											
With integrated coil circuit (varistor integrated at the factory)											
2	DC-1	32	7	14	19.2	24	2	1[2]	24	**3TC4417-0LB4**	1.322
	DC-3/DC-5	7.5	5	9	9	4			110	**3TC4417-0LF4**	1.304
With laterally mounted coil circuit (varistor mounted externally in additional auxiliary switch enclosure on the contactor)											
4	DC-1	75	16.5	33	45	56	2	1[2]	24	**3TC4817-0LB4**	4.700
	DC-3/DC-5	75	13	27	38	45			110	**3TC4817-0LF4**	4.630
8	DC-1	170	48	97	132	165	2	1[2]	24	**3TC5217-0LB4**	10.400
	DC-3/DC-5	170	41	82	110	110			110	**3TC5217-0LF4**	10.334
12	DC-1	400	88	176	240	300	2	1[2]	24	**3TC5617-0LB4**	24.450
	DC-3/DC-5	400	70	140	200	250			110	**3TC5617-0LF4**	21.837

[1] No expansion auxiliary contacts can be fitted.
[2] One NC contact used for series resistor.

Other rated control supply voltages according to page 2/121 on request.

Accessories

Accessories, see basic units of the 3TC contactors, page 2/121 onwards.

Spare parts for contactors with extended operating range

For contactors Size	Type	Remarks	Rated control supply voltage U_s V DC	Article No.	Weight kg
Arc chutes					
2	3TC4417-0L..	With cutout for resistor mounting	--	**3TY2442-0B**	0.160
Solenoid coils					
2	3TC44	With series resistor, without varistor	24	**3TY6443-0LB4**	0.364
			110	**3TY6443-0LF4**	0.345
4	3TC48		24	**3TY6483-0LB4**	1.239
			110	**3TY6483-0LF4**	1.167

All spare parts not mentioned here are identical to those of the basic units of the 3TC contactors, see page 2/123.

* You can order this quantity or a multiple thereof.

Overview

3TC4 and 3TC5

IEC 60947-1, IEC 60947-4-1, IEC 60947-5-1 (auxiliary switches)

The contactors are finger-safe according to IEC 60529. Terminal covers may have to be fitted onto the connecting bars, depending on the configuration with other devices.

The DC motor ratings given in the tables are applicable to the DC-3 and DC-5 utilization categories with 2-pole switching of the load or with the two conducting paths of the contactor connected in series.

One contactor conducting path can switch full power up to 220 V. For voltages over 220 V, the two conducting paths are to be switched in series, see rated data of the main contacts, page 2/116.

Surge suppression

Contactors supplied without a coil circuit can be retrofitted with RC elements, varistors, diodes or diode assemblies (combination of diode and Zener diode for short break times) for damping opening surges in the coil, see page 2/122 onwards.

Note:

The break times of the contactor, the opening delay times of the NO contacts and the closing delay times of the NC contacts increase if the contactor coils are damped against voltage peaks. Different accessories are available for the contactors (time change with: Interference suppression diode 6x to 10x; diode assembly 2x to 6x; suppressor diode +1 to 5 ms; varistor +2 to 5 ms).

For details, see Equipment Manual.

Auxiliary contacts

The contactors are equipped with two lateral auxiliary switches each with 1 NO + 1 NC contact. On the 3TC48 to 3TC56 contactors with AC operation, a second auxiliary switch can be mounted on the right and left. On contactors with DC operation, expansion of the auxiliary contacts is not possible.

3TC7

IEC 60947-4-1

The contactors are suitable for use in any climate. They are suitable for switching and controlling DC motors as well as all other DC circuits.

The solenoid excitation is configured for a particularly large operating range. It is between 0.7 or 0.8 and 1.2 × U_S.

3TC74 contactors can be used at up to 750 V/400 A and 50 Hz in AC-1 operation. For voltages over 750 V, the two conducting paths (3TC74: two contactors) are to be switched in series, see rated data of the main contacts, page 2/118.

Application

The contactors are suitable for switching and controlling DC motors as well as all other DC circuits.

A version with a particularly large coil operating range is available for operation in electrically driven vehicles and in switchgear subject to large fluctuations in actuating voltage (see page 2/112).

3TC contactors for switching DC voltage, 1- and 2-pole

Technical specifications

More information

Technical specifications, see
https://support.industry.siemens.com/cs/ww/en/ps/16181/td
FAQs, see
https://support.industry.siemens.com/cs/ww/en/ps/16181/faq

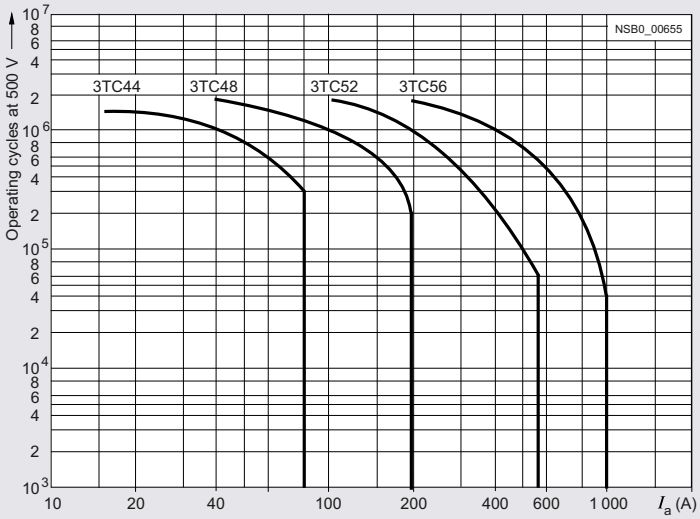
Manuals, see
https://support.industry.siemens.com/cs/ww/en/ps/16181/man

Type			3TC4 and 3TC7	3TC5
Rated data of the auxiliary contacts				
Rated insulation voltage U_i (pollution degree 3)		V	690	
Conventional thermal current I_{th} = rated operational current I_e/AC-12		A	10	10
AC load				
Rated operational current I_e/AC-15/AC-14				
• At rated operational voltage U_e	24 V	A	10	10
	110 V	A	10	10
	125 V	A	10	10
	220 V	A	6	6
	230 V	A	5.6	5.6
	380 V	A	4	4
	400 V	A	3.6	3.6
	500 V	A	2.5	2.5
	660 V	A	2.5	2.5
	690 V	A	--	--
DC load				
Rated operational current I_e/DC-12				
• At rated operational voltage U_e	24 V	A	10	10
	60 V	A	10	10
	110 V	A	3.2	8
	125 V	A	2.5	6
	220 V	A	0.9	2
	440 V	A	0.33	0.6
	600 V	A	0.22	0.4
Rated operational current I_e/DC-13				
• At rated operational voltage U_e	24 V	A	10	10
	48 V	A	5	5
	110 V	A	1.14	2.4
	125 V	A	0.98	2.1
	220 V	A	0.48	1.1
	440 V	A	0.13	0.32
	600 V	A	0.07	0.21

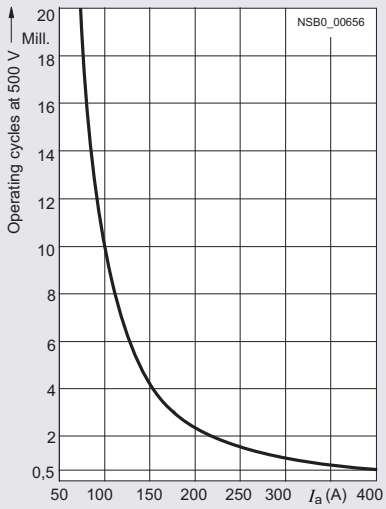
Type		3TC44 to 3TC56
CSA and UL rated data of the auxiliary contacts		
Rated voltage, max.	V AC	600
Switching capacity		A 600, P 600

Type **3TC44 to 3TC78**

Contact endurance of the main contacts

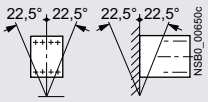


3TC44 to 3TC56 contactors



3TC74 and 3TC78 contactors

Legend for the diagrams:
I_a = Breaking current

Contactor	Type	3TC44	3TC48	3TC52	3TC56
	Size	2	4	8	12
General data					
Dimensions (W x H x D)					
• DC operation	mm	70 x 85 x 141	100 x 183 x 180	135 x 238 x 232	160 x 279 x 310
• AC operation	mm	70 x 85 x 100	100 x 183 x 154	135 x 238 x 200	160 x 279 x 251
Permissible mounting position The contactors are designed for operation on a vertical mounting surface.					
Mechanical service life Operating cycles		10 million			
Electrical endurance		See the endurance diagram above			
Rated insulation voltage U_i (pollution degree 3)	V	800		1 000	
Rated impulse withstand voltage U_{imp}	kV	8			
Protective separation between the coil and the main contacts acc. to IEC 60947-1, Annex N	V	Up to 300		Up to 660	
Mirror contacts[1] A mirror contact is an auxiliary NC contact that cannot be closed simultaneously with an NO main contact.		Yes, acc. to IEC 60947-4-1, Annex F			
Permissible ambient temperature					
• During operation	°C	-25 ... +55			
• During storage	°C	-50 ... +80			
Degree of protection IP on the front according to IEC 60529		IP00	IP00 (IP20 with cover)		
Touch protection on the front acc. to IEC 60529		--	Finger-safe for vertical touching from the front with cover		
Shock resistance Rectangular pulse	g/ms	7.5/5 and 3.4/10	10/5 and 5/10	12/5 and 5.5/10	12/5 and 5.6/10
Short-circuit protection					
Main circuit					
• Type of coordination "1"		2 x 3NA3020 (50 A) in series	2 x 3NA31.. (160 A) in series	3NE1332-4D (400 A)	2 x 3NE1330-4D (315 A) parallel
• Type of coordination "2"		2 x 3NA3020 (50 A) in series	2 x 3NA31.. (63 A) in series	3NE1332-4D (400 A)	2 x 3NE1330-4D (315 A) parallel
Auxiliary circuit (short-circuit current $I_k \leq 1$ kA)					
• Fuse links, operational class gG: DIAZED, type 5SB; NEOZED, type 5SE	A	16			
• Miniature circuit breaker with C characteristic	A	10			

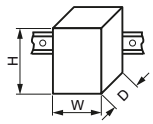
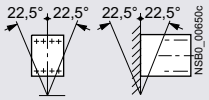
[1] For 3TC44, one NC contact each must be connected in series for the right and left auxiliary switch respectively.

Rated data of the auxiliary contacts, see page 2/114.

3TC contactors for switching DC voltage, 1- and 2-pole

Type			3TC44	3TC48	3TC52	3TC56
Size			2	4	8	12
Control						
Solenoid coil operating range						
• DC operation			0.7 ... 1.25 x U_s			
• AC operation			0.8 ... 1.1 x U_s			
Power consumption of the solenoid coils (for cold coil and 1.0 x U_s)						
• DC operation	Closing = Closed	W	10	19	30	86
• AC operation, 50 Hz coil	Closing	VA/p.f.	68/0.86	300/0.5	640/0.48	1 780/0.3
	Closed	VA/p.f.	10/0.29	26/0.24	46/0.23	121/0.22
• AC operation, 60 Hz coil	Closing	VA/p.f.	95/0.79	365/0.45	730/0.38	2 140/0.3
	Closed	VA/p.f.	12/0.3	35/0.26	56/0.24	140/0.29
• AC operation, 50/60 Hz coil	Closing at 50/60 Hz	VA/p.f.	79/73/0.83/0.78	--		
	Closed at 50/60 Hz	VA/p.f.	11/9/0.28/0.27	--		
Operating times within operating range						
Total break time = Opening delay + Arcing time						
• DC operation	Closing delay	ms	35 ... 190	90 ... 380	120 ... 400	110 ... 400
	Opening delay	ms	10 ... 25	17 ... 28	22 ... 35	40 ... 110
• AC operation	Closing delay	ms	10 ... 40	20 ... 50		
	Opening delay	ms	5 ... 25	5 ... 30	10 ... 30	
• Arcing time	DC-1	ms	20			
	DC-3/DC-5	ms	30			
Rated data of the main contacts						
Load rating with DC						
Utilization category DC-1, (*L/R* ≤ 1 ms)						
• Rated operational currents I_e (at 55 °C)	Up to U_e 750 V	A	32	75	220	400
• Minimum conductor cross-section		mm^2	6	25	95	240
• Rated power at U_e	At 220 V	kW	7	16.5	48	88
(≤ 220 V DC: one conducting path,	440 V	kW	14	33	97	176
> 220 V DC: two conducting paths in series)	600 V	kW	19.2	45	132	240
	750 V	kW	24	56	165	300
Utilization category DC-3 and DC-5, shunt-wound and series-wound motors (*L/R* ≤ 15 ms)						
• Rated operational currents I_e (at 55 °C)	Up to 220 V	A	32	75	220	400
	440 V	A	29	75	220	400
	600 V	A	21	75	220	400
	750 V	A	7.5	75	170	400
• Rated power at U_e	At 110 V	kW	2.5	6.5	20	35
(≤ 220 V DC: one conducting path,	220 V	kW	5	13	41	70
> 220 V DC: two conducting paths in series)	440 V	kW	9	27	82	140
	600 V	kW	9	38	110	200
	750 V	kW	4	45	110	250
Switching frequency						
Switching frequency *z* in operating cycles/hour						
AC/DC operation						
• For weak or non-inductive load DC-1		h^{-1}	1 500	1 000		
• For inductive load DC-3/DC-5		h^{-1}	750	600		
Conductor cross-sections						
Main conductors (1 or 2 conductors can be connected)			**Screw terminals**			
• Solid		mm^2	2 x (2.5 ... 10)	2 x (6 ... 16)	--	
• Finely stranded with end sleeve		mm^2	2 x (1.5 ... 4)	--		
• Stranded with cable lug		mm^2	2 x 16	2 x 35	2 x 120	2 x 150
• Pin-end connector to DIN 46231		mm^2	2 x (1 ... 6)	--		
• Busbars		mm	--	15 x 2.5	25 x 4	2 x (25 x 3)
• Terminal screw			M5	M6	M10	
Auxiliary conductors (1 or 2 conductors can be connected)						
• Solid		mm^2	2 x (1 ... 2.5)			
• Finely stranded with end sleeve		mm^2	2 x (0.75 ... 1.5)			

Rated data of the auxiliary contacts, see page 2/114.

Type			3TC74	3TC78
Design			1-pole contactors	2-pole contactors
General data				
Dimensions (W x H x D) 		mm	78 x 352 x 276	160 x 366 x 290
Permissible mounting position The contactors are designed for operation on a vertical mounting surface.				
Mechanical service life		Operating cycles	30 million	
Electrical endurance			See page 2/115	
Rated insulation voltage U_i (pollution degree 3)		V	1 500	
Rated impulse withstand voltage U_{imp}		kV	8	
Protective separation between the coil and the main contacts acc. to IEC 60947-1, Annex N		V	630	
Mirror contacts[1] A mirror contact is an auxiliary NC contact that cannot be closed simultaneously with an NO main contact.			Yes, according to IEC 60947-4-1, Annex F	
Permissible ambient temperature		°C	-25 ... +55	
Degree of protection IP on the front according to IEC 60529			IP00	
Short-circuit protection				
Main circuit				
• Type of coordination "1"		A	2 x 3NE1330-4D (315 A) parallel	2 x 3NE1330-5E (315 A) parallel
• Type of coordination "2"		A	2 x 3NE1330-4D (315 A) parallel	2 x 3NE1330-5E (315 A) parallel
Auxiliary circuit (Short-circuit current $I_k \leq 1$ kA)				
• Fuse links, operational class gG: DIAZED, type 5SB; NEOZED, type 5SE		A	16	
• Miniature circuit breaker with C characteristic		A	10	
Control				
Solenoid coil operating range				
• DC operation	At U_c = 24 V		0.8 ... 1.2 x U_s	
	At U_c > 24 V		0.7 ... 1.2 x U_s	
• AC operation	At U_c = 24 V		0.7 ... 1.15 x U_s	
	At U_c > 24 V		0.7 ... 1.14 x U_s	
Power consumption of the solenoid coils (For cold coil and 1.0 x U_s)				
• DC operation	Closing = Closed	W	46	92
• AC operation, 50 Hz	Closing = Closed	VA	80	160
		P.f.	0.95	
Operating times within operating range				
Total break time = Opening delay + Arcing time				
• AC and DC operation	Closing delay	ms	60 ... 100	
	Opening delay	ms	20 ... 35	
• Arcing time at 0.06 ... 4 x I_e		ms	40 ... 70	

[1] For 3TC78, one auxiliary NC contact each of the right and left conducting paths must be connected in series.

Rated data of the auxiliary contacts, see page 2/114.

3TC contactors for switching DC voltage, 1- and 2-pole

Type			3TC74	3TC78
Design			1-pole contactors	2-pole contactors
Rated data of the main contacts				
Load rating with DC				
Utilization category DC-1, (*L/R* ≤ 1 ms)				
• Rated operational current I_e/DC-1 (at 55 °C)		A	500	
• Minimum conductor cross-section		mm²	2 x 150	
• Rated power	At 220 V	kW	110	
(≤ 750 V DC: one conducting path,	440 V	kW	220	
> 750 V DC: two conducting paths in series)	600 V	kW	300	
	750 V	kW	375	
	1 200 V	kW	--	600
	1 500 V	kW	--	750
• Critical currents, without arc extinction	At 440 V	A	≤ 7	--
	600 V	A	≤ 13	--
	750 V	A	≤ 15	--
	≤ 800 V	A	--	≤ 7
	1 200 V	A	--	≤ 13
	1 500 V	A	--	≤ 15
Utilization category DC-3 and DC-5, shunt-wound and series-wound motors (*L/R* ≤ 15 ms)				
• Rated operational current I_e (at 55 °C)		A	400	
• Rated power at U_e	At 110 V	kW	35	
(≤ 750 V DC: one conducting path,	220 V	kW	70	
> 750 V DC: two conducting paths in series)	440 V	kW	140	
	600 V	kW	200	
	750 V	kW	250	
	1 200 V	kW	--	400
	1 500 V	kW	--	500
Permissible rated current for regenerative braking At 110 ... 600 V		A	400	
Switching frequency				
Switching frequency *z* in operating cycles/hour				
AC/DC operation				
• For weak or non-inductive load DC-1		h^{-1}	750	1 000
• For inductive load DC-3/DC-5		h^{-1}	500	
Conductor cross-sections				
Main conductors (1 or 2 conductors can be connected)			**Screw terminals**	
• Stranded with cable lug		mm²	2 x ... 150	
• Busbars		mm	2 x (30 x 4)	
Auxiliary conductors (1 or 2 conductors can be connected)				
• Solid		mm²	1 ... 2.5	
• Finely stranded with end sleeve		mm²	0.75 ... 1.5	

Rated data of the auxiliary contacts, see page 2/114.

Selection and ordering data

DC operation or AC operation, 50 Hz

3TC44

3TC48

Size	Utilization category[1]	Operational current I_e[2]	Ratings of DC motors at 110 V	220 V	440 V	600 V	750 V	Auxiliary contacts[3] Version NO	NC	Rated control supply voltage U_s	Screw terminals Article No.	Weight
		A	kW	kW	kW	kW	kW			V		kg
3TC44 to 3TC56 2-pole contactors · Operational voltage up to 750 V												
DC operation												
For screw fixing and snap-on mounting on TH 35 standard mounting rail												
2	DC-3, DC-5	32	2.5	5	9	9	4	2	2	24 DC	**3TC4417-0AB4**	1.060
										110 DC	**3TC4417-0AF4**	1.043
										220 DC	**3TC4417-0AM4**	1.000
For screw fixing												
4	DC-3, DC-5	75	6.5	13	27	38	45	2	2	24 DC	**3TC4817-0AB4**	4.500
										110 DC	**3TC4817-0AF4**	4.490
										220 DC	**3TC4817-0AM4**	4.425
8	DC-3, DC-5	220[4]	20	41	82	110	110	2	2	24 DC	**3TC5217-0AB4**	10.000
										110 DC	**3TC5217-0AF4**	9.734
										220 DC	**3TC5217-0AM4**	9.660
12	DC-3, DC-5	400	35	70	140	200	250	2	2	24 DC	**3TC5617-0AB4**	23.554
										110 DC	**3TC5617-0AF4**	21.234
										220 DC	**3TC5617-0AM4**	23.100

1) Permissible load for DC-1 utilization category, see detailed technical specifications in the Reference Manual.

2) The following rated operational currents are permitted for reversing duty with 3TC44 to 3TC56 contactors:

Contactor Type	Rated operational voltage 110 V, 220 V	440 V
3TC44	32 A	7 A
3TC48	75 A	75 A
3TC52	170 A	170 A
3TC56	400 A	400 A

3) The fitting of auxiliary switches cannot be altered on DC-operated contactors.

4) At > 600 V: I_e = 170 A.

Other rated control supply voltages according to page 2/121 on request.

Accessories, see page 2/121 onwards.

For spare parts, see page 2/123.

*** You can order this quantity or a multiple thereof.**

3TC contactors for switching DC voltage, 1- and 2-pole

DC operation ⎓ or AC operation, 50 Hz ∿

For screw fixing

3TC74

3TC78

Size	Utilization category[1]	Operational current I_e	Ratings of DC motors at 110 V	220 V	440 V	600 V	750 V	1 200 V	1 500 V	Auxiliary contacts[2] Version NO	NC	Rated control supply voltage U_s	Screw terminals Article No.	Weight
		A	kW	kW	kW	kW	kW	kW	kW	NO	NC	V		kg
3TC74 1-pole contactors · Operational voltage up to 750 V														
DC operation														
12	DC-3, DC-5	400	35	70	140	200	250	--	--	4	4	24 DC 110 DC	**3TC7414-0EB** **3TC7414-0EF**	10.600 10.514
3TC78 2-pole contactors · Operational voltage up to 1 500 V														
DC operation														
12	DC-3, DC-5	400	35	70	140	200	250	400	500	4	4	24 DC 110 DC	**3TC7814-0EB** **3TC7814-0EF**	22.000 23.490

[1] Permissible load for DC-1 utilization category, see detailed technical specifications in the Reference Manual.

[2] The fitting of auxiliary switches cannot be altered on DC-operated contactors.

Other rated control supply voltages according to page 2/121 on request.

For spare parts, see page 2/123.

*** You can order this quantity or a multiple thereof.**

Options

Rated control supply voltages, possible on request (change of the 10th and 11th digits of the Article No.)

Delivery time on request

Rated control supply voltage U_s	**Contactor type**	**3TC44**	**3TC48**	**3TC52/3TC56**	**3TC74/3TC78**
DC operation					
24 V DC		B4	B4	B4	B
48 V DC		W4	W4	--	--
60 V DC		E4	E4	--	--
110 V DC		F4	F4	F4	F
125 V DC		G4	G4	--	--
220 V DC		M4	M4	M4	M
230 V DC		P4	P4	--	--
AC operation					
Solenoid coils for 50 Hz					
24 V AC		B0	B0	--	--
110 V AC		F0	F0	F0	--
230/220 V AC		P0[1]	P0[1]	P0[1]	M[2]
240 V AC		U0	U0	--	--
Solenoid coils for 50/60 Hz					
24 V AC		C2	--	--	--
110 V AC		G2	--	--	--
120 V AC		K2	--	--	--
220 V AC		N2	--	--	--
230 V AC		L2	--	--	--

[1] Operating range at 220 V AC: 0.85 to 1.15 × U_s; lower operating range limit according to IEC 60947.

[2] Upper operating range limit at 230 V AC: 1.14 × U_s.

Accessories

For contactors		Version	Auxiliary switches		**Screw terminals**	Weight
		Auxiliary contacts	Left	Right	Article No.	
						
Size	Type	NO NC				kg
Second auxiliary switch (for AC operation only)						
4	3TC48	2nd auxiliary switch, left			**3TY6501-1K**	0.055
		1 1		--		
		2nd auxiliary switch, right			**3TY6501-1L**	0.055
		1 1	--			
8 and 12	3TC52, 3TC56	2nd auxiliary switch, left			**3TY6561-1K**	0.085
		1 1		--		
		2nd auxiliary switch, right			**3TY6561-1L**	0.086
		1 1	--			
Solid-state compatible auxiliary switches						
		For operation in dusty atmospheres and in solid-state circuits with rated operational currents $I_{e/}$AC-14 and DC-13 of 1 ... 300 mA at 3 ... 60 V				
2 and 4	3TC44, 3TC48	2nd auxiliary switch, left or right (replacement for 3TY6561-1U, 3TY6561-1V)			**3TY7561-1UA00**	0.055
		1 CO contact				

5TY7561-1.

* You can order this quantity or a multiple thereof.

3TC contactors for switching DC voltage, 1- and 2-pole

	For contactors		Version	Rated control supply voltage U_s		Article No.	Weight
	Size	Type		V AC	V DC		kg
Surge suppressors · Varistors							
 3TX7402-3.	2	3TC44[1]	**Varistors**[2] With line spacer, for mounting on the coil terminal	24 ... 48	24 ... 70	**3TX7402-3G**	0.014
				48 ... 127	70 ... 150	**3TX7402-3H**	0.015
				127 ... 240	150 ... 250	**3TX7402-3J**	0.015
				240 ... 400	--	**3TX7402-3K**	0.021
				400 ... 600	--	**3TX7402-3L**	0.023
	4	3TC48	**Varistors**[2] For sticking onto the contactor base or for mounting separately	24 ... 48	24 ... 70	**3TX7462-3G**	0.014
				48 ... 127	70 ... 150	**3TX7462-3H**	0.014
				127 ... 240	150 ... 250	**3TX7462-3J**	0.015
				240 ... 400	--	**3TX7462-3K**	0.016
				400 ... 600	--	**3TX7462-3L**	0.016
 3TX7462-3.	8 and 12	3TC52, 3TC56	**Varistors** For sticking onto the contactor base or for mounting separately	24 ... 48	--	**3TX7462-3G**	0.014
				48 ... 127	--	**3TX7462-3H**	0.014
				127 ... 240	--	**3TX7462-3J**	0.015
				240 ... 400	--	**3TX7462-3K**	0.016
				400 ... 600	--	**3TX7462-3L**	0.016
 3TX7522-3.	8 and 12	3TC52, 3TC56	**Varistors**[2] For separate screw fixing or snapping onto TH 35 standard mounting rail	--	24 ... 70	**3TX7522-3G**	0.088
				--	70 ... 150	**3TX7522-3H**	0.086
				--	150 ... 250	**3TX7522-3J**	0.090
Surge suppressors · RC elements							
 3TX7462-3., 3TX7522-3.	4	3TC48	**RC elements** For lateral snapping onto auxiliary switch or TH 35 standard mounting rail	24 ... 48	--	**3TX7462-3R**	0.084
				--	24 ... 70	**3TX7522-3R**	0.090
				48 ... 127	--	**3TX7462-3S**	0.083
				--	70 ... 150	**3TX7522-3S**	0.090
				127 ... 240	--	**3TX7462-3T**	0.094
				--	150 ... 250	**3TX7522-3T**	0.083
				240 ... 400	--	**3TX7462-3U**	0.089
				400 ... 600	--	**3TX7462-3V**	0.089
	8 and 12	3TC52, 3TC56	**RC elements** For lateral snapping onto auxiliary switch or TH 35 standard mounting rail	24 ... 48	--	**3TX7522-3R**	0.090
				48 ... 127	--	**3TX7522-3S**	0.090
				127 ... 240	--	**3TX7522-3T**	0.083
				240 ... 400	--	**3TX7522-3U**	0.088
				400 ... 600	--	**3TX7522-3V**	0.085
Surge suppressors · Diodes							
 3TX7462-3.	4 to 12	3TC48, 3TC52, 3TC56	**Diode assemblies**[3] (Diode and Zener diode) for DC solenoid system, for sticking onto the contactor base or for mounting separately	--	24 ... 250	**3TX7462-3D**	0.014

[1] The connection piece for mounting the surge suppressor must be bent slightly.

[2] Includes the peak value of the alternating voltage on the DC side.

[3] Not for DC operation.

	For contactors		Version		Article No.	Weight
	Size	Type				kg
Terminal covers						
 3TX6546-3B	2	3TC44	For protection against inadvertent contact with exposed busbar connections (1 set = 2 units)	--	**3TY2444-0B**	0.026
	6	3TC48	For protection against inadvertent contact with exposed busbar connections Can be screwed on free screw end; covers one busbar connection (1 set = 6 units)	M6	**3TX6506-3B**	0.076
	8 and 12	3TC52, 3TC56		M10	**3TX6546-3B**	0.278

* You can order this quantity or a multiple thereof.

Spare parts

For contactors Size	Type	Version	Auxiliary contacts NO	NC	Auxiliary switches Left	Right	Screw terminals Article No.	Weight kg
Auxiliary switches								
For lateral mounting								
2 and 4	3TC44, 3TC48	Auxiliary switch (replacement for 3TY6501-1A, 3TY6501-1B)	1	1	13 21 14 22	31 43 32 44	**3TY6501-1AA00**	0.051
8 and 12	3TC52, 3TC56	Auxiliary switch, left	1	1	13 21 14 22	--	**3TY6561-1A**	0.081
		Auxiliary switch, right	1	1	--	31 43 32 44	**3TY6561-1B**	0.081
12	3TC74	Auxiliary switch	4	4	13 21 31 43 14 22 32 44	53 61 71 83 54 62 72 84	**3TY2741-2J**	0.271
12	3TC78	Auxiliary switch, left	2	2	13 21 31 43 14 22 32 44	--	**3TY2781-2C**	0.193
		Auxiliary switch, right	2	2	--	53 61 71 83 54 62 72 84	**3TY2781-2D**	0.193


3TY6561-1A

For contactors Size	Type	Version	Rated control supply voltage U_s V AC/DC	Article No.	Weight kg
Surge suppressors · Varistors					
12	3TC7	For sticking onto the contactor base	24	**3TX2746-2F**	0.012
			110	**3TX2746-2G**	0.014

For contactors Size	Type	Version	Article No.	Weight kg
Solenoid coils				
DC operation[1]				
2	3TC44	--	**3TY6443-0B..**	
4	3TC48		**3TY6483-0B..**	
8	3TC52		**3TY6523-0B..**	
12	3TC56		**3TY6563-0B..**	
AC operation[1]				
2	3TC44	--	**3TY7403-0A..**	
4	3TC48		**3TY6483-0A..**	
8	3TC52		**3TY6523-0A..**	
12	3TC56		**3TY6566-0A..**	
Contacts with fixing parts				
		In order to ensure reliable operation of the contactors, only **original replacement contacts** should be used.		
2	3TC44	(1 set = 2 moving and 4 fixed switching elements)	**3TY2440-0A**	0.065
4	3TC48		**3TY2480-0A**	0.093
8	3TC52		**3TY2520-0A**	0.220
12	3TC56		**3TY2560-0A**	0.421
12	3TC7	Main contacts (1 set) For 3TC78: 2 units required per contactor	**3TY2740-0E**	0.357
Arc chutes				
2	3TC44	Arc chutes, 2-pole	**3TY2442-0A**	0.157
4	3TC48		**3TY2482-0A**	0.470
8	3TC52		**3TY2522-0A**	1.100
12	3TC56		**3TY2562-0A**	2.080
12	3TC7	For 3TC78: 2 units required per contactor	**3TY2742-0C**	3.856


3TY2520-0A


3TY2482-0A

[1] For rated control supply voltages, see page 2/121.
The 10th and 11th digits of the article number must be supplemented accordingly.

*** You can order this quantity or a multiple thereof.**

Introduction

Overview

More information	
Homepage, see www.siemens.com/sirius	Conversion tool, see www.siemens.com/conversion-tool
Industry Mall, see www.siemens.com/product?3RH_3TH	

The advantages at a glance

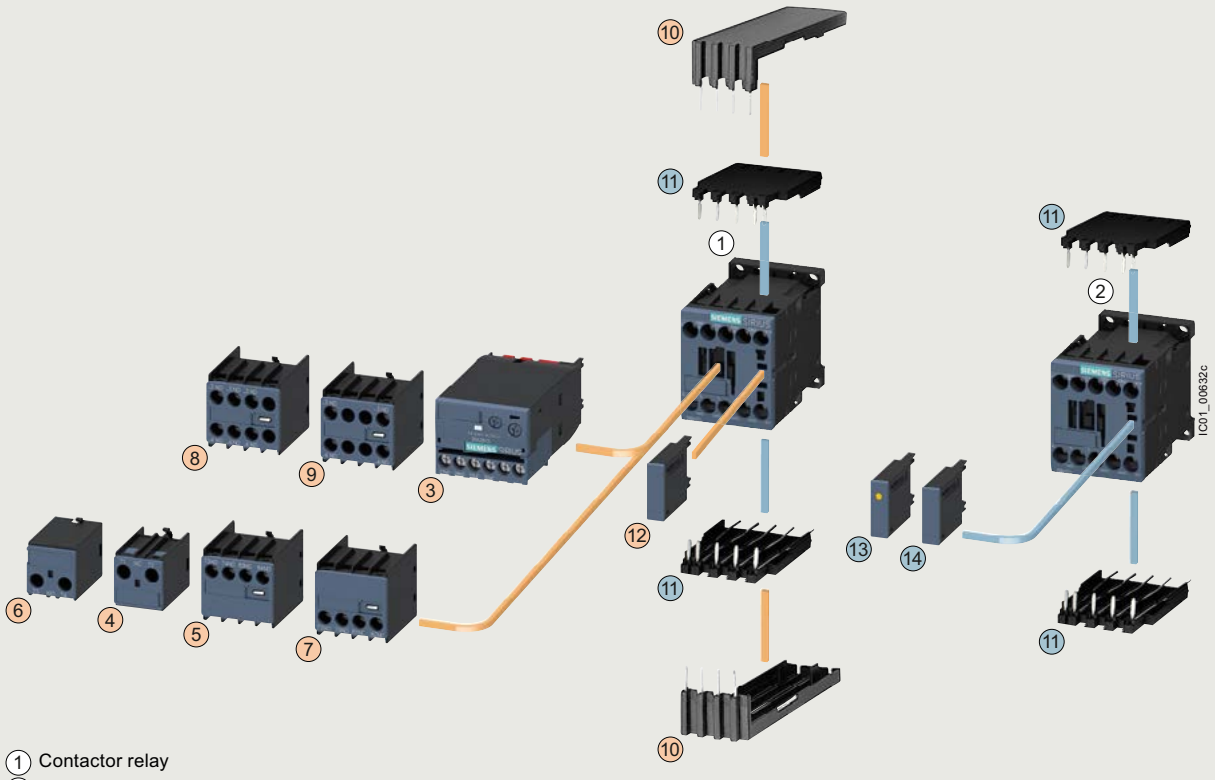
Size	**S00**	**S00**		
Type	3RH21	3RH22	3TH42	3TH43

		Article No.	Page
SIRIUS 3RH2 contactor relays			
4-pole	• Screw or spring-loaded terminals	**3RH21**	2/132, 2/132
8-pole		**3RH22**	2/132, 2/132
4-pole, latched		**3RH24**	2/132, 2/132
Coupling contactor relays	• Coils for control by the PLC	**3RH21**	2/133, 2/134
Contactor relays for railway applications	• Coils with extended voltage range	**3RH21**	2/134
3TH4 contactor relays			
8-pole	• Screw terminals	**3TH42**	2/140
10-pole		**3TH43**	2/141
Contactor relays for railway applications	• Coils with extended voltage range	**3TH42**	2/135
Accessories for SIRIUS 3RH2 contactor relays			
Auxiliary switches	• On front	**3RH29, 3RA281.**[1)]	from 2/59 onwards
	• Lateral	**3RH29**	2/61
Function modules (direct-on-line starting, star-delta (wye-delta) starting)	• On front	**3RA281., 3RA283.**	[1)]
Surge suppressors	• On front	**3RT2916**	[1)]
Additional load modules	• On front	**3RT2916**	[1)]

[1)] see Catalog IC 10.

Overview

Contactor relays,
size S00, with accessories



(1) Contactor relay
(2) Coupling contactor relay for auxiliary circuits

(3) 3RA28 function module
(4) 1-pole auxiliary switch, cable entry from the top
(5) 2-pole auxiliary switch, cable entry from the top
(6) 1-pole auxiliary switch, cable entry from the bottom
(7) 2-pole auxiliary switch, cable entry from the bottom
(8) 4-pole auxiliary switch
(terminal designations according to EN 50011 or EN 50005)
(9) 2-pole auxiliary switch, solid-state compatible version
(terminal designations according to EN 50005)

(10) Solder pin adapter for contactor relays with 4-pole auxiliary switch
(11) Solder pin adapter
(12) Additional load module for increasing the permissible residual current
(13) Surge suppressor with LED
(14) Surge suppressor without LED

For contactor relays
For contactor relays and coupling contactor relays

SIRIUS 3RH2 contactor relays, 4- and 8-pole

Standards

IEC 60947-1, IEC 60947-4-1, IEC 60947-5-1

The 3RH2 contactor relays are available with screw or spring-loaded terminals. The basic unit contains four contacts with terminal designations according to EN 50011.

The 3RH2 contactor relays are suitable for use in any climate. They are finger-safe according to IEC 60529.

The 3RH21 coupling contactor relays for switching auxiliary circuits are tailored to the special requirements of working with electronic controls.

Contact reliability

High contact stability at low voltages and currents, suitable for solid-state circuits with currents ≥ 1 mA at a voltage of ≥ 17 V.

Surge suppression

RC elements, varistors, diodes or diode assemblies (combination of a diode and a Zener diode) can be plugged onto all 3RH2 contactor relays from the front for damping opening surges in the coil. The plug-in direction is determined by a coding device.

Coupling contactor relays have a low power consumption and an extended solenoid coil operating range.

Depending on the version, the solenoid coils of the coupling contactor relays are supplied either without overvoltage damping (versions 3RH21..-.HB40 or 3RH21..-.MB40-0KT0) or with a diode or suppressor diode connected as standard.

Note:

The auxiliary contactor's OFF times, the opening delay times of the NO contacts and the closing delay times of the NC contacts increase if the contactor coils are attenuated against voltage peaks. Various accessories are available for the auxiliary contactors (time change for: interference suppression diode 6x to 10x; diode assembly 2x to 6x; suppressor diode +1 to 5 ms; varistor +2 to 5 ms).

For details, see Equipment Manual.

Accessories

The accessories for the 3RT2 contactors in size S00 can also be used for the 3RH2 contactor relays (see page 2/52 onwards).

Auxiliary switches

The 3RH21 contactor relays (with the exception of coupling contactor relays) can be expanded by up to four contacts by the addition of mounted auxiliary switches.

The auxiliary switch can easily be snapped onto the front of the contactor relays. The auxiliary switch has a centrally positioned release lever for disassembly.

The conventional front auxiliary contacts fulfill the characteristics of force-guided operation and are therefore suitable for safety applications.

Contactor relays in safety-related applications

Contactor relays are a significant part of safety-related applications. They are generally the actuators that perform the switching operation leading to the safe disconnection of the corresponding application or system.

Contactor relays with force-guided operation according to IEC 60947-5-1 are generally required for use in safety-related applications. Most of our contactors meet this requirement; a corresponding note can be found in the technical product data sheet.

Contactor relays with increased tamper protection

Increased tamper protection is ensured either by using our contactor relay versions with permanently mounted auxiliary switches installed in the factory (e.g. 3RH22 contactor relays), or by using the 3RT2916-4MA10 sealable cover as an accessory (see page 2/72).

Article No. scheme

Product versions		Article number
SIRIUS contactor relays		**3RH2 □ □ □ – □ □ □ □ 0 – □ □ □ □**
Device type	e.g. 1 = 4-pole contactor relay	□
Number of NO contacts	e.g. 2 = 2 NO	□
Number of NC contacts	e.g. 2 = 2 NC	□
Type of electrical connection	Screw terminals	**1**
	Spring-loaded terminals	**2**
Operating range/solenoid coil circuit	e.g. A = AC standard/without coil circuit	□
Rated control supply voltage	e.g. P0 = 50/60 Hz 230 V AC	□ □
Special version		□ □ □ □
Example		**3RH2 1 2 2 – 1 A P 0 0**

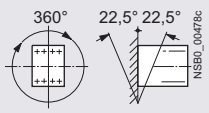
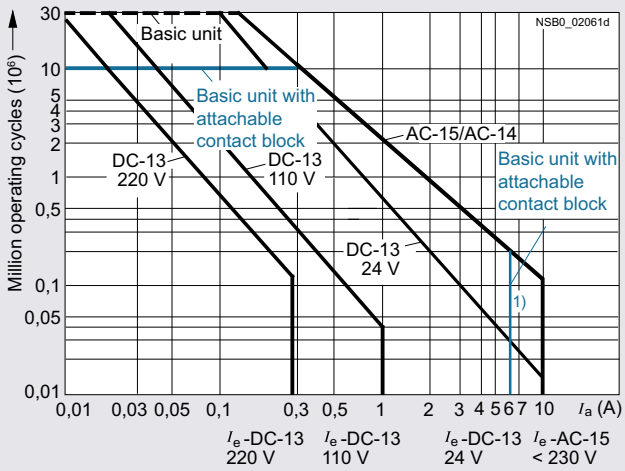
Note:

The Article No. scheme shows an overview of product versions for better understanding of the logic behind the article numbers.

For your orders, please use the article numbers quoted in the selection and ordering data.

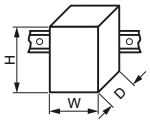
Technical specifications

More information	
Technical specifications, see https://support.industry.siemens.com/cs/ww/en/ps/16188/td FAQs, see https://support.industry.siemens.com/cs/ww/en/ps/16188/faq	Manuals, see https://support.industry.siemens.com/cs/ww/en/ps/16188/man

	Contactor relays
Type	**3RH2**
Size	**S00**
Permissible mounting position	
The contactor relays are designed for operation on a vertical mounting surface.	
Upright mounting position	 Special version required (in the case of coupling contactor relays and contactor relays with extended operating range 3RH2122-2K.40 on request)
Force-guided operation of contacts in contactor relays	
3RH2: **Yes,** in the basic unit and the auxiliary switch as well as between the basic unit and the mounted auxiliary switch **(removable)** acc. to: • ZH1/457 • IEC 60947-5-1, Annex L **3RH22:** **Yes,** in the basic unit and the auxiliary switch as well as between the basic unit and the mounted auxiliary switch **(permanently mounted)** acc. to: • ZH1/457 • IEC 60947-5-1, Annex L Note: 3RH2911-.NF. solid-state compatible auxiliary switches have no force-guided contacts.	Explanations: There is force-guided operation if it is ensured that the NC and NO contacts cannot be closed at the same time. **ZH1/457** Safety Rules for Controls on Power-Operated Metalworking Presses. **IEC 60947-5-1, Annex L** Standard for low-voltage switchgear and controlgear; Special requirements for mechanically linked contact elements
Contact reliability	
Contact reliability at 17 V, 1 mA acc. to IEC 60947-5-4	Frequency of contact faults $<10^{-8}$, i.e. < 1 fault per 100 million operating cycles
Contact endurance for AC-15/AC-14 and DC-13 utilization categories	
The contact endurance is mainly dependent on the breaking current. It is assumed that the operating mechanisms are switched randomly, i.e. not synchronized with the phase angle of the supply system. If magnetic circuits other than the contactor operating mechanisms or solenoid valves are present, e.g. magnetic brakes, protective measures for the load circuits are necessary, e.g. in the form of RC elements and freewheel diodes. The characteristic curves apply to • 3RH21/3RH22 contactor relays[1)] • 3RH24 latched contactor relays • 3RH2911 auxiliary switches[1)] • Auxiliary switches for snapping onto the front, max. 4-pole and for mounting onto the side in size S00	 Diagram legend: I_a = Breaking current I_e = Rated operational current

[1)] 3RH22, 3RH2911: I_e = 6 A for AC-15/AC-14 and DC-13.

SIRIUS 3RH2 contactor relays, 4- and 8-pole

		Contactor relays		
Type		3RH21	3RH22	3RH24
Size		S00		
General data				
Dimensions (W x H x D) 				
• Basic units				
- Screw terminals	mm	45 x 58 x 73	--	90 x 58 x 73
- Spring-loaded terminals	mm	45 x 70 x 73	--	
• Basic unit with mounted auxiliary switch				
- Screw terminals	mm	45 x 58 x 117		--
- Spring-loaded terminals	mm	45 x 70 x 121		--
• Basic unit with mounted function module or solid-state time-delay auxiliary switch				
- Screw terminals	mm	45 x 58 x 147	--	
- Spring-loaded terminals	mm	45 x 70 x 147	--	
Mechanical service life				
• Basic units	Operating cycles	30 million		5 million
• Basic unit with mounted auxiliary switch	Operating cycles	10 million		5 million
• Solid-state-compatible auxiliary switch	Operating cycles	5 million		
Rated insulation voltage U_i (pollution degree 3)	V	690		
Rated impulse withstand voltage U_{imp}	kV	6		
Protective separation between coil and contacts in the basic unit, acc. to IEC 60947-1, Annex N	V	400		
Permissible ambient temperature				
• During operation	°C	-25 ... +60		
• During storage	°C	-55 ... +80		
Degree of protection IP on the front according to IEC 60529		IP20 (screw terminals and spring-loaded terminals)		
Touch protection on the front according to IEC 60529		Finger-safe for vertical touching from the front (screw and spring-loaded terminals)		
Shock resistance				
• Rectangular pulse				
- AC operation	*g*/ms	7.3/5 and 4.7/10		
- DC operation	*g*/ms	10/5 and 5/10		
• Sine pulse				
- AC operation	*g*/ms	11.4/5 and 7.3/10		
- DC operation	*g*/ms	15/5 and 8/10		
Short-circuit protection				
• Short-circuit test				
- With fuse links of operational class gG: DIAZED, type 5SB; NEOZED, type 5SE with short-circuit current I_k = 1 kA acc. to IEC 60947-5-1	A	10		
- With miniature circuit breakers with C characteristic with short-circuit current I_k = 400 A acc. to IEC 60947-5-1	A	6		

			Contactor relays
Type			**3RH2**
Size			**S00**
Control			
Solenoid coil operating range			
• AC operation	At 50 Hz		0.8 ... 1.1 x U_s
	At 60 Hz		0.85 ... 1.1 x U_s
• DC operation	At +50 °C		0.8 ... 1.1 x U_s
	At +60 °C		0.85 ... 1.1 x U_s
Power consumption of the solenoid coil (for cold coil and 1.0 x U_s)			
• AC operation, 50 Hz			
- Closing		VA/p.f.	37/0.8
- Closed		VA/p.f.	5.7/0.25
• AC operation, 60 Hz			
- Closing		VA/p.f.	33/0.75
- Closed		VA/p.f.	4.4/0.25
• DC operation Closing = Closed		W	4.0
Permissible residual current of the electronics (with 0 signal)			
• For AC operation[1)]			< 4 mA x (230 V/U_s)
• For DC operation			< 10 mA x (24 V/U_s)
Operating times within operating range			
Total break time = Opening delay + Arcing time			
• AC operation			
- Closing delay		ms	8 ... 33
- Opening delay		ms	4 ... 15
• DC operation			
- Closing delay		ms	30 ... 100
- Opening delay		ms	38 ... 65
• Arcing time		ms	10 ... 15
3RH24 minimum operating time			
• AC operation			
- Closing		ms	≥ 35
- Opening		ms	≥ 30
• DC operation			
- Closing		ms	≥ 100
- Opening		ms	≥ 30

1) The 3RT2916-1GA00 additional load module is recommended for higher residual currents.

SIRIUS 3RH2 contactor relays, 4- and 8-pole

			Coupling contactor relays		
Type			**3RH21..-.HB40**	**3RH21..-.JB40**	**3RH21..-.KB40**
Size			**S00**		
Control					
Solenoid coil operating range			0.7 ... 1.25 x U_s		
Power consumption of the solenoid coil (for cold coil and 1.0 x U_s) Closing = Closed at U_s = 24 V		W	2.8		
Permissible residual current of the electronics with 0 signal			<10 mA x (24 V/U_s)		
Overvoltage configuration of the solenoid coil			No overvoltage damping	Integrated diode	Integrated suppressor diode
Operating times within operating range					
Total break time = Opening delay + Arcing time					
• DC operation	Closing delay	ms	25 ... 130		
	Opening delay	ms	7 .. 20	38 .. 65	7 .. 20
Upright mounting position			On request		

			Coupling contactor relays		
Type			**3RH21..-.MB40-0KT0**	**3RH21..-.VB40**	**3RH21..-.SB40**
Size			**S00**		
Control					
Solenoid coil operating range			0.85 ... 1.85 x U_s		
Power consumption of the solenoid coil (for cold coil and 1.0 x U_s) Closing = Closed at U_s = 24 V		W	1.6		
Permissible residual current of the electronics with 0 signal			< 8 mA x (24 V/U_s)		
Overvoltage configuration of the solenoid coil			No overvoltage damping	Integrated diode	Integrated suppressor diode
Operating times within operating range					
Total break time = Opening delay + Arcing time					
• DC operation	Closing delay	ms	25 ... 120		
	Opening delay	ms	5 .. 20	20 .. 80	5 .. 20
Upright mounting position			On request		

			Contactor relays
Type			**3RH2**
Size			**S00**
Rated data of the auxiliary contacts			
Load rating with AC			
Rated operational currents I_e			
AC-12		A	10
AC-15/AC-14, at rated operational voltage U_e			
	Up to 230 V	A	10[1]
	400 V	A	3
	500 V	A	2
	690 V	A	1
Load rating with DC			
Rated operational currents I_e			
DC-12, at rated operational voltage U_e			
• 1 conducting path	24 V	A	10
	60 V	A	6
	110 V	A	3
	220 V	A	1
	440 V	A	0.3
	600 V	A	0.15
• 2 conducting paths in series	24 V	A	10
	60 V	A	10
	110 V	A	4
	220 V	A	2
	440 V	A	1.3
	600 V	A	0.65
• 3 conducting paths in series	24 V	A	10
	60 V	A	10
	110 V	A	10
	220 V	A	3.6
	440 V	A	2.5
	600 V	A	1.8
DC-13, at rated operational voltage U_e			
• 1 conducting path	24 V	A	10[1]
	60 V	A	2
	110 V	A	1
	220 V	A	0.3
	440 V	A	0.14
	600 V	A	0.1
• 2 conducting paths in series	24 V	A	10
	60 V	A	3.5
	110 V	A	1.3
	220 V	A	0.9
	440 V	A	0.2
	600 V	A	0.1
• 3 conducting paths in series	24 V	A	10
	60 V	A	4.7
	110 V	A	3
	220 V	A	1.2
	440 V	A	0.5
	600 V	A	0.26
Switching frequency			
Switching frequency *z* in operating cycles/hour			
• Rated operation for utilization category	AC-12/DC-12	1/h	1 000
	AC-15/AC-14	1/h	1 000
(Dependence of the switching frequency z' on operational current I' and operational voltage U': $z' = z \cdot (I_e/I') \cdot (U_e/U')^{1.5} \cdot 1/h$)	DC-13	1/h	1 000
• No-load switching frequency		1/h	10 000
cULus and cULus rated data			
Basic units and auxiliary switches			
• Rated control supply voltage		V AC	max. 600
• Rated voltage		V AC	600
• Switching capacity			A 600, Q 600
• Uninterrupted current at 240 V AC		A	10

1) 3RH22, 3RH29: I_e = 6 A for AC-15/AC-14 and DC-13.

SIRIUS 3RH2 contactor relays, 4- and 8-pole

Selection and ordering data

DC operation

3RH2422-1B.40

Rated operational current I_e/AC-15/AC-14 at **230 V**	Contacts Ident. No.	Version NO	Version NC	Rated control supply voltage U_s	**Screw terminals** Article No.	Weight
A				V DC		kg
For screw fixing and snap-on mounting onto TH 35 standard mounting rail						
Latched						
No lateral auxiliary switches can be mounted						
10	**40E**	4	--	24	**3RH2440-1BB40**	0.554
				110	**3RH2440-1BF40**	0.561
				220	**3RH2440-1BM40**	0.563
	31E	3	1	24	**3RH2431-1BB40**	0.570
				110	**3RH2431-1BF40**	0.564
				220	**3RH2431-1BM40**	0.564
	22E	2	2	24	**3RH2422-1BB40**	0.571
				110	**3RH2422-1BF40**	0.568
				220	**3RH2422-1BM40**	0.560

Other voltages on request.

Accessories, see page 2/52 onwards.

*** You can order this quantity or a multiple thereof.**

DC operation for direct control by PLC ⎓

- Coupling contactor relays with adapted power consumption
- Suitable for solid-state PLC outputs
- Cannot be expanded with auxiliary switches

3RH21..-2.B40

Rated operational current I_e/AC-15/AC-14 at **230 V**	Auxiliary contacts Ident. No. acc. to EN 50011	Version		Rated control supply voltage U_s	**Spring-loaded terminals**	Weight
		NO	NC		Article No.	
A				V DC		kg
For screw fixing and snap-on mounting onto TH 35 standard mounting rail						
Size S00						
Cannot be expanded with auxiliary switches						
Operating range **0.7 to 1.25 x U_s**, power consumption of the solenoid coils **2.8 W** at 24 V						
10	**40E**	4	--	24	**3RH2140-2HB40**	0.321
	31E	3	1	24	**3RH2131-2HB40**	0.316
	22E	2	2	24	**3RH2122-2HB40**	0.315
Operating range **0.85 to 1.85 x U_s**, power consumption of the solenoid coils **1.6 W** at 24 V						
10	**40E**	4	--	24	**3RH2140-2MB40-0KT0**	0.320
	31E	3	1	24	**3RH2131-2MB40-0KT0**	0.319
	22E	2	2	24	**3RH2122-2MB40-0KT0**	0.314

Other voltages on request.

Accessories, see page 2/52 onwards.

*** You can order this quantity or a multiple thereof.**

SIRIUS 3RH2 contactor relays, 4- and 8-pole

DC operation for direct control by PLC ⎓

- Coupling contactor relays with adapted power consumption
- Suitable for solid-state PLC outputs
- Cannot be expanded with auxiliary switches

3RH21..-2.B40

Rated operational current I_e/AC-15/AC-14 at **230 V**	Auxiliary contacts Ident. No. acc. to EN 50011	Version NO	Version NC	Rated control supply voltage U_s	**Spring-loaded terminals** Article No.	Weight
A				V DC		kg
For screw fixing and snap-on mounting onto TH 35 standard mounting rail						
Size S00						
With integrated coil circuit (diode integrated at factory)						
Cannot be expanded with auxiliary switches						
Operating range **0.7 to 1.25 x U_s** Power consumption of the solenoid coils **2.8 W** at 24 V						
10	**40E**	4	--	24	**3RH2140-2JB40**	0.315
	31E	3	1	24	**3RH2131-2JB40**	0.317
	22E	2	2	24	**3RH2122-2JB40**	0.316
Operating range **0.85 to 1.85 x U_s** Power consumption of the solenoid coils **1.6 W** at 24 V						
10	**40E**	4	--	24	**3RH2140-2VB40**	0.320
	31E	3	1	24	**3RH2131-2VB40**	0.320
	22E	2	2	24	**3RH2122-2VB40**	0.330
With integrated coil circuit (suppressor diode integrated at factory)						
Cannot be expanded with auxiliary switches						
Operating range **0.7 to 1.25 x U_s** Power consumption of the solenoid coils **2.8 W** at 24 V						
10	**40E**	4	--	24	**3RH2140-2KB40**	0.315
	31E	3	1	24	**3RH2131-2KB40**	0.316
	22E	2	2	24	**3RH2122-2KB40**	0.316
Operating range **0.85 to 1.85 x U_s** Power consumption of the solenoid coils **1.6 W** at 24 V						
10	**40E**	4	--	24	**3RH2140-2SB40**	0.316
	31E	3	1	24	**3RH2131-2SB40**	0.316
	22E	2	2	24	**3RH2122-2SB40**	0.320

Other voltages on request.

Accessories, see page 2/52 onwards.

* You can order this quantity or a multiple thereof.

Overview

Standards

IEC 60947-5-1

The contactor relays are finger-safe according to IEC 60529. Terminal covers may have to be fitted onto the connecting bars, depending on the configuration with other devices.

Ambient temperature

The permissible ambient temperature for operation of the contactors (across the full coil operating range) is -50 to +70 °C. Uninterrupted duty at temperatures < -25 °C and > +55 °C reduces the mechanical service life, the current carrying capacity of the conducting paths and the switching frequency.

A clearance of 10 mm is required for side-by-side mounting at ambient temperatures > 55 °C. There is no need to reduce the technical specifications.

Application

For operation in installations which are subject both to considerable variations in the control voltage and to high ambient temperatures, e.g. in railway applications.

Control and auxiliary circuits

The solenoid coils of the contactor relays have an extended coil operating range from 0.7 to 1.25 x U_s and are fitted as standard with varistors to provide protection against overvoltage. The opening delay is consequently 2 to 5 ms longer than for standard contactors.

Technical specifications

More information	
Technical specifications, see https://support.industry.siemens.com/cs/ww/en/ps/16176/td FAQs, see https://support.industry.siemens.com/cs/ww/en/ps/16176/faq	Manuals, see https://support.industry.siemens.com/cs/ww/en/ps/16176/man

Contactor relays		Type	3TH42
General data			
Permissible ambient temperature			
• During operation		°C	-50 ... +70[1)]
• During storage		°C	-55 ... +80
Control			
Solenoid coil operating range			0.7 ... 1.25 x U_s
Power consumption of the solenoid coils (for cold coil and 1.0 x U_s) For cold coil: Closing = Closed		W	5.2
Permissible residual current of the electronics (with 0 signal)			
• DC operation			≤ 10 mA x (24 V/U_s)
Operating times within operating range			
Total break time = Opening delay + Arcing time			
• DC operation	Closing delay	ms	40 ... 200
	Opening delay	ms	20 ... 30
• Arcing time		ms	10 ... 20

[1)] Side-by-side mounting with 10 mm clearance.

All details and technical specifications not mentioned here are identical to those of the 3TH4 basic units, see page 2/127 onwards.

3TH4 contactor relays, 8- and 10-pole

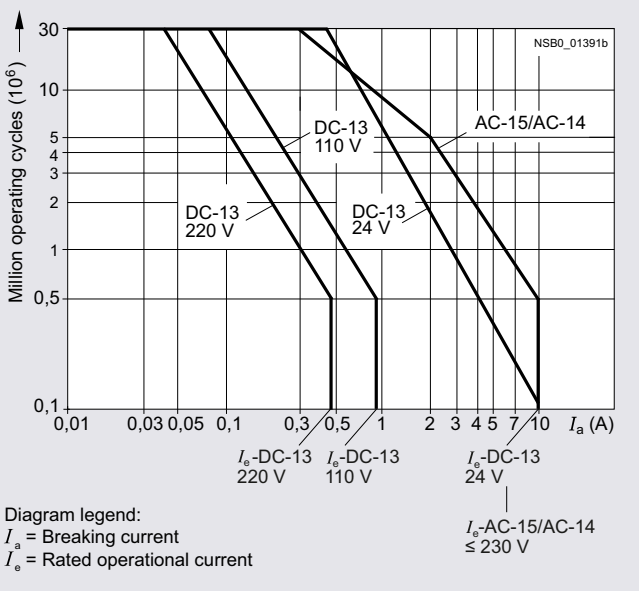
Contactor relays	Type	3TH42, 3TH43

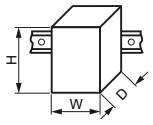
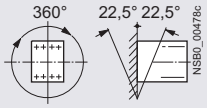
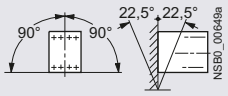
Contact endurance for AC-15/AC-14 and DC-13 utilization categories

The contact endurance is mainly dependent on the breaking current. It is assumed that the operating mechanisms are switched randomly, i.e. not synchronized with the phase angle of the supply system.

If magnetic circuits other than the contactor operating mechanisms or solenoid valves are present, e.g. magnetic brakes, protective measures for the load circuits are necessary.

RC elements or freewheel diodes are suitable as protective measures for the circuits.



Contactor relays		Type	3TH42	3TH43
General data				
Dimensions (W x H x D)				
• AC operation		mm	45 x 78 x 97	55 x 78 x 97
• DC operation		mm	45 x 78 x 130	55 x 78 x 130
Permissible mounting position				
The contactor relays are designed for operation on a vertical mounting surface.				
• AC operation				
• DC operation				
Upright mounting position AC and DC operation			Special version required	
Mechanical service life	Basic units	Operating cycles	30 million	
Rated insulation voltage U_i (pollution degree 3)		V	690	
Rated impulse withstand voltage U_{imp}		kV	8	
Protective separation between the coil and the main contacts acc. to IEC 60947-1, Annex N		V	Up to 500	
Permissible ambient temperature				
• During operation		°C	-25 ... +55	
• During storage		°C	-55 ... +80	
Degree of protection IP on the front according to IEC 60529			IP00	
Shock resistance				
• Rectangular pulse				
- AC operation		*g*/ms	7.7/5 and 4.4/10	
- DC operation		*g*/ms	9.3/5 and 5.4/10	
• Sine pulse				
- AC operation		*g*/ms	12/5 and 6.8/10	
- DC operation		*g*/ms	14.7/5 and 8.5/10	
Short-circuit protection				
Short-circuit test				
• With fuse links of operational class gG With short-circuit current I_k = 1 kA acc. to IEC 60947-5-1				
- LV HRC, type 3NA		A	16	
- DIAZED, type 5SB		A	16	
- NEOZED, type 5SE, quick		A	20	
• With miniature circuit breakers With short-circuit current I_k = 400 A acc. to IEC 60947-5-1				
- C characteristic		A	16	
- B characteristic		A	16	
cULus and cULus rated data				
Basic units				
Rated control supply voltage U_s			Max. 600 V AC, 230 V DC (acc. to UL 240 V DC)	
Rated voltage			600 V AC, 600 V DC	
Switching capacity			A 600, P 600	
Conductor cross-sections				
Auxiliary conductors and coil terminals (1 or 2 conductors can be connected)			**Screw terminals**	
• Solid or stranded		mm^2	2 x (0.5 ... 1)[1]; 2 x (1 ... 2.5)[1]; 1 x 4	
• Finely stranded with end sleeve		mm^2	2 x (0.75 ... 2.5)	
• Terminal screw			M3.5	

[1] If two different conductor cross-sections are connected to one clamping point, both cross-sections must lie in one of the ranges specified.

3TH4 contactor relays, 8- and 10-pole

Contactor relays	Type	3TH42, 3TH43
Control		
Solenoid coil operating range		
• AC operation		0.8 ... 1.1 x U_s [1]
• DC operation (except 24 V)		0.8 ... 1.1 x U_s
- At 24 V DC		0.8 ... 1.2 x U_s
Power consumption of the solenoid coil (for cold coil and 1.0 x U_s)		
• AC operation, 50 Hz, standard version		
- Closing	VA/p.f.	68/0.82
- Closed	VA/p.f.	10/0.29
• AC operation, 50/60 Hz, standard version		
- Closing, 50 Hz	VA/p.f.	77/0.81
- Closed, 50 Hz	VA/p.f.	11/0.28
- Closing, 60 Hz	VA/p.f.	71/0.75
- Closed, 60 Hz	VA/p.f.	9/0.27
• AC operation, 50 Hz, USA/Canada		
- Closing	VA/p.f.	68/0.82
- Closed	VA/p.f.	10/0.29
• AC operation, 60 Hz, USA/Canada		
- Closing	VA/p.f.	75/0.76
- Closed	VA/p.f.	9.4/0.29 ... 0.3
• AC operation, 50 Hz, Japan		
- Closing	VA/p.f.	80/0.8
- Closed	VA/p.f.	10.7/0.29
• AC operation, 60 Hz, Japan		
- Closing	VA/p.f.	75 ... 90/0.73
- Closed	VA/p.f.	8.5 ... 10.7/0.29 ... 0.3
• DC operation up to 250 V Closing = Closed	W	6.2
Permissible residual current of the electronics (with 0 signal)		
• For AC operation		≤ 8 mA x (220 V/U_s)
• For DC operation		≤ 1.25 mA x (220 V/U_s)
Operating times within operating range		
Total break time = Opening delay + Arcing time		
• AC operation		
- Closing delay	ms	8 ... 35
- Opening delay	ms	4 ... 18
• DC operation		
- Closing delay	ms	20 ... 170
- Opening delay	ms	10 ... 25
• Arcing time	ms	10 ... 20

[1] Coils for USA, Canada and Japan: 0.85 to 1.1 x U_s at 60 Hz.

Contactor relays	Type		3TH42, 3TH43
Rated data of the auxiliary contacts			
Load rating with AC			
Rated operational currents I_e			
• AC-12		A	16
• AC-15/AC-14, at rated operational voltage U_e	230 V	A	10
	400 V	A	6
	500 V	A	4
	690 V	A	2
Rated power of three-phase motors Acc. to utilization categories AC-2 and AC-3, 50 Hz	230/220 V	kW	2.4
	400/380 V	kW	4
	500 V	kW	4
	690/660 V	kW	4
Load rating with DC			
Rated operational currents I_e			
• DC-12, at rated operational voltage U_e			
- 1 conducting path	Up to 48 V	A	10
	110 V	A	2.1
	220 V	A	0.8
	440 V	A	0.6
- 2 conducting paths in series	Up to 48 V	A	10
	110 V	A	10
	220 V	A	1.6
	440 V	A	0.8
- 3 conducting paths in series	Up to 48 V	A	10
	110 V	A	10
	220 V	A	10
	440 V	A	1.3
• DC-13, at rated operational voltage U_e			
- 1 conducting path	Up to 24 V	A	10
	48 V	A	5
	110 V	A	1
	220 V	A	0.45
	440 V	A	0.25
	600 V	A	0.2
- 2 conducting paths in series	Up to 24 V	A	10
	48 V	A	10
	110 V	A	2.5
	220 V	A	0.75
	440 V	A	0.5
	600 V	A	0.4
- 3 conducting paths in series	Up to 24 V	A	10
	48 V	A	10
	110 V	A	10
	220 V	A	2
	440 V	A	0.9
	600 V	A	0.8
Switching frequency			
Switching frequency *z* in operating cycles/hour			
• Rated operation for utilization category	AC-12/DC-12	1/h	1 000
(Dependence of the switching frequency z' on operational current I' and operational voltage U': $z' = z \cdot (I_e/I')^{\cdot} \cdot (U_e/U')^{1.5} \cdot 1/h$)	AC-2	1/h	500
	AC-3	1/h	1 000
	AC-15/AC-14	1/h	3 600
	DC-13	1/h	3 600
• No-load switching frequency		1/h	10 000

*** You can order this quantity or a multiple thereof.**

3TH4 contactor relays, 8- and 10-pole

Selection and ordering data

DC operation ⎓

3TH4244-0L..

Contacts	Rated operational current I_e/AC-15/AC-14				Contacts[1] Ident. No. acc. to EN 50011	Version		Rated control supply voltage U_s	Screw terminals	Weight
	230 V	400 V	500 V	690 V					Article No.	
Number	**A**	A	A	A		NO	NC	V DC		kg
For screw fixing and snap-on mounting on TH 35 standard mounting rail										
With integrated coil circuit (varistor integrated at the factory)										
8	**10**	6	4	2	**44E**	4	4	24 110	**3TH4244-0LB4** **3TH4244-0LF4**	0.682 0.644
8	**10**	6	4	2	**53E**	5	3	24 110	**3TH4253-0LB4** **3TH4253-0LF4**	0.692 0.648
8	**10**	6	4	2	**62E**	6	2	24 110	**3TH4262-0LB4** **3TH4262-0LF4**	0.674 0.660

[1] No expansion contacts can be fitted.

Other voltages on request.

Accessories, see page 2/142.

* You can order this quantity or a multiple thereof.

10-pole contactor relays
AC operation or DC operation

3TH4355-0BB4

Contacts	Rated operational current I_e/AC-15/AC-14 at				Contacts					Screw terminals	Weight
	230 V	400 V	500 V	690 V	Ident. No. acc. to EN 50011	Version				Article No.	
Number	**A**	A	A	A		NO	NC	NO	NC		kg
For screw fixing and snap-on mounting onto TH 35 standard mounting rail											
DC operation, rated control supply voltage U_s = 24 V DC											
10	**10**	6	4	2	**100E**	10	--	--	--	**3TH4310-0BB4**	0.709
					91E	9	1	--	--	**3TH4391-0BB4**	0.706
					82E	8	2	--	--	**3TH4382-0BB4**	0.712
					73E	7	3	--	--	**3TH4373-0BB4**	0.692
					73E, U	6	2	1	1	**3TH4346-0BB4**	0.708
					64E	6	4	--	--	**3TH4364-0BB4**	0.712
					55E	5	5	--	--	**3TH4355-0BB4**	0.702
					55E, U	4	4	1	1	**3TH4394-0BB4**	0.703

[1] Operating range at 220 V: 0.85 to 1.1 × U_S; lower operating range limit according to IEC 60947.

Other voltages according to page 2/141 on request.
For accessories, see page 2/142.

Note:

The solenoid coils of the 3TH43 contactor relays are available in various voltages as spare parts (on request).

- AC operation: 3TY7403-0A..
- DC operation: 3TY4803-0B..

The contacts cannot be replaced on 3TH43 contactor relays.

Options

Rated control supply voltages, possible on request (change of the 10th and 11th digits of the Article No.)

Delivery time on request

Contactor type	3TH42/3TH43
Rated control supply voltage U_s	
DC operation	
12 V DC	A4
24 V DC	B4
30 V DC	C4
36 V DC	V4
42 V DC	D4
48 V DC	W4
60 V DC	E4
110 V DC	F4
125 V DC	G4
220 V DC	M4
230 V DC	P4
240 V DC	Q4

*** You can order this quantity or a multiple thereof.**

Selection and ordering data

Surge suppressors for 3TH4 contactor relays


3TX7402-3.

Version	Rated control supply voltage U_s AC V	Rated control supply voltage U_s DC V	Article No.	Weight kg
Interference suppression diodes With line spacer, for mounting onto the coil terminal	--	24 ... 250	**3TX7402-3A**	0.014
Diode assemblies (diode and Zener diode) With line spacer, DC operation, for mounting onto the coil terminal	--	24 ... 250	**3TX7402-3D**	0.015
Varistors[1)] With line spacer, for mounting onto the coil terminal	24 ... 48 48 ... 127 127 ... 240 240 ... 400 400 ... 600	24 ... 70 70 ... 150 150 ... 250 -- --	**3TX7402-3G** **3TX7402-3H** **3TX7402-3J** **3TX7402-3K** **3TX7402-3L**	0.014 0.015 0.015 0.021 0.023
RC elements With line spacer, for mounting onto the coil terminal	24 ... 48 48 ... 127 127 ... 240 240 ... 400 400 ... 600	24 ... 70 70 ... 150 150 ... 250 -- --	**3TX7402-3R** **3TX7402-3S** **3TX7402-3T** **3TX7402-3U** **3TX7402-3V**	0.025 0.024 0.021 0.022 0.022
Covers for switch position indicator	--	--	**3TX4210-0P**	0.001

1) Includes the peak value of the alternating voltage on the DC side.

ON-delay devices


3TX4180-0A

For contactors Type	Version	Rated control supply voltage U_s 50/60 Hz AC V	Time setting range (minimum times) s	Screw terminals Article No.	Weight kg
3TH42, 3TH43	**NTC thermistors** Time tolerance +100%, -50%	220 ... 230	0.1	**3TX4180-0A**	0.012

More information
Homepage, see www.siemens.com/relays
Industry Mall, see www.siemens.com/product?3RQ_3RS_LZ
TIA Selection Tool Cloud (TST Cloud), see www.siemens.com/tstcloud/?node=SignalConverters
Conversion tool, see www.siemens.com/conversion-tool

Video: Overview about SIRIUS coupling relays

The advantages at a glance

Type	3RQ1	3RQ2	3RQ3

		Article No.	Page
SIRIUS 3RQ1 force-guided coupling relays, fail-safe up to SIL 3 / PL e			
Coupling relays with force-guided contacts	• Widths 17.5 and 22.5 mm • Safety certification according to functional safety SIL 3 / PL e • Can be used as output extension for SIRIUS 3SK safety relays via device connectors	**3RQ1**	2/144
SIRIUS 3RQ2 coupling relays with industrial enclosure			
Coupling relays with relay output	• 1, 2 or 3 changeover contacts with wide voltage range • Also available with hard gold-plated contacts	**3RQ2**	2/151
SIRIUS 3RQ3 coupling relays, narrow design			
Coupling relays with relay output (not plug-in)	• Width 6.2 mm, 1 CO, versions with hard gold-plated contacts optionally available - Output coupling links - Input coupling links	 **3RQ301** **3RQ303**	 2/154 2/154
Coupling relays with plug-in relays	• Width 6.2 mm, 1 CO, versions with hard gold-plated contacts optionally available - Output coupling links	 **3RQ311**	 2/154
Coupling relays with semiconductor output (not plug-in)	• Width 6.2 mm, output 1 semiconductor, triac or transistor - Output coupling links - Input coupling links	 **3RQ305, 3RQ306** **3RQ307**	 2/154 2/154

Connection methods

The contactor relays and the relays are available with screw terminals (box terminals) or with spring-loaded terminals.

The 3RQ coupling relays are supplied with screw terminals or spring-loaded (push-in) terminals. The plug-in bases for LZS/LZX coupling relays are also available with plug-in (push-in) terminals.

- Screw terminals
- Spring-loaded terminals, spring-loaded terminals (push-in)
- Flat connectors
- Plug-in terminals (push-in)

The terminals are indicated in the corresponding tables by the symbols shown on orange backgrounds.

3RQ coupling relays: Spring-loaded terminals (push-in) with TOP-wiring

Push-in terminals are a form of spring-loaded terminals allowing fast wiring without tools for rigid conductors or conductors equipped with end sleeves.

As with other spring-loaded terminals, a screwdriver (with 3.0 x 0.5 mm blade) is required to disconnect the conductor. The same tool can also be used to wire finely-stranded or stranded conductors with no end finishing.

The advantages of the push-in terminals are found, as with all spring-loaded terminals, in speed of assembly and disassembly and vibration-proof connection. There is no need for the checking and tightening required with screw terminals.

With the TOP wiring method, the wire inlet and terminals can be reached from the front. This helps to speed up the wiring process and eliminate wiring errors.

Video: SIRIUS spring-loaded terminals – Strong, flexible, safe, fast

SIRIUS 3RQ1 force-guided coupling relays, fail-safe up to SIL 3 / PL e NEW

Overview

Figure on left: 3RQ1000-1EW00 coupling relay,
1 NO contact + 1 NC contact, screw terminal
Figure on right: 3RQ1000-2LW00 coupling relay,
4 NO contacts + 1 NC contact, spring-loaded terminal (push-in)

3RQ1 coupling relay in the 3SK system

More information

Homepage, see www.siemens.com/relays

Industry Mall, see www.siemens.com/product?3RQ1

Technical specifications, see
https://support.industry.siemens.com/cs/ww/en/ps/26008/td

Manuals, see
https://support.industry.siemens.com/cs/ww/en/ps/26008/man

Video: SIRIUS 3RQ1 coupling relays

The force-guided SIRIUS 3RQ1 coupling relays in a modern titanium gray industrial enclosure are available in widths of 17.5 mm and 22.5 mm, and each with a supply voltage of 24 V DC (120 mm mounting depth) and 24 to 240 V AC/DC (90 mm mounting depth).

They are used for safe coupling up to SIL 3 / PL e of control signals to and from a control system or as an output expansion for the SIRIUS 3SK safety relays.

Further fields of application are based on the force-guided operation of relays according to IEC 60947-5-1 and EN 61810-3 for reading back relay states, for reliable diagnostics or signaling, or for the use of antivalent signals. Typical fields of application here are railways, signaling technology, and elevators.

The series consists of devices with up to five outputs and can be supplied with screw or spring-loaded (push-in) terminals.

International standards and certifications including CE, UL/CSA, EAC and railway approvals ensure international usability and exportability.

An extensive range of accessories is also available, such as device connectors for easy and safe connection of the 3RQ1 devices, replacement terminals, push-in lugs for wall mounting, and coding pins, see page 2/149 onwards.

NEW **SIRIUS 3RQ1 force-guided coupling relays, fail-safe up to SIL 3 / PL e**

Article No. scheme

Product versions		Article number											
Coupling relays with force-guided contacts		**3RQ1**	**□**	**0**	**0**	**–**	**□**	**□**	**□**	**0**	**0**		
Version	Performance level (SIL level): c (SIL 2)		**0**										
	Performance level (SIL level): e (SIL 3)		**2**										
Connection methods	Screw terminals						**1**						
	Spring-loaded terminals (push-in)						**2**						
Outputs	1 NO + 1 NC							**E**					Width 17.5 mm
	2 NO + 1 NC							**G**					Width 17.5 mm
	2 NO + 2 NC							**H**					Width 22.5 mm
	4 NO + 1 NC							**L**					Width 22.5 mm
Rated control supply voltage	24 V DC								**B**				Depth 120 mm
	24 to 240 V AC/DC								**W**				Depth 90 mm
Example		**3RQ1**	**0**	**0**	**0**	**–**	**1**	**E**	**W**	**0**	**0**		

Note:

The Article No. scheme shows an overview of product versions for better understanding of the logic behind the article numbers.

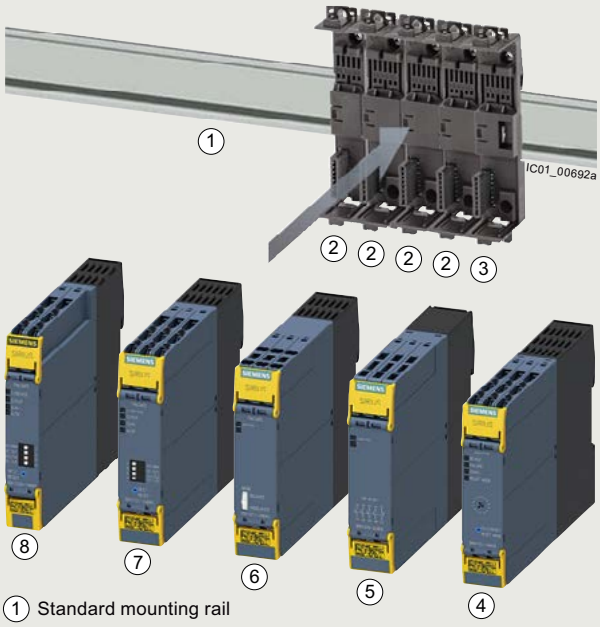
For your orders, please use the article numbers quoted in the selection and ordering data.

Benefits

- Wide-range voltage versions from 24 to 240 V AC/DC available with a mounting depth of 90 mm for all variants
- Permanent wiring thanks to removable terminals in screw or spring-loaded technology (push-in)
- Replacement of individual terminals minimizes wiring effort
- Can be used as output extension for SIRIUS 3SK safety relays via device connectors
- All versions with real load contacts, also in the NC circuit
- Safety certification according to functional safety SIL 3 / PL e
- International standards and certifications including CE, UL/CSA, EAC, railway approvals, and more

SIRIUS 3RQ1 force-guided coupling relays, fail-safe up to SIL 3 / PL e

Application



1 Standard mounting rail
2 Device connector
3 Device termination connector
4 SIRIUS 3RM1 motor starter
5 Force-guided 3RQ1 coupling relay as output expansion up to SIL 3/PL e
6 SIRIUS 3SK1211 output expansion
7 SIRIUS 3SK1121 Advanced basic unit
8 SIRIUS 3SK1220 sensor expansion

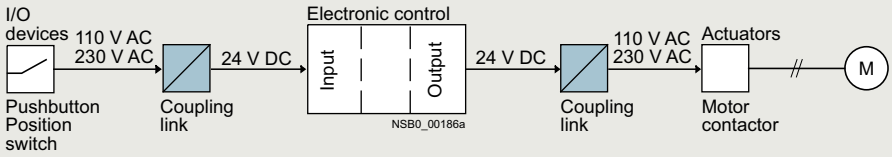
System configuration example with SIRIUS 3SK safety relays

- Safe coupling up to SIL 3 / PL e of control signals from and to a control system
- Output expansion for 3SK safety relays
- Use of force-guided contacts for reading back relay states
- For reliable diagnostics or signaling or for antivalent switching of loads
- Safe coupling:
  - Electrical separation between the input and output circuit
  - Adjustment of different signal levels
  - Signal amplification
  - Contact multiplication

3RQ1 output expansion (up to SIL 3 / PL e) for the 3SK system

The force-guided 3RQ1 coupling relays with a mounting depth of 120 mm can be used as an output expansion up to SIL 3 / PL e and can be connected by wiring to all 3SK basic units and by using the 3ZY12 device connector to all 3SK1 and 3SK2 Advanced basic units.

They have a switching capacity of AC-15 5/3 A (like 3SK1211) at a switching voltage of 230 V and are available in widths of 17.5 mm and 22.5 mm. Furthermore, they have NC contacts with a switching capacity of AC-15 2/1.5 A for direct switching of loads (anti-parallel switching, signaling, etc.).

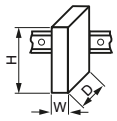


Typical application with a fail-safe control system

NEW **SIRIUS 3RQ1 force-guided coupling relays, fail-safe up to SIL 3 / PL e**

Technical specifications

More information	
Technical specifications, see https://support.industry.siemens.com/cs/ww/en/ps/26008/td	Manuals, see https://support.industry.siemens.com/cs/ww/en/ps/26008/man Equipment Manual 3SK1/3RQ1, see https://support.industry.siemens.com/cs/ww/en/view/67585885

Article number		3RQ1000-.EB00, 3RQ1000-.GB00	3RQ1200-.EB00	3RQ1000-.EW00, 3RQ1000-.GW00	3RQ1200-.EW00	3RQ1000-.HB00, 3RQ1000-.LB00	3RQ1000-.HW00, 3RQ1000-.LW00
General data							
Dimensions (W x H x D) 	mm	17.5 x 100 x 120		17.5 x 100 x 90		22.5 x 100 x 120	22.5 x 100 x 90
Safety integrity level (SIL) according to IEC 62061		2	3	2	3	2	
Performance level (PL) according to ISO 13849-1		c	e	c	e	c	
Certificate of suitability							
• UL approval		Yes					
• TÜV approval		Yes					
Insulation voltage for overvoltage category III acc. to IEC 60664 for pollution degree 3	V	300					
Ambient temperature							
• During operation	°C	-25 ... +60					
• During storage	°C	-40 ... +80					
Degree of protection IP		IP20					
Control circuit							
Control supply voltage							
• At AC							
- At 50 Hz	V	--		24 ... 240		--	24 ... 240
- At 60 Hz	V	--		24 ... 240		--	24 ... 240
• At DC	V	24		24 ... 240		24	24 ... 240
Operating range factor of the control supply voltage, rated value							
• At DC		0.8 ... 1.2		0.7 ... 1.1		0.8 ... 1.2	0.7 ... 1.1
Load circuit							
Thermal current of the non-solid-state contact blocks, maximum	A	5					
Mechanical service life (operating cycles) typical		10 000 000					

Article number		3RQ1000-1, 3RQ1200-1	3RQ1000-2, 3RQ1200-2
Type of electrical connection		**Screw terminals**	**Spring-loaded terminals (push-in)**
Type of connectable conductor cross-sections			
• Solid		1x (0.5 ... 4.0 mm^2), 2x (0.5 ... 2.5 mm^2)	1x (0.5 ... 4 mm^2)
• Finely stranded with end sleeve		1x (0.5 ... 4 mm^2), 2x (0.5 ... 1.5 mm^2)	1x (0.5 ... 2.5 mm^2)
• Solid for AWG cables	AWG	1x (20 ... 12), 2x (20 ... 14)	1x (20 ... 12)
Tightening torque	Nm	0.6 ... 0.8	--

SIRIUS 3RQ1 force-guided coupling relays, fail-safe up to SIL 3 / PL e NEW

Selection and ordering data

Control supply voltage At AC at 50/60 Hz	Control supply voltage At DC	Number of auxiliary contacts NO	Number of auxiliary contacts NC	Depth	Suitable for use with 3ZY12 device connector	Spring-loaded terminals (push-in) Article No.	Weight kg
V	V			mm			
Width 17.5 mm							
Fail-safe up to SIL 2 / PL c							
--	24	1	1	120	✓	**3RQ1000-2EB00**	0.200
--	24	2	1	120	✓	**3RQ1000-2GB00**	0.177
24 ... 240	24 ... 240	1	1	90	--	**3RQ1000-2EW00**	0.153
24 ... 240	24 ... 240	2	1	90	--	**3RQ1000-2GW00**	0.156
Fail-safe up to SIL 3 / PL e							
--	24	1	--[1]	120	✓	**3RQ1200-2EB00**	0.177
24 ... 240	24 ... 240	1	1	90	--	**3RQ1200-2EW00**	0.160
Width 22.5 mm							
Fail-safe up to SIL 2 / PL c							
--	24	2	2	120	✓	**3RQ1000-2HB00**	0.205
--	24	4	1	120	✓	**3RQ1000-2LB00**	0.209
24 ... 240	24 ... 240	2	2	90	--	**3RQ1000-2HW00**	0.193
24 ... 240	24 ... 240	4	1	90	--	**3RQ1000-2LW00**	0.194


3RQ1000-1EW00


3RQ1000-2EW00


3RQ1000-1LW00


3RQ1000-2LW00

✓ Yes
-- No
[1] NC contact designed to act as feedback contact.

Note:

All force-guided 3RQ1 coupling relays have safety certification up to SIL 2 / PL c or SIL 3 / PL e according to IEC 62061 / ISO 13849.

To achieve SIL 3 / PL e, two 3RQ10 devices can also be wired in series, see Equipment Manual.

In addition, the 3SK1211 devices (output expansions for 3SK) provide force-guided coupling relays with 4 NO contacts and 1 NC contact up to SIL 3 / PL e with 24 V AC, 24 V DC and 110 to 240 V AC/DC.

For applications with high currents up to a switching capacity of 10 A AC-15, the 3SK1213 output expansions are also available with 24 V AC, 24 V DC and 110 to 240 V AC/DC.

These devices can be used in the same way as the 3RQ1 coupling relays for coupling to and from safe control systems, they feature 4 NO contacts and 1 NC contact, and are available as variants with 24 V AC, 24 V DC and 110 to 240 V AC/DC.

* You can order this quantity or a multiple thereof.

Accessories

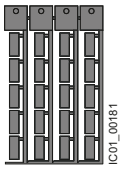
More information

Manuals, see
https://support.industry.siemens.com/cs/ww/en/ps/26008/man

	Version	Article No.	Weight kg
Device connectors for the electrical connection of SIRIUS devices in the industrial standard mounting rail enclosure			
 3ZY1212-1BA00  3ZY1212-2BA00	**Device connectors** • Width 17.5 mm (for 3RQ1000-.EB00/-.GB00, 3RQ1200-.EB00) • Width 22.5 mm (for 3RQ1000-.HB00/-.LB00)	**3ZY1212-1BA00** **3ZY1212-2BA00**	0.022 0.026
 3ZY1212-2DA00	**Device termination connectors** • Width 17.5 mm (for 3RQ1000-.EB00/-.GB00, 3RQ1200-.EB00) • Width 22.5 mm (for 3RQ1000-.HB00/-.LB00) Note: Observe positions of the slide switch for width 22.5 mm, see Equipment Manual.	**3ZY1212-1DA00** **3ZY1212-2DA00**	0.023 0.027
	Device daisy chain connectors 24 V DC, 22.5 mm, for implementation of distances between devices according to the installation guidelines	**3ZY1212-2AB00**	0.023
	Device connectors For height adjustment for device arrangements without electrical connection via device connector, with a width of 22.5 mm or greater	**3ZY1210-2AA00**	0.019
Terminals for SIRIUS devices in the industrial standard mounting rail enclosure			
 3ZY1122-1BA00  3ZY1122-2BA00	**Removable terminals**	**Screw terminals**	
	• 2-pole, up to 1 x 4 mm² or 2 x 2.5 mm²	**3ZY1122-1BA00**	0.010
		Spring-loaded terminals (push-in)	
	• 2-pole, up to 1 x 4 mm² or 2 x 1.5 mm² (in shared end sleeve)	**3ZY1122-2BA00**	0.008

*** You can order this quantity or a multiple thereof.**

SIRIUS 3RQ1 force-guided coupling relays, fail-safe up to SIL 3 / PL e

	Version	Article No.	Weight kg
Accessories for enclosures			
 3ZY1321-2AA00	**Sealing covers**		
	• 17.5 mm	**3ZY1321-1AA00**	0.002
	• 22.5 mm	**3ZY1321-2AA00**	0.002
 3ZY1311-0AA00	**Push-in lugs** For wall mounting	**3ZY1311-0AA00**	0.001
 3ZY1440-1AA00	**Coding pins** For removable terminals of SIRIUS devices in the industrial standard mounting rail enclosure; they enable the mechanical coding of terminals, see Equipment Manual.	**3ZY1440-1AA00**	
 3ZY1450-1BA00 3ZY1450-1BB00	**Hinged cover** Replacement cover, without terminal labeling, yellow		
	• 17.5 mm wide	**3ZY1450-1BA00**	0.004
	• 22.5 mm wide	**3ZY1450-1BB00**	0.004
Blank labels			
 3RT2900-1SB20	**Unit labeling plates**[1] For SIRIUS devices		
	• 17.5 mm: 10 mm x 7 mm, titanium gray	**3RT2900-1SB10**	0.028
	• 20 mm x 7 mm, titanium gray	**3RT2900-1SB20**	0.062
Tools for opening spring-loaded terminals			
 3RA2908-1A	**Screwdriver** For all SIRIUS devices with spring-loaded terminals 3.0 mm x 0.5 mm, length approx. 200 mm, titanium gray/black, partially insulated	**Spring-loaded terminals (push-in)** **3RA2908-1A**	0.050

[1] PC labeling system for individual inscription of unit labeling plates available from: murrplastik Systemtechnik GmbH.

* You can order this quantity or a multiple thereof.

Overview

SIRIUS 3RQ2 coupling relay, screw terminals, 3 changeover contacts

More information

Homepage, see www.siemens.com/relays

Industry Mall, see www.siemens.com/product?3RQ2

TIA Selection Tool Cloud (TST Cloud), see www.siemens.com/tstcloud/?node=SignalConverters

Conversion tool, see www.siemens.com/conversion-tool

3RQ2 coupling relays in their 22.5 mm industrial enclosure serve to couple control signals to and from a controller and replace the 3RS18 coupling relays. The 3RQ2 has an impressively high-quality industrial enclosure finished in modern titanium gray so that it fits in visually with the SIRIUS series of relays.

The series consists of devices with up to three changeover contacts with screw or spring-loaded terminals (push-in) and, with its wide voltage range from 24 to 240 V AC/DC, is a genuine highlight in the coupling relay market.

Thanks to terminal assignment that is identical to the previous version, existing products can easily be converted.

The reduced variety of components simplifies product selection and standardization.

Numerous accessories are available for the 3RQ2 coupling relays, for example replacement terminals, push-in lugs for wall mounting and coding pins.

Article No. scheme

Product versions		Article number						
Coupling relays, standard		**3RQ2000 –**	☐	☐	☐	**0**	☐	
Connection methods	Screw terminals		**1**					
	Spring-loaded terminals (push-in)		**2**					
Outputs	1 CO contact			**A**				
	2 CO contacts			**B**				
	3 CO contacts			**C**				
Rated control supply voltage	24 ... 240 V AC/DC				**W**			
Material of switching contacts	0 = AgSnO2						**0**	
	1 = AgNi + Au						**1**	
Example		**3RQ2000 –**	**1**	**C**	**W**	**0**	**1**	

Note:

The Article No. scheme shows an overview of product versions for better understanding of the logic behind the article numbers.

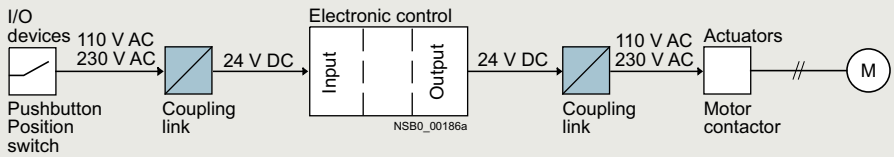
For your orders, please use the article numbers quoted in the selection and ordering data.

Benefits

- Permanent wiring thanks to removable terminals in screw or spring-loaded technology (push-in)
- Replacement of individual terminals minimizes wiring effort
- A product for all voltages from 24 to 240 V AC/DC
- Reduced costs thanks to fewer versions
- Especially high contact reliability even at low currents thanks to versions with hard gold-plated contacts
- International standards and certifications including CE, UL/CSA, EAC, railway approvals, and more

Application

- Electrical separation between the input and output circuit
- Adjustment of different signal levels
- Signal amplification
- Contact multiplication

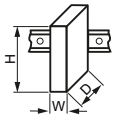


Application example motor controller

SIRIUS 3RQ2 coupling relays with industrial enclosure

Technical specifications

More information	
Technical specifications, see https://support.industry.siemens.com/cs/ww/en/ps/25158/td	Operating Instructions, see https://support.industry.siemens.com/cs/ww/en/ps/25158/man

Type			3RQ2000-.AW00 3RQ2000-.BW00 3RQ2000-.CW00	3RQ2000-.CW01
General data				
Dimensions (W x H x D)		mm	22.5 x 100 x 90	
Insulation voltage for overvoltage category III acc. to IEC 60664 for pollution degree 3		V	300	
Max. permissible voltage for protective separation between control circuit and auxiliary circuit acc. to IEC 60947-1		V	300	
Ambient temperature				
• During operation		°C	-40 ... +60	
• During storage		°C	-40 ... +80	
Degree of protection IP			IP20	
Control circuit				
Control supply voltage		V	24 ... 240 AC/DC; 50/60 Hz	
Operating range factor of control supply voltage			0.7 ... 1.1	
Load circuit				
Thermal current of the non-solid-state contact blocks, maximum		A	5	
Current carrying capacity of the output relay				
• At AC-15 at 250 V		A	3	
• At DC-13 at 24 V		A	1	
• At DC-13 at 125 V		A	0.2	
• At DC-13 at 250 V		A	0.1	
Mechanical service life (operating cycles) typical			10 000 000	
Electrical endurance (operating cycles) for AC-15 at 230 V, typical			100 000	
Material of switching contacts			AgSnO2	AgNi + Au

Article number			3RQ2000-1	3RQ2000-2
Type of electrical connection			**Screw terminals**	**Spring-loaded terminals (push-in)**
Type of connectable conductor cross-sections				
• Solid			1x (0.5 ... 4 mm²), 2x (0.5 ... 2.5 mm²)	1x (0.5 ... 4 mm²)
• Finely stranded with end sleeve			1x (0.5 ... 4 mm²), 2x (0.5 ... 1.5 mm²)	1x (0.5 ... 2.5 mm²)
• Solid for AWG cables			1x (20 ... 12), 2x (20 ... 14)	1x (20 ... 12)
Tightening torque		Nm	0.6 ... 0.8	--

Selection and ordering data

Control supply voltage At AC At 50 Hz	Control supply voltage At DC	Number of CO contacts for auxiliary contacts	Material of switching contacts	Spring-loaded terminals (push-in) Article No.	Weight kg
V	V	W			
Coupling relays with industrial enclosure, 22.5 mm					
24 ... 240	24 ... 240	1	AgSnO2	**3RQ2000-2AW00**	0.158
		2	AgSnO2	**3RQ2000-2BW00**	0.165
		3	AgSnO2	**3RQ2000-2CW00**	0.184
		3	AgNi + Au	**3RQ2000-2CW01**	0.185


3RQ2000-1CW00

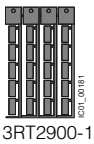

3RQ2000-2CW00

Accessories

More information

Operating Instructions, see https://support.industry.siemens.com/cs/ww/en/ps/25158/man

Conversion tool, see www.siemens.com/conversion-tool

	Version	Article No.	Weight kg
Terminals for SIRIUS devices in the industrial standard mounting rail enclosure			
 3ZY1122-1BA00	**Removable terminals**	**Screw terminals**	
	• 2-pole, up to 1 x 4 mm² or 2 x 2.5 mm²	**3ZY1122-1BA00**	0.010
		Spring-loaded terminals (push-in)	
	• 2-pole, up to 1 x 4 mm² or 2 x 1.5 mm² (in shared end sleeve)	**3ZY1122-2BA00**	0.008
Accessories for enclosures			
  3ZY1450-1AB00	**Hinged cover** Replacement cover, without terminal labeling, titanium gray, 22.5 mm wide	**3ZY1450-1AB00**	0.004
 3ZY1311-0AA00	**Push-in lugs** For wall mounting	**3ZY1311-0AA00**	0.001
 3ZY1440-1AA00	**Coding pins** For removable terminals of SIRIUS devices in the industrial standard mounting rail enclosure; they enable the mechanical coding of terminals	**3ZY1440-1AA00**	
Blank labels			
 3RT2900-1SB20	**Unit labeling plates** For SIRIUS devices 20 mm x 7 mm, titanium gray[1)]	**3RT2900-1SB20**	0.062
Tools for opening spring-loaded terminals			
 3RA2908-1A	**Screwdriver** For all SIRIUS devices with spring-loaded terminals	**Spring-loaded terminals (push-in)**	
	3.0 mm x 0.5 mm, length approx. 200 mm, titanium gray/black, partially insulated	**3RA2908-1A**	0.050

*** You can order this quantity or a multiple thereof.**

SIRIUS 3RQ3 coupling relays, narrow design

Overview

SIRIUS 3RQ3 coupling relays

More information

Homepage, see www.siemens.com/relays

Industry Mall, see www.siemens.com/product?3RQ3

TIA Selection Tool Cloud (TST Cloud), see www.siemens.com/tstcloud/?node=SignalConverters

Conversion tool, see www.siemens.com/conversion-tool

SIRIUS 3RQ3 coupling relays in narrow design are used for coupling control signals from and to a controller, and they are available in different versions:

- Coupling relays with relay output (not plug-in)
- Coupling relays with plug-in relays
- Coupling relays with semiconductor output (not plug-in)

Coupling relays with relay output (not plug-in)

AC and DC operation

IEC 60947-5-1

The input and output coupling relays differ with regard to the positioning of the terminals and the LEDs.

Coupling relays with plug-in relays

AC and DC operation

IEC 60947-1

The coupling relays are plug-in, so the relay can be replaced quickly at the end of its service life without detaching the wiring.

Coupling relays with semiconductor output (not plug-in)

AC and DC operation

IEC 60947-1, EN 60664-1 and EN 50005;
coupling relays with semiconductor output: EN 60747-5;
programmable controllers: IEC 61131-2

The input and output coupling relays differ with regard to the positioning of the terminals and the LEDs.

The coupling relays with semiconductor output have extremely high contact reliability, so they are especially suitable for solid-state systems.

For test purposes, versions are available with manual-off-automatic switches.

Article No. scheme

Product versions		**Article number**										
Coupling relays with relay output (not plug-in)		**3RQ30**	☐	**8**	**–**	☐	**A**	☐	**0**	☐		
Design and type of output	Output coupler, without manual/automatic switch		**1**									
	Input coupler		**3**									
Type of electrical connection	Screw terminals					**1**						
	Spring-loaded terminals (push-in)					**2**						
Control supply voltage	24 V AC/DC							**B**				
	115 V AC/DC							**E**				
	230 V AC/DC							**F**				
Material of switching contacts	e.g.											
	0 = AgSnO2									☐		
	1 = AgSnO2 hard gold-plated									☐		
Example		**3RQ30**	**1**	**8**	**–**	**1**	**A**	**B**	**0**	**1**		

Product versions		**Article number**										
Coupling relays with relay output (not plug-in)		**3RQ30**	**1**	**8**	**–**	**2**	**A**	☐	**0**	**8**	**–**	**0 A A 0**
Railway version with extended operating range 0.7 ... 1.2 x U_s												
Control supply voltage	24 V DC							**M**				
	110 V DC							**N**				
Example		**3RQ30**	**1**	**8**	**–**	**2**	**A**	**M**	**0**	**8**	**–**	**0 A A 0**

Product versions		**Article number**										
Coupling relays with plug-in relays		**3RQ31**	**1**	**8**	**–**	☐	**A**	☐	**0**	☐		
Type of electrical connection	Screw terminals					**1**						
	Spring-loaded terminals (push-in)					**2**						
Control supply voltage	24 V AC/DC							**B**				
	115 V AC/DC							**E**				
	230 V AC/DC							**F**				
	24 V DC							**M**				
Material of switching contacts	AgSnO2									**0**		
	AgSnO2 hard gold-plated									**1**		
Example		**3RQ31**	**1**	**8**	**–**	**1**	**A**	**B**	**0**	**1**		

Product versions		**Article number**										
Coupling relays with semiconductor output (not plug-in)		**3RQ30**	☐	☐	**–**	☐	**S**	☐	☐	**0**		
	Current carrying capacity of the semiconductor output										Control supply voltage	Switching voltage of the semiconductor output
Output coupler												
• Without manual/automatic switch	1 mA ... 0.5 A		**5**	**0**		☐		**M**	**5**		11 ... 30 V DC	10 ... 60 V DC
	5 mA ... 2 A		**5**	**2**		☐		**M**	**3**		11 ... 30 V DC	10 ... 30 V DC
	1 mA ... 2 A		**5**	**2**		☐		**M**	**4**		11 ... 30 V DC	10 ... 60 V DC
	5 mA ... 2 A		**5**	**2**		☐		**M**	**5**		11 ... 30 V DC	20 ... 264 V AC
	1 mA ... 3 A		**5**	**3**		☐		**G**	**3**		110 ... 230 V AC/DC	10 ... 30 V DC
	5 mA ... 5 A		**5**	**5**		☐		**M**	**3**		11 ... 30 V DC	10 ... 30 V DC
• With manual/automatic switch	5 mA ... 5 A		**6**	**5**		☐		**M**	**3**		11 ... 30 V DC	10 ... 30 V DC
Input coupler	10 mA ... 0.5 A		**7**	**0**		☐		**B**	**3**		11 ... 30 V AC/DC	10 ... 30 V DC
			7	**0**		☐		**G**	**3**		110 ... 230 V AC/DC	10 ... 30 V DC
Type of electrical connection	Screw terminals					**1**						
	Spring-loaded terminals (push-in)					**2**						
Example		**3RQ30**	**7**	**0**	**–**	**1**	**S**	**B**	**3**	**0**		

Note:

This Article No. scheme shows an overview of product versions for better understanding of the logic behind the article numbers.

For your orders, please use the article numbers quoted in the selection and ordering data.

SIRIUS 3RQ3 coupling relays, narrow design

Benefits

General

- All versions with screw terminals or spring-loaded terminals (push-in technology)
- TOP wiring with spring-loaded terminals (push-in) for quick and reliable wiring
- Low space requirements in the control cabinet thanks to a consistent width of 6.2 mm
- Reduced stockkeeping due to fewer variants
- Clearly visible functional state of the coupling relay by green LED
- Integrated reverse polarity protection and EMC suppressor diode
- Standardized accessories across the entire 3RQ3 series
- Universal bridging option using connecting combs for all terminals
- Galvanic isolation plate for isolating different voltages for neighboring units
- Clip-on labels available as set for individual labeling

Coupling relays with relay output (not plug-in)

- Relays fixed in enclosure for increased contact reliability
- Device variants with hard gold-plated contacts, hence high contact reliability at low currents

Coupling relays with plug-in relays

- Fast replacement of the relays with existing wiring
- Shorter installation times thanks to certified complete units
- Individual relays available as spare parts
- Device variants with hard gold-plated contacts, hence high contact reliability at low currents

Coupling relays with semiconductor output (not plug-in)

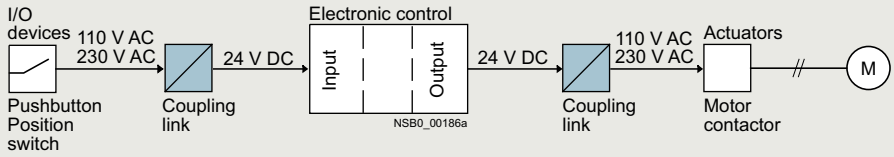
- Long service life since there is no mechanical wear
- High switching frequency thanks to short make-break times
- Vibration-resistant
- No contact bounce
- Extremely high contact reliability
- Noise-free switching
- Low control power required
- Switching of DC and capacitive loads

Note:

With semiconductors, the switching current is not dependent on the inductance of the load, i.e. the switching current for an inductive DC-13 load is the same as that for a DC-12 load. This means that coupling links with a semiconductor output are particularly suitable for inductive loads such as solenoid valves. It is not relevant to specify the number of operating cycles, because this does not affect the endurance of the semiconductor, provided it is not overheated.

Application

- Electrical separation between the input and output circuit
- Adjustment of different signal levels
- Signal amplification

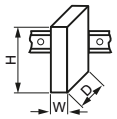


Application example motor controller

Technical specifications

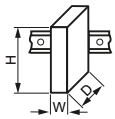
More information	
Technical specifications, see https://support.industry.siemens.com/cs/ww/en/ps/16198/td	Operating Instructions, see https://support.industry.siemens.com/cs/ww/en/ps/16198/man FAQs, see https://support.industry.siemens.com/cs/ww/en/ps/16198/faq

Coupling relays with relay output (not plug-in)

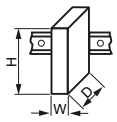
Article number		3RQ30.8-.AB00	3RQ30.8-.AB01	3RQ30.8-.AE00	3RQ30.8-.AE01	3RQ30.8-.AF00	3RQ30.8-.AF01	3RQ3018-2AM08-0AA0	3RQ3018-2AN08-0AA0
General technical specifications									
Width x height x depth 	mm	6.2 x 93 x 72.5							
Insulation voltage for overvoltage category III acc. to IEC 60664 for pollution degree 3	V	300							
Max. permissible voltage for protective separation between control circuit and auxiliary circuit	V	300							
Ambient temperature									
• During operation	°C	-25 ... +60						-40 ... +70	
• During storage	°C	-40 ... +85							
Degree of protection IP		IP20							
Version of the fuse link required for short-circuit protection of the auxiliary switch		Fuse gG: 4 A							
Operational current of the auxiliary contacts									
• At AC-15									
- At 24 V	A	3							
- At 250 V	A	3							
• At DC-13									
- At 24 V	A	1							
- At 125 V	A	0.2							
- At 250 V	A	0.1							
Contact reliability of the auxiliary contacts (one contact failure per 100 million)		17 V, 5 mA	5 V, 1 mA	17 V, 5 mA	5 V, 1 mA	17 V, 5 mA	5 V, 1 mA	17 V, 5 mA	
Mechanical service life (operating cycles) typical		10 000 000							
Electrical endurance (operating cycles) for AC-15 at 250 V typical		100 000							
Operating range factor of the control supply voltage, rated value									
• At AC									
- At 50 Hz		0.8 ... 1.25		0.8 ... 1.1				--	
- At 60 Hz		0.8 ... 1.25		0.8 ... 1.1				--	
• At DC		0.8 ... 1.25		0.8 ... 1.1				0.7 ... 1.25	
Active power input	W	0.3		0.5		1		0.3	0.6
Thermal current	A	6							
• Note		--						Derating, see characteristic curves	

SIRIUS 3RQ3 coupling relays, narrow design

Coupling relays with plug-in relays

Article number		3RQ3118-.AB00	3RQ3118-.AB01	3RQ3118-.AE00	3RQ3118-.AE01	3RQ3118-.AF00	3RQ3118-.AF01	3RQ3118-.AM00	3RQ3118-.AM01
General technical specifications									
Width x height x depth 	mm	6.2 x 93 x 76							
Insulation voltage for overvoltage category III acc. to IEC 60664 for pollution degree 3	V	300							
Max. permissible voltage for protective separation between control circuit and auxiliary circuit	V	300							
Ambient temperature									
• During operation	°C	-25 ... +60							
• During storage	°C	-40 ... +85							
Degree of protection IP		IP20							
Version of the fuse link required for short-circuit protection of the auxiliary switch		Fuse gG: 4 A							
Operational current of the auxiliary contacts									
• At AC-15									
- At 24 V	A	3							
- At 250 V	A	3							
• At DC-13									
- At 24 V	A	1							
- At 125 V	A	0.2							
- At 250 V	A	0.1							
Contact reliability of the auxiliary contacts (one contact failure per 100 million)		17 V, 5 mA	5 V, 1 mA	17 V, 5 mA	5 V, 1 mA	17 V, 5 mA	5 V, 1 mA	17 V, 5 mA	5 V, 1 mA
Mechanical service life (operating cycles) typical		10 000 000							
Electrical endurance (operating cycles) for AC-15 at 250 V typical		100 000							
Operating range factor of the control supply voltage, rated value									
• At AC									
- At 50 Hz		0.8 ... 1.25		0.8 ... 1.1				--	
- At 60 Hz		0.8 ... 1.25		0.8 ... 1.1				--	
• At DC		0.8 ... 1.25		0.8 ... 1.1				0.8 ... 1.25	
Active power input	W	0.3		0.5		1		0.3	
Thermal current	A	6							

Coupling relays with semiconductor output (not plug-in)

Article number		3RQ3050-.SM50	3RQ3052-.SM30	3RQ3052-.SM40	3RQ3052-.SM50	3RQ3053-.SG30	3RQ3055-.SM30	3RQ3065-.SM30	3RQ3070-.SB30	3RQ3070-.SG30
General technical specifications										
Width x height x depth 	mm	6.2 x 93 x 72.5						6.2 x 93 x 75	6.2 x 93 x 72.5	
Insulation voltage for overvoltage category III acc. to IEC 60664 for pollution degree 3	V	50			300		50			--
Ambient temperature										
• During operation	°C	-25 ... +60								
• During storage	°C	-40 ... +85								
Degree of protection IP		IP20								
Switching voltage of the semiconductor output										
• At AC	V	--			20 ... 264	--				
• At DC	V	10 ... 60	10 ... 30	10 ... 60	--	10 ... 30				
Current carrying capacity of the semiconductor output										
• At AC		--			5 mA ... 2 A	--				
• At DC		1 mA ... 0.5 A	5 mA ... 2 A	1 mA ... 2 A	--	1 mA ... 3 A	5 mA ... 5 A		10 mA ... 0.5 A	
Operating range factor of the control supply voltage, rated value										
• At AC										
- At 50 Hz		--				0.7 ... 1.1	--		1 ... 1	0.7 ... 1.1
- At 60 Hz		--				0.7 ... 1.1	--		1 ... 1	0.7 ... 1.1
• At DC		1 ... 1				0.7 ... 1.1	1 ... 1			0.7 ... 1.1
Active power input	W	0.3			0.25	0.3			0.5	
Thermal current	A	0.5	2			3	5		0.5	

Article number		3RQ3...-1....	3RQ3...-2....
Type of electrical connection for auxiliary and control circuits		**Screw terminals**	**Spring-loaded terminals (push-in)**
Type of connectable conductor cross-sections			
• Solid		1x (0.25 ... 2.5) mm^2	
• Finely stranded			
- Without end sleeves		--	1x (0.25 ... 2.5) mm^2
- With end sleeves		1x (0.25 ... 1.5) mm^2	
• Solid for AWG cables		1x (20 ... 14)	

SIRIUS 3RQ3 coupling relays, narrow design

Selection and ordering data

Type of voltage	Control supply voltage At AC At 50 Hz	At AC At 60 Hz	At DC	Number of CO contacts for auxiliary contacts	Material of switching contacts	Article No.	Weight
	V	V	V				kg
Coupling relays with relay output (not plug-in)							
	Output coupling links						
AC/DC	24	24	24	1	AgSnO2	**3RQ3018-☐AB00**	0.035
					AgSnO2 hard gold-plated	**3RQ3018-☐AB01**	0.035
	115	115	115	1	AgSnO2	**3RQ3018-☐AE00**	0.036
	230	230	230	1	AgSnO2	**3RQ3018-☐AF00**	0.035
DC	--	--	24	1	AgSnO2	**3RQ3018-2AM08-0AA0**	0.033
			110	1	AgSnO2	**3RQ3018-2AN08-0AA0**	0.033
	Input coupling links						
AC/DC	24	24	24	1	AgSnO2	**3RQ3038-☐AB00**	0.035
					AgSnO2 hard gold-plated	**3RQ3038-☐AB01**	0.035
	115	115	115	1	AgSnO2	**3RQ3038-☐AE00**	0.035
					AgSnO2 hard gold-plated	**3RQ3038-☐AE01**	0.034
	230	230	230	1	AgSnO2	**3RQ3038-☐AF00**	0.035
					AgSnO2 hard gold-plated	**3RQ3038-☐AF01**	0.035
Coupling relays with plug-in relays							
	Output coupling links						
AC/DC	24	24	24	1	AgSnO2	**3RQ3118-☐AB00**	0.035
					AgSnO2 hard gold-plated	**3RQ3118-☐AB01**	0.035
	115	115	115	1	AgSnO2	**3RQ3118-☐AE00**	0.035
					AgSnO2 hard gold-plated	**3RQ3118-☐AE01**	0.035
	230	230	230	1	AgSnO2	**3RQ3118-☐AF00**	0.035
					AgSnO2 hard gold-plated	**3RQ3118-☐AF01**	0.035
DC	--	--	24	1	AgSnO2	**3RQ3118-☐AM00**	0.035
					AgSnO2 hard gold-plated	**3RQ3118-☐AM01**	0.035

3RQ30.8-2....

3RQ3118-2....

Type of electrical connection

- Screw terminals
- Spring-loaded terminals (push-in)

1
2

Type of voltage	Control supply voltage At AC At 50 Hz	At AC At 60 Hz	At DC	Current carrying capacity of the semiconductor output At AC	At DC	Operating mode selectable via switch position	Article No.	Weight
								kg
Coupling relays with semiconductor output (not plug-in)								
	Output coupling links							
DC	--	--	11 ... 30 V	--	1 mA ... 0.5 A	--	**3RQ3050-☐SM50**	0.031
					5 mA ... 2 A	--	**3RQ3052-☐SM30**	0.032
					1 mA ... 2 A	--	**3RQ3052-☐SM40**	0.031
				5 mA ... 2 A	--	--	**3RQ3052-☐SM50**	0.034
				--	5 mA ... 5 A	--	**3RQ3055-☐SM30**	0.032
						Manual/ Off/ Automatic	**3RQ3065-☐SM30**	0.032
AC/DC	110 ... 230 V	110 ... 230 V	110 ... 230 V	--	1 mA ... 3 A	--	**3RQ3053-☐SG30**	0.033
	Input coupling links							
AC/DC	11 ... 30 V	11 ... 30 V	11 ... 30 V	--	10 mA ... 0.5 A	--	**3RQ3070-☐SB30**	0.031
	110 ... 230 V	110 ... 230 V	110 ... 230 V	--	10 mA ... 0.5 A	--	**3RQ3070-☐SG30**	0.032

3RQ3050-2SM50

Type of electrical connection

- Screw terminals
- Spring-loaded terminals (push-in)

1
2

* You can order this quantity or a multiple thereof.

Accessories

	Version	Article No.	Weight kg
Galvanic isolation plates			
 3RQ3900-0A	For electrical separation of different potentials when devices of different types are installed side by side	**3RQ3900-0A**	0.014
Connecting combs			
 3RQ3901-0B	For linking the same potentials, current carrying capacity for infeed max. 6 A		
	• 2-pole	**3RQ3901-0A**	0.001
	• 4-pole	**3RQ3901-0B**	0.001
	• 8-pole	**3RQ3901-0C**	0.002
	• 16-pole	**3RQ3901-0D**	0.004
Clip-on labels[1]			
 3RQ3902-0A	For terminal and equipment labeling, white		
	• 5 x 5 mm	**3RQ3902-0A**	0.009
	• 6 x 12 mm	**3RQ3902-0B**	0.017
Tools for opening spring-loaded terminals			
 3RA2908-1A	**Screwdriver** For all SIRIUS devices with spring-loaded terminals 3.0 mm x 0.5 mm, length approx. 200 mm, titanium gray/black, partially insulated	**Spring-loaded terminals (push-in)** **3RA2908-1A**	0.050

[1] PC labeling system for individual inscription of unit labeling plates available from Conta-Clip Verbindungstechnik GmbH.

Coupling relays with plug-in relays	Control supply voltage	Material of switching contacts	Number of CO contacts for auxiliary contacts	Article No.	Weight
Type	V				kg
Replacement modules for 3RQ3118 coupling relays with plug-in relays					
3RQ3118-.AM00	24 DC	AgSnO2	1	**3TX7014-7BM00**	0.007
3RQ3118-.AM01		AgSnO2 hard gold-plated		**3TX7014-7BM02**	0.007
3RQ3118-.AB00	24 AC/DC	AgSnO2	1	**3TX7014-7BM00**	0.007
3RQ3118-.AB01		AgSnO2 hard gold-plated		**3TX7014-7BM02**	0.007
3RQ3118-.AE00	115 AC/DC	AgSnO2	1	**3TX7014-7BP00**	0.006
3RQ3118-.AF00	230 AC/DC	AgSnO2			
3RQ3118-.AE01	115 AC/DC	AgSnO2 hard gold-plated	1	**3TX7014-7BP02**	0.006
3RQ3118-.AF01	230 AC/DC	AgSnO2 hard gold-plated			

*** You can order this quantity or a multiple thereof.**

Introduction

Overview






Type		3RV20	3RV21	3RV23	3RV24	3RV27	3RV28
SIRIUS 3RV2 motor starter protectors/circuit breakers							
Applications							
• System protection		✓[1] / 3RV20..-.....-0DA0[2]	✓[1]	--	--	✓	✓
• Motor protection		✓	--	--	--	--	--
• Motor protection with overload relay function		--	✓	--	--	--	--
• Starter combinations		--	--	✓	--	--	--
• Transformer protection		--	--	--	✓ / 3RV24..-.....-0DA0[2]	--	✓
Size		S00, S0, S2, S3	S00, S0, S2, S3	S00, S0, S2, S3	S00, S0, S2	S00, S0, S3	S00, S0
Rated current I_n							
• Size S00	A	Up to 16	Up to 16	Up to 16	Up to 16	Up to 15	Up to 15
• Size S0	A	Up to 40	Up to 32	Up to 40	Up to 25	Up to 22	Up to 22
• Size S2	A	Up to 80	Up to 80	Up to 80	Up to 65	--	--
• Size S3	A	Up to 100	Up to 100	Up to 100	--	Up to 70	--
Rated operational voltage U_e acc. to IEC	V	690 AC[3]	690 AC[3]	690 AC[3]	690 AC[3]	690 AC	690 AC
Rated frequency	Hz	50/60	50/60	50/60	50/60	50/60	50/60
Trip class		CLASS 10 (S00 ... S3), CLASS 20 (S2, S3)	CLASS 10	--	CLASS 10	--	--
Thermal overload release	A A	0.11 ... 0.16 to 80 ... 100	0.11 ... 0.16 to 80 ... 100	None[4]	0.11 ... 0.16 to 54 ... 65	0.16 ... 70 Non-adjustable	0.16 to 22 Non-adjustable
Electronic releases A multiple of the rated current		13 times	13 times	13 times	20 times	13 times	20 times
Short-circuit breaking capacity I_{cu} at 400 V AC	kA	20/55/65/100	55/65/100	20/55/65/100	55/65/100	[5]	[5]
Pages		2/177 ... 2/184	2/185, 2/186	2/187 ... 2/189	2/190, 2/191	[7]	[7]

Accessories																				
For sizes	S00	S0	S2	S3	S00	S0	S2	S3	S00	S0	S2	S3	S00	S0	S2	S00	S0	S3	S00	S0
Auxiliary switches	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓[6]	✓	✓
Signaling switches	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	--	--	--	--	--
Undervoltage releases	✓	✓	✓	✓	--	--	--	--	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Shunt releases	✓	✓	✓	✓	--	--	--	--	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Isolator modules	✓	✓	✓	--	✓	✓	✓	--	✓	✓	✓	--	✓	✓	✓	--	--	--	--	--
Insulated 3-phase busbar system	✓	✓	✓	--	--	--	✓	--	✓	✓	✓	--	✓	✓	✓	✓	✓	--	✓	✓
Busbar adapters	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	--	--
Door-coupling rotary operating mechanisms	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Link modules	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	--	--	--	--	--
Enclosures for surface mounting	✓	✓	✓	--	✓	✓	✓	--	✓	✓	✓	--	✓	✓	✓	--	--	--	--	--
Enclosures for flush mounting	✓	✓	--	--	✓	✓	--	--	✓	✓	--	--	✓	✓	--	--	--	--	--	--
Front plates	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	--	--	--	--	--
Infeed system	✓	✓	--	--	--	--	--	--	✓	✓	--	--	✓	✓	--	✓	✓	--	✓	✓
Sealable scale covers for setting knobs	✓	✓	✓	✓	✓	✓	✓	✓	--	--	--	--	✓	✓	✓	--	--	--	--	--
Remote motorized operating mechanisms	--	--	--	✓	--	--	--	✓	--	--	--	✓	--	--	--	--	--	--	--	--
Pages	2/195																			

✓ Has this function or can use this accessory
-- Does not have this function or cannot use this accessory

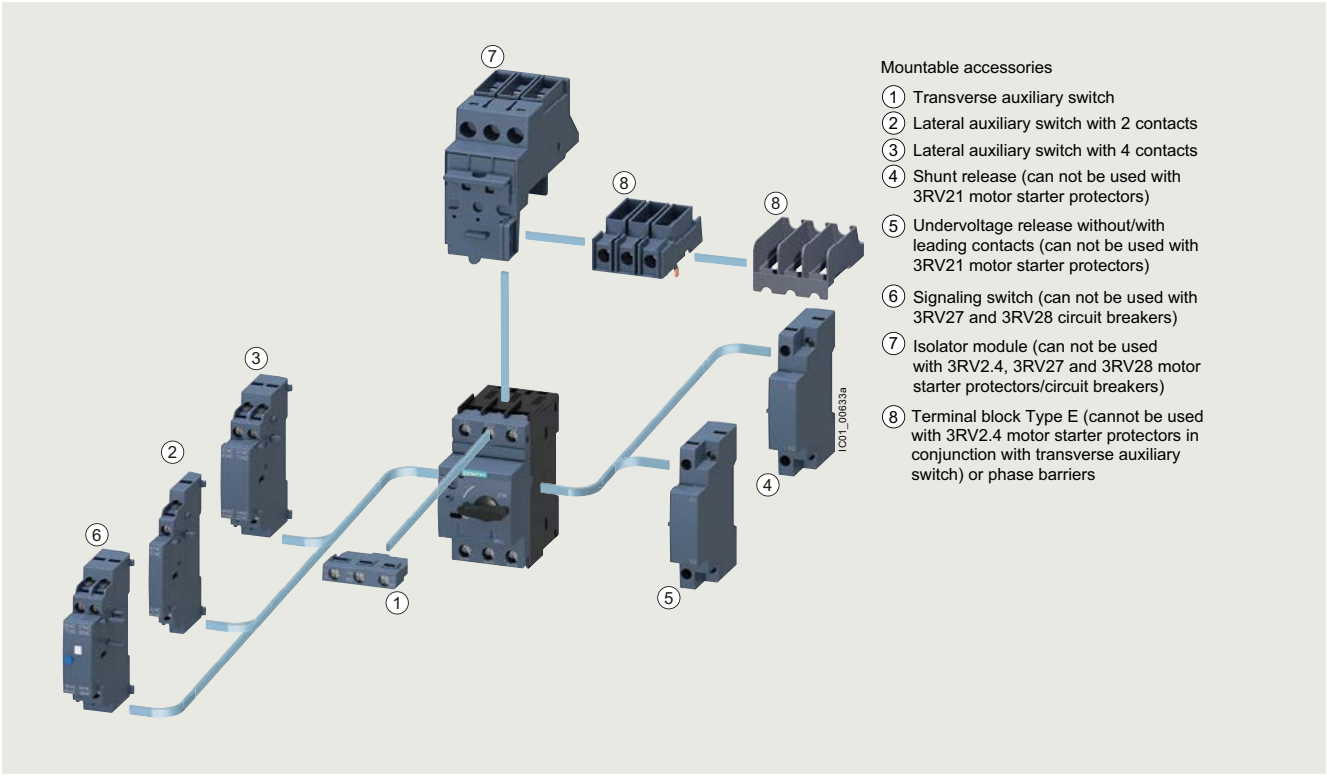
1) For symmetrical loading of the three phases.
2) For 1-phase, 2-phase and 3-phase asymmetrical loading of the three phases.
3) With molded-plastic enclosure 500 V AC.
4) For overload protection of the motors, appropriate overload relays must be used.
5) According to UL 489 at 480 Y/277 V AC: 65 kA or 50 kA.
6) Only lateral auxiliary switches can be used.
7) see Catalog IC 10.

Overview

More information	
Homepage, see www.siemens.com/sirius-circuit-breakers	Application Manual for controls with IE3/IE4 motors, see https://support.industry.siemens.com/cs/ww/en/view/94770820
Industry Mall, see www.siemens.com/product?3RV2	System Manual for modular system, see https://support.industry.siemens.com/cs/ww/en/view/60311318
TIA Selection Tool Cloud (TST Cloud), see www.siemens.com/tstcloud/?node=MotorStarterProtector	Equipment Manual, see https://support.industry.siemens.com/cs/ww/en/view/60279172
Conversion tool, see www.siemens.com/conversion-tool	Certificates, see https://support.industry.siemens.com/cs/ww/en/ps/16245/cert

The following illustration shows 3RV2 motor starter protectors/circuit breakers with the accessories which can be mounted for the sizes S00 to S3, see also "Introduction" ➞ "Overview", page 2/162.

For accessories, see page 2/195 onwards.



Mountable accessories for SIRIUS 3RV2 motor starter protectors/circuit breakers

Motor starter protector with spring-loaded terminals, size S0 (left) and motor starter protector with screw terminals, size S00 (right)

The SIRIUS 3RV2 motor starter protectors/circuit breakers are compact, current limiting motor starter protectors/circuit breakers which are optimized for load feeders. The motor starter protectors/circuit breakers are used for switching and protecting three-phase motors of up to 55/45 kW at 400 V AC and for other loads with rated currents of up to 100 A.

3RV2 motor starter protectors are usually approved according to IEC and UL/CSA. According to UL 508/UL 60947-4-1, the 3RV2 motor starter protectors/circuit breakers in sizes S00 to S3 are approved as:

- "Manual Motor Controllers"
- "Manual Motor Controllers" for "Group Installations"
- "Manual Motor Controllers Suitable for Tab Conductor Protection in Group Installations"
- "Self-Protected Combination Motor Controllers (Type E)" Please note that for this approval the 3RV20 motor starter protectors must be equipped with additional infeed terminals or phase barriers.

Corresponding short-circuit values, see page 2/166.

General data

The 3RV2...-.....-0BA0 motor starter protectors/circuit breakers can be used at low ambient temperatures down to -50 °C.

3RV20..-.....-0DA0 motor starter protectors for system protection according to IEC, 3RV24..-.....-0DA0 for transformer protection according to IEC and 3RV27 and 3RV28 circuit breakers according to UL 489 can be used for 1-phase, 2-phase and 3-phase loads, as these motor starter protectors/circuit breakers do not have asymmetry detection.

The 3RV27 and 3RV28 are approved as circuit breakers according to UL 489; they are a special version of the 3RV2 motor starter protectors.

Thanks to their dimensions, the 3RV1011 motor starter protectors are suitable for installation in enclosures or under cramped installation conditions.

Type of construction

The 3RV2 motor starter protectors are available in four sizes:

- Size S00 – width 45 mm, max. rated current 16 A, at 400 V AC suitable for three-phase motors up to 7.5 kW
- Size S0 – width 45 mm, max. rated current 40 A, at 400 V AC suitable for three-phase motors up to 18.5 kW
- Size S2 – width 55 mm, max. rated current 80 A, at 400 V AC suitable for three-phase motors up to 37 kW
- Size S3 – width 70 mm, max. rated current 100 A, at 400 V AC suitable for three-phase motors up to 45/55 kW

Circuit breakers acc. to UL 489

The 3RV27 and 3RV28 circuit breakers are available in two or three sizes:

- Size S00 – width 45 mm, max. rated current 15 A, for 480 Y/277 V AC
- Size S0 – width 45 mm, max. rated current 22 A, for 480 Y/277 V AC
- Size S3 – width 70 mm, max. rated current 70 A, for 480 Y/277 V AC

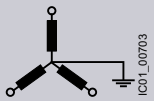
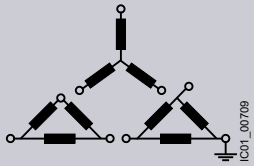
Connection methods

The 3RV2 motor starter protectors/circuit breakers can be supplied with screw terminals and spring-loaded terminals.

	Screw terminals
	Spring-loaded terminals
	The terminals are indicated in the corresponding tables by the symbols shown on orange backgrounds.

Voltage data

The data for 3-phase power systems according to IEC 60947-4-1 are valid for the following line system configurations:

Voltage data U_e in the catalog	Line system configurations	
	Three-phase Four-wire systems 	Three-phase Three-wire systems 
V	V	V
230	--	230
400	230/400	400
440	260/440	440
500	--	500
690	400/690	690 (only from size S3)
1 000	--	1 000

-- Not specified

Use in hazardous areas

The 3RV20 motor starter protectors for motor protection (without 3RV20..-.....-0BA0 and -0DA0) have certification in accordance with both the European explosion protection directive (ATEX) and the international explosion protection standard (IECEx).

In accordance with the European directive (ATEX), the 3RV20 (without 3RV20..-.....-0BA0 and -0DA0) are able to switch and protect explosion-proof motors of type of protection "Increased Safety EEx e".

In accordance with the international guideline (IECEx), the 3RV20 (without 3RV20..-.....-0BA0 and -0DA0) are able to switch and protect motors of the types "Increased Safety Ex e" or "Flameproof enclosure Ex d".

Article No. scheme

Product versions		Article number
Motor starter protectors/circuit breakers		**3RV2** □ □ □ – □ □ □ □ □ – □ □ □ □
Type of motor starter protector/circuit breaker	e.g. 0 = for motor protection/system protection	□
Size	e.g. 1 = 16 A (7.5 kW) for size S00	□
Breaking capacity	e.g. 1 = standard switching capacity	□
Setting range for overload release	e.g. 1A = 1.1 ... 1.6 A	□ □
Trip class (CLASS)	e.g. A = a (adjustable CLASS 10) / n (13 or 20 x I_n)	□
Connection methods	e.g. 1 = screw terminal	□
With or without auxiliary switch	e.g. 0 = without	□
Special versions		□ □ □ □
Example		**3RV2 0 1 1 – 1 A A 1 0**

Note:

The Article No. scheme shows an overview of product versions for better understanding of the logic behind the article numbers.

For your orders, please use the article numbers quoted in the selection and ordering data.

Application

Operating conditions

3RV2 motor starter protectors/circuit breakers are suitable for use in any climate. They are intended for use in enclosed rooms in which no severe operating conditions (such as dust, caustic vapors, hazardous gases) prevail. When installed in dusty and damp areas, suitable enclosures must be provided.

3RV2 motor starter protectors/circuit breakers can optionally be fed from the top or from below.

The permissible ambient temperatures, the maximum switching capacities, the tripping currents and other boundary conditions can be found in the technical specifications and tripping characteristics.

3RV2 motor starter protectors/circuit breakers are suitable for operation in IT systems (IT networks). In this case, the different short-circuit breaking capacity in the IT system must be taken into account, see page 2/168.

Since operational currents, starting currents and current peaks are different even for motors with identical power ratings due to the inrush current, the motor ratings in the selection tables are only guide values. The specific rated and startup data of the motor to be protected are always paramount to the choice of the most suitable motor starter protector/circuit breaker. This also applies to motor starter protectors for transformer protection.

Possible uses

The 3RV motor starter protectors/circuit breakers can be used:

- For short-circuit protection
- For motor protection (also with overload relay function)
- For system protection
- For short-circuit protection for starter combinations
- For transformer protection
- As main and EMERGENCY OFF switches
- For operation in IT systems (IT networks)
- In hazardous areas (ATEX, IECEx)
- As circuit breakers according to UL 489 (3RV27 and 3RV28)
- For fuse monitoring
- For distance protection

Use of SIRIUS protection devices in conjunction with IE3/IE4 motors

Note:

For the use of 3RV2 motor starter protectors/circuit breakers in conjunction with highly energy-efficient IE3/IE4 motors, please observe the information on dimensioning and configuring, see Application Manual.

General data

Technical specifications

More information	
System Manual for modular system, see https://support.industry.siemens.com/cs/ww/en/view/60311318	Equipment Manual, see https://support.industry.siemens.com/cs/ww/en/view/60279172
Configuration Manual for load feeders, see https://support.industry.siemens.com/cs/ww/en/view/39714188	Technical specifications, see https://support.industry.siemens.com/cs/ww/en/ps/16245/td For UL reports for the individual devices, see https://support.industry.siemens.com/cs/ww/en/ps/16245/cert

Short-circuit breaking capacity I_{cu}, I_{cs} according to IEC 60947-2

The table shows the rated ultimate short-circuit breaking capacity I_{cu} and the rated service short-circuit breaking capacity I_{cs} of the 3RV motor starter protectors/circuit breakers with different operating voltages dependent on the rated current I_n of the motor starter protectors/circuit breakers.

Power can be supplied to the motor starter protectors/circuit breakers via the terminals at the top or at the bottom without restricting the rated data. If the short-circuit current at the installation location exceeds the motor starter protector/circuit breaker's specified rated short-circuit breaking capacity, you will need to use a back-up fuse. It is also possible to install an upstream motor starter protector/circuit breaker with a limiter function.

The maximum rated current of this back-up fuse is indicated in the tables. The rated ultimate short-circuit breaking capacity then applies as specified on the fuse.

Fuseless design

Motor starter protector/contactor assemblies for short-circuit currents up to 150 kA can be ordered as 3RA2 fuseless load feeders.

Motor starter protectors/ circuit breakers	Rated current I_n	Up to 240 V AC[1]			Up to 400 V AC[1]/415 V AC[2]			Up to 440 V AC[1]/460 V AC[2]			Up to 500 V AC[1]/525 V AC[2]			Up to 690 V AC[1]		
		I_{cu}	I_{cs}	Max. fuse (gG)	I_{cu}	I_{cs}	Max. fuse (gG)[3]	I_{cu}	I_{cs}	Max. fuse (gG)[3]	I_{cu}	I_{cs}	Max. fuse (gG)[3]	I_{cu}	I_{cs}	Max. fuse (gG)[3][4]
Type	A	kA	kA	A	kA	kA	A	kA	kA	A	kA	kA	A	kA	kA	A
Size S00																
3RV2.11	0.16 ... 1.6	100	100	--	100	100	--	100	100	--	100	100	--	100	100	--
	2; 2.5	100	100	--	100	100	--	100	100	--	100	100	--	10	10	25
	3.2	100	100	--	100	100	--	100	100	--	100	100	--	10	10	32
	4; 5	100	100	--	100	100	--	100	100	--	100	100	--	6	4	32
	6.3	100	100	--	100	100	--	100	100	--	100	100	--	6	4	50
	8	100	100	--	100	100	--	50	50	63	42	42	63	6	4	50
	10	100	100	--	100	100	--	50	50	80	42	42	63	6	4	50
	12.5	100	100	--	100	100	--	50	50	80	42	42	80	6	4	63
	16	100	100	--	55	30	100	50	12.5	80	10	5	80	4	4	63
Size S0																
3RV2.21	0.16 ... 1.6	100	100	--	100	100	--	100	100	--	100	100	--	100	100	--
	2; 2.5	100	100	--	100	100	--	100	100	--	100	100	--	10	10	25
	3.2	100	100	--	100	100	--	100	100	--	100	100	--	10	10	32
	4; 5	100	100	--	100	100	--	100	100	--	100	100	--	6	4	32
	6.3	100	100	--	100	100	--	100	100	--	100	100	--	6	4	50
	8	100	100	--	100	100	--	50	50	63	42	42	63	6	4	50
	10	100	100	--	100	100	--	50	50	80	42	42	63	6	4	50
	12.5	100	100	--	100	100	--	50	50	80	42	42	80	6	4	63
	16	100	100	--	55	25	100	50	12.5	80	10	5	80	4	2	63
	20	100	100	--	55	25	125	50	10	80	10	5	80	4	2	63
	22; 25	100	100	--	55	25	125	50	10	100	10	5	80	4	2	63
	28; 32	100	100	--	55	25	125	30	10	125	10	5	100	4	2	100
	36; 40	100	100	--	20	10	125	12	8	125	6	3	100	3	2	100

-- No back-up fuse required, since short-circuit-proof up to 100 kA

1) 10% overvoltage.

2) 5% overvoltage.

3) Back-up fuse only required if short-circuit current at the installation location is > I_{cu}.

4) Alternatively, fuseless limiter combinations for 690 V AC can also be used.

Motor starter protectors/ circuit breakers	Rated current I_n	Up to 240 V AC[1]			Up to 400 V AC[1]/415 V AC[2]			Up to 440 V AC[1]/460 V AC[2]			Up to 500 V AC[1]/525 V AC[2]			Up to 690 V AC[1]		
		I_{cu}	I_{cs}	Max. fuse (gG)	I_{cu}	I_{cs}	Max. fuse (gG)[3]	I_{cu}	I_{cs}	Max. fuse (gG)[3]	I_{cu}	I_{cs}	Max. fuse (gG)[3]	I_{cu}	I_{cs}	Max. fuse (gG)[3][4]
Type	A	kA	kA	A	kA	kA	A	kA	kA	A	kA	kA	A	kA	kA	A
Size S2																
3RV2.31	14; 17	100	100	--	65	30	100	50	25	100	12	6	63	5	3	63
	20	100	100	--	65	30	100	50	25	100	12	6	80	5	3	80
	25	100	100	--	65	30	100	50	15	100	12	6	80	5	3	80
	32; 36	100	100	--	65	30	125	50	15	125	10	5	100	4	2	100
	40; 45	100	100	--	65	30	160	50	15	125	10	5	100	4	2	100
	52	100	100	--	65	30	160	50	15	125	10	5	125	4	2	125
	59; 65	100	100	--	65	30	160	50	15	160	8	4	125	4	2	125
	73; 80	100	100	--	65	30	200	50	15	200	8	4	160	4	2	125
Size S2, with increased switching capacity																
3RV2.32	14; 17	100	100	--	100	50	--	65	30	100	18	10	63	8	5	63
	20; 25	100	100	--	100	50	--	65	30	100	18	10	80	8	5	80
	32 ... 45	100	100	--	100	50	--	65	30	125	15	8	100	6	4	100
	52	100	100	--	100	50	--	65	30	125	15	8	125	6	4	125
	59; 65	100	100	--	100	50	--	50	15	160	10	5	125	6	4	125
	73; 80	100	100	--	100	50	--	50	15	200	10	5	160	6	4	125
Size S3																
3RV2.41	40	100	100	--	65	30	125	65	30	125	12	6	100	6	3	63
	50	100	100	--	65	30	125	65	30	125	12	6	100	6	3	80
	63	100	100	--	65	30	160	65	30	160	12	6	100	6	3	80
	75	100	100	--	65	30	160	65	30	160	8	4	125	5	3	100
	84 ... 100	100	100	--	65	30	160	65	30	160	8	4	125	5	3	125
Size S3, with increased switching capacity																
3RV2.42	40	100	100	--	100	50	--	100	50	--	18	9	160	12	6	80
	50	100	100	--	100	50	--	100	50	--	15	7.5	160	10	5	100
	63	100	100	--	100	50	--	70	50	200	15	7.5	160	7.5	4	100
	75	100	100	--	100	50	--	70	50	200	10	5	160	6	3	125
	84 ... 100	100	100	--	100	50	--	70	50	200	10	5	160	6	3	160
3RV2742	10 ... 20	100	100	--	100	50	--	100	50	--	30	15	80	12	7	63
	25	100	100	--	100	50	--	100	50	--	22	11	100	12	7	63
	30	100	100	--	100	50	--	100	50	--	18	9	160	12	6	80
	35 ... 40	100	100	--	100	50	--	100	50	--	15	7.5	160	10	5	100
	45 ... 50	100	100	--	100	50	--	70	50	200	15	7.5	160	7.5	4	100
	60	100	100	--	100	50	--	70	50	200	10	5	160	6	3	125
	70	100	100	--	100	50	--	70	50	200	10	5	160	6	3	160

-- No back-up fuse required, since short-circuit-proof up to 100 kA

1) 10% overvoltage.

2) 5% overvoltage.

3) Back-up fuse only required if short-circuit current at the installation location is > I_{cu}.

4) Alternatively, fuseless limiter combinations for 690 V AC can also be used.

General data

Short-circuit breaking capacity I_{cuIT} in the IT system (IT network) according to IEC 60947-2

3RV motor starter protectors/circuit breakers are suitable for use in IT systems. The values of I_{cu} and I_{cs} apply for the 3-pole short circuit. In the case of a double ground fault in different phases at the input and output side of a motor starter protector/circuit breaker, the special short-circuit breaking capacity I_{cuIT} applies. The specifications in the table below apply to 3RV motor starter protectors/circuit breakers.

If the short-circuit current at the installation location exceeds the motor starter protector/circuit breaker's specified rated short-circuit breaking capacity, you will need to use a back-up fuse. The maximum rated current of this back-up fuse is indicated in the tables. The rated short-circuit breaking capacity then applies as specified on the fuse.

Motor starter protectors/ circuit breakers	Rated current I_n	Up to 240 V AC[1]		Up to 400 V AC[1]/415 V AC[2]		Up to 440 V AC[1]/460 V AC[2]		Up to 500 V AC[1]/525 V AC[2]		Up to 690 V AC[1][3]	
		I_{cuIT}	Max. fuse (gG)[4]	I_{cuIT}	Max. fuse (gG)[4][5]	I_{cuIT}	Max. fuse (gG)[4]	I_{cuIT}	Max. fuse (gG)[4]	I_{cuIT}	Max. fuse (gG)[4]
Type	A	kA	A	kA	A	kA	A	kA	A	kA	A
Size S00											
3RV2.11	0.16 ... 0.4	100	--	100	--	100	--	100	--	100	--
	0.5	100	--	100	--	100	--	100	--	0.5	4
	0.63; 0.8	100	--	100	--	100	--	100	--	0.5	6
	1	100	--	100	--	2	10	2	10	1.5	10
	1.25	100	--	100	--	2	16	2	16	1.5	16
	1.6	100	--	100	--	2	20	2	20	1.5	16
	2; 2.5	100	--	8	25	2	25	2	25	1.5	20
	3.2	100	--	8	32	2	32	2	32	1.5	25
	4; 5	100	--	4	32	1.5	32	1.5	32	1.5	25
	6.3; 8	100	--	4	50	1	40	1	40	1	35
	10	100	--	4	50	1	40	1	40	1	40
	12.5	100	--	4	63	1	50	1	50	1	40
	16	55	80	4	63	1	50	1	50	1	40
Size S0											
3RV2.21	0.16 ... 0.4	100	--	100	--	100	--	100	--	100	--
	0.5	100	--	100	--	100	--	100	--	0.5	4
	0.63; 0.8	100	--	100	--	100	--	100	--	0.5	6
	1	100	--	100	--	2	10	2	10	1.5	10
	1.25	100	--	100	--	2	16	2	16	1.5	16
	1.6	100	--	100	--	2	20	2	20	1.5	16
	2; 2.5	100	--	8	25	2	25	2	25	1.5	20
	3.2	100	--	8	32	2	32	2	32	1.5	25
	4; 5	100	--	4	32	1.5	32	1.5	32	1.5	25
	6.3; 8	100	--	4	50	1	40	1	40	1	35
	10	100	--	4	50	1	40	1	40	1	40
	12.5	100	--	4	63	1	50	1	50	1	40
	16	55	80	4	63	1	50	1	50	1	40
	20 ... 25	55	80	4	63	1	50	1	50	1	50
	28; 32	55	80	2	63	1	63	1	63	1	63
	36; 40	20	80	2	63	1	63	1	63	1	63

-- No back-up fuse required, since short-circuit-proof up to 100 kA

1) 5% overvoltage.

2) Without overvoltage.

3) Overvoltage category II applies for applications in IT systems > 600 V.

4) Back-up fuse only required if short-circuit current at installation location is > I_{cuIT}.

5) Alternatively, fuseless limiter combinations for 690 V AC can also be used.

Motor starter protectors/ circuit breakers	Rated current I_n	Up to 240 V AC[1]		Up to 400 V AC[1]/415 V AC[2]		Up to 440 V AC[1]/460 V AC[2]		Up to 500 V AC[1]/525 V AC[2]		Up to 690 V AC[1][3]	
		I_{cuIT}	Max. fuse (gG)[4]	I_{cuIT}	Max. fuse (gG)[4][5]	I_{cuIT}	Max. fuse (gG)[4]	I_{cuIT}	Max. fuse (gG)[4]	I_{cuIT}	Max. fuse (gG)[4]
Type	A	kA	A	kA	A	kA	A	kA	A	kA	A
Size S2											
3RV2031, 3RV2131, 3RV2331	14 ... 25	100	--	8	100	6	80	6	80	4	63
	32 ... 45	100	--	6	125	4	100	4	100	3	80
	52 ... 80	100	--	4	160	3	125	3	125	2	100
Size S2, with increased switching capacity											
3RV2032, 3RV2332	14 ... 25	100	--	8	100	6	80	6	80	4	63
	32 ... 45	100	--	6	125	6	100	6	100	4	80
	52	100	--	6	160	6	125	6	125	4	100
	59 ... 80	100	--	6	160	4	125	4	125	4	100
Size S3											
3RV2.41	40	65	125	10	63	5	50	5	50	5	50
	50	65	125	8	80	3	63	3	63	3	63
	63	65	160	6	80	3	63	3	63	3	63
	75	65	160	5	100	2	80	2	80	2	80
	84; 100	65	160	5	125	2	100	2	100	2	100
Size S3, with increased switching capacity											
3RV2.42	40	100	--	12	80	6	63	6	63	6	63
	50	100	--	10	100	4	80	4	80	4	80
	63	100	--	7.5	100	4	80	4	80	4	80
	75	100	--	6	125	3	100	3	100	3	100
	84; 100	100	--	6	160	3	125	3	125	3	125

-- No back-up fuse required, since short-circuit-proof up to 100 kA

1) 10% overvoltage.

2) 5% overvoltage.

3) Overvoltage category II applies for applications in IT systems > 600 V.

4) Back-up fuse only required if short-circuit current at installation location is > I_{cuIT}.

5) Alternatively, fuseless limiter combinations for 690 V AC can also be used.

General data

Limiter function with standard devices for 500 V AC and 690 V AC according to IEC 60947-2

The table shows the rated ultimate short-circuit breaking capacity I_{cu} and the rated service short-circuit breaking capacity I_{cs} with an upstream standard motor starter protector/circuit breaker that fulfills the limiter function at voltages 500 V AC and 690 V AC.

The short-circuit breaking capacity can be increased significantly with an upstream standard motor starter protector/circuit breaker with limiter function. The motor starter protector/circuit breaker which is connected downstream must be set to the rated current of the load.

With motor starter protector/circuit breaker assemblies, note the clearance to grounded parts and between the motor starter protectors/circuit breakers. Short-circuit-proof wiring between the motor starter protectors/circuit breakers must be ensured. The motor starter protectors/circuit breakers can be mounted side by side in a modular arrangement.

Standard motor starter protectors/circuit breakers		**Rated current I_n**	**Up to 500 V AC[1]/525 V AC[2]**		**Up to 690 V AC[1][3]**	
With limiter Rated current I_n			I_{cu}	I_{cs}	I_{cu}	I_{cs}
Type	Type	A	kA	kA	kA	kA
Size S00						
Size S0: **3RV2321-4EC10** I_n = 32 A	**3RV2011**	2 ... 6.3 8 10 ... 16	-- 100 100	-- 50 50	50 50 20[4]	25 25 10[4]
Size S2: **3RV2331-4WC10** I_n = 52 A	**3RV2011**	10 ... 16	--	--	50	25
Size S0						
Size S0: **3RV2321-4EC10** I_n = 32 A	**3RV2021**	12 ... 32	100	50	20[4]	10[4]
Size S2: **3RV2331-4WC10** I_n = 52 A	**3RV2021**	16 ... 32	--	--	50	20
Size S2, with increased switching capacity						
Size S2: **3RV2332-4RC10** I_n = 80 A	**3RV2032**	14 ... 80	100	50	70	35
Size S3, with increased switching capacity						
Size S3[5]: **3RV2342-4MC10** I_n = 100 A	**3RV2042**	40 ... 100	100	50	50	25

-- No limiter required

1) 10% overvoltage.

2) 5% overvoltage.

3) Use phase barriers 3RV29.8-1K on the infeed side.

4) Infeed to the limiter is always on the side 1L1/3L2/5L3.

5) Infeed to the limiter only on the side 2T1/4T2/6T3. At the infeed side phase barriers 3RV2948-1K have to be used.

Permissible rated data of devices approved for North America (UL/CSA)

Motor starter protectors of the 3RV2 series are approved for UL/CSA, and according to UL 508/UL 60947-4-1 and CSA C22.2 No. 14/CSA C22.2 No. 60947-4-1 they can be used on their own or as load feeders in combination with a contactor.

These motor starter protectors/circuit breakers can be used as "Manual Motor Controllers" for "Group Installations", as "Manual Motor Controllers Suitable for Tap Conductor Protection in Group Installations" and as "Self-Protected Combination Motor Controllers (Type E)".

3RV motor starter protectors as "Manual Motor Controllers"

If used as a "Manual Motor Controller", the motor starter protector is always operated in combination with an upstream short-circuit protection. Approved fuses or motor starter protectors/circuit breakers according to UL 489/CSA C22.2 No. 5 may be used for this purpose. These devices must be dimensioned according to the National Electrical Code (UL) or Canadian Electrical Code (CSA).

The file numbers for the approval of the 3RV as a manual motor controller are as follows:

- UL File No. 47705, CCN: NLRV
- CSA Master Contract 165071, Product Class: 3211

Motor starter protectors/ circuit breakers		hp rating[1] for FLA[2] max.		Rated current I_n	240 V AC		480 V AC		600 V AC	
					UL I_{bc}[3]	CSA I_{bc}[3]	UL I_{bc}[3]	CSA I_{bc}[3]	UL I_{bc}[3]	CSA I_{bc}[3]
Type	V	1-phase	3-phase	A	kA	kA	kA	kA	kA	kA
Size S00										
3RV2011, 3RV2111, 3RV2311, 3RV2411				0.16 ... 12.5	65	65	65	65	30	30
				16	65	65	65	65	--	--
FLA[2] max.	115/120	1	2							
16 A, 480 V	200/208	2	3							
12.5 A, 600 V	230/240	2	5							
	460/480	--	10							
	575/600	--	10							
Size S0										
3RV2021, 3RV2121, 3RV2321, 3RV2421				0.16 ... 12.5	65	65	65	65	30	30
				16 ... 25	65	65	65	65	--/(30)[4]	--/(30)[4]
FLA[2] max.	115/120	3	5	28, 32	65	65	50	50	--	--
40 A, 480 V	200/208	5	10	36, 40	65	65	12	12	--	--
12.5 A, 600 V	230/240	7 1/2	10							
	460/480	--	30							
	575/600	--	--							
Size S2										
3RV2031, 3RV2331				14 ... 36	65	65	65	65	25	25
				40 ... 52	65	65	65	65	22	22
FLA[2] max.	115/120	7 1/2	10	59 ... 65	65	65	65[5]	65[5]	20[5]	20[5]
80 A, 600 V	200/208	15	25	73 ... 80	65	65	65[5]	65[5]	20[5]	20[5]
	230/240	15	30							
	460/480	--	60							
	575/600	--	75							
Size S2, with increased switching capacity										
3RV2032, 3RV2332				14 ... 36	100	100	100	100	25	25
				40 ... 52	100	100	100	100	22	22
FLA[2] max.	115/120	7 1/2	10	59 ... 65	100	100	100[5]	100[5]	25[5]	25[5]
80 A, 600 V	200/208	15	25	73 ... 80	100	100	100[5]	100[5]	25[5]	25[5]
	230/240	15	30							
	460/480	--	60							
	575/600	--	75							
Size S3										
3RV2.41, 3RV2.42				40 ... 75	65	65	65	65	30	30
				84 ... 100	65	65	65	65	10/30[6]	10/30[6]
FLA[2] max.	115/120	7 1/2	15							
100 A, 600 V	200/208	15	30							
	230/240	20	40							
	460/480	--	75							
	575/600	--	100							

-- No approval

1) hp rating = Power rating in horse power (maximum motor rating).

2) FLA = Full Load Amps/motor full load current.

3) Corresponds to "short-circuit breaking capacity" according to UL/CSA.

4) Values in brackets only apply to 3RV2.23 motor starter protectors.

5) With Class J fuse.

6) With Class J fuse 300 A.

General data

3RV20 motor starter protectors (up to 100 A) as "Manual Motor Controllers Suitable for Tap Conductor Protection in Group Installations"

The application as "Manual Motor Controllers Suitable for Tap Conductor Protection in Group Installations" is only available for UL. CSA does not recognize this approval! When the motor starter protector is used as a "Manual Motor Controller Suitable for Tap Conductor Protection in Group Installations", it must always be combined with upstream short-circuit protection. Approved fuses or motor starter protectors/circuit breakers according to UL 489 may be used for this purpose. These devices must be dimensioned according to the National Electrical Code.

The 3RV20 motor starter protectors are approved as "Manual Motor Controllers Suitable for Tap Conductor Protection in Group Installations" under the following file number:

- UL File No. 47705, CCN: NLRV

Motor starter protectors/circuit breakers		**hp rating[1] for FLA[2] max.**		**Rated current I_n**	**240 V AC** UL	**480 Y/277 V AC** UL	**600 Y/347 V AC** UL
					I_{cu}[3]	I_{cu}[3]	I_{cu}[3]
Type	V	1-phase	3-phase	A	kA	kA	kA
Size S00							
3RV2011				0.16 ... 12.5	65	65	30
				16	65	65	--
FLA[2] max.	115/120	1	2				
16 A, 480 V	200/208	2	3				
12.5 A, 600 V	230/240	2	5				
	460/480	--	10				
	575/600	--	10				
Size S0							
3RV2021				0.16 ... 12.5	65	65	30
				16 ... 25	65	65	--
FLA[2] max.	115/120	2	5	28; 32	50	50	--
32 A, 480 V	200/208	3	10				
12.5 A, 600 V	230/240	5	10				
	460/480	--	20				
	575/600	--	--				
Size S2							
3RV2031				14 ... 36	65	65	25
				40 ... 52	65	65	22
FLA[2] max.	115/120	7 1/2	10	59 ... 65	65	30	--
80 A, 480 V	200/208	15	25	73	65	20	--
52 A, 600 V	230/240	15	30	80	65	10	--
	460/480	--	60				
	575/600	--	75				
Size S2, with increased switching capacity							
3RV2032				14 ... 36	100	100	25
				40 ... 52	100	100	22
FLA[2] max.	115/120	7 1/2	10	59 ... 65	100	42	--
80 A, 480 V	200/208	15	25	73	100	30	--
52 A, 600 V	230/240	15	30	80	100	10	--
	460/480	--	60				
	575/600	--	75				
Size S3							
3RV204.				40 ... 75	65	65	30
				84 ... 100	65	65	--
FLA[2] max.	115/120	7 1/2	15				
100 A, 480 V	200/208	15	30				
75 A, 600 V	230/240	20	40				
	460/480	--	75				
	575/600	--	75				

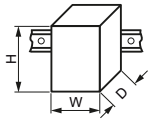
-- No approval

[1] hp rating = Power rating in horse power (maximum motor rating).

[2] FLA = Full Load Amps/motor full load current.

[3] Corresponds to "short-circuit breaking capacity" according to UL.

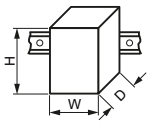
General data

Type			**3RV2.1.**	**3RV2.2.**	**3RV2.3.**	**3RV2.4.**	**3RV27, 3RV28**
Size			S00	S0	S2	S3	S00, S0
Dimensions (W x H x D)							
• Screw terminals		mm	45 x 97 x 92	45 x 97 x 92	55 x 140 x 149	70 x 165 x 169	45 x 144 x 92
• Spring-loaded terminals		mm	45 x 106 x 92	45 x 119 x 92	--	--	--
Standards							
• IEC 60947-1 (VDE 0660 Part 100)			Yes				
• IEC 60947-2 (VDE 0660 Part 101)			Yes				
• IEC 60947-4-1 (VDE 0660 Part 102)			Yes				
• UL 508/UL 60947-4-1, CSA C22.2 No. 14/CSA C22.2 No. 60947-4-1			Yes (does not apply to 3RV2...-.....-0BA0 and -0DA0 motor starter protectors)				--
• UL 489, CSA C22.2 No. 5			--				Yes
Number of poles			3				
Max. rated current $I_{n\ max}$ (= max. rated operational current I_e)		A	16	40	80	100	22
Permissible ambient temperature							
• Storage/transport		°C	-50 ... +80				
• Operation	I_n: 0.16 ... 32 A	°C	-20 (-50)[1] ... +70 (current reduction above +60 °C)		--		
	I_n: 36 ... 40 A	°C	--	-20 ... +40 (the devices must not be mounted side-by-side and they must not be assembled with link modules with contactors. A lateral clearance of 9 mm is required.)	--		
	I_n: 14 ... 80 A	°C	--		-20 (-50)[1] ... +70 (current reduction above +60 °C)	--	
	I_n: 40 ... 100 A	°C	--			-20 ... +70 (current reduction above +60 °C)	--
Permissible rated current at inside temperature of control cabinet							
• +60 °C		%	100				
• +70 °C		%	87				
Permissible rated current at ambient temperature of enclosure (applies to motor starter protector/circuit breaker inside enclosure: S00/S0 ≤ 32 A, S2 ≤ 52 A)							
• +35 °C		%	100			--	
• +60 °C		%	--				
Rated operational voltage U_e							
• Acc. to IEC		V AC	690 (when a molded-plastic enclosure is used only 500 V)				
• Acc. to UL/CSA		V AC	600				
Rated frequency		Hz	50/60				
Rated insulation voltage U_i		V	690			1 000	690
Rated impulse withstand voltage U_{imp}		kV	6			8	6
Utilization category							
• IEC 60947-2 (motor starter protector/circuit breaker)			A				
• IEC 60947-4-1 (motor starter)			AC-3				
Trip class CLASS	Acc. to IEC 60947-4-1		10		10/20		--
Power loss P_v per motor starter protector dependent upon rated current I_n (upper setting range) $R_{\text{per conducting path}} = \frac{P}{I^2 \times 3}$	I_n: 0.16 ... 0.63 A	W	5.5		--		5.5
	I_n: 0.8 ... 6.3 A	W	7.3		--		7.3
	I_n: 8 ... 16 A	W	9.3		--		9.3
	I_n: 14 ... 16 A	W	--	9.3	12.5	--	9.3
	I_n: 17 ... 25 A	W	--	10.5	14.5	--	10.5
	I_n: 28 ... 32 A	W	--	13.3	18	--	
	I_n: 36 ... 40 A	W	--	16.3	20	--	
	I_n: 45 ... 52 A	W	--		24.5	--	
	I_n: 59 ... 65 A	W	--		26	--	
	I_n: 73 ... 80 A	W	--		29.5	--	
	I_n: 40 ... 50 A	W	--			27	--
	I_n: 63 ... 75 A	W	--			38	--
	I_n: 84 ... 93 A	W	--			39	--
	I_n: 100 A	W	--			44	--
Shock resistance	Acc. to IEC 60068-2-27	*g*/ms	25/11 (square and sine pulse)				

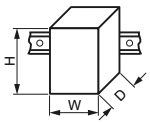
[1] Value in brackets applies to the 3RV2...-.....-0BA0 motor starter protectors.

General data

General data (continued)

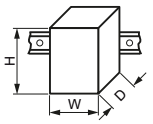
Type			**3RV2.1.**	**3RV2.2.**	**3RV2.3.**	**3RV2.4.**	**3RV27, 3RV28**
Size			S00	S0	S2	S3	S00, S0
Dimensions (W x H x D)							
• Screw terminals		mm	45 x 97 x 92	45 x 97 x 92	55 x 140 x 149	70 x 165 x 169	45 x 144 x 92
• Spring-loaded terminals		mm	45 x 106 x 92	45 x 119 x 92	--	--	--
Degree of protection IP on the front	according to IEC 60529		IP20 (screw terminals and spring-loaded terminals)				
Touch protection on the front	according to IEC 60529		Finger-safe for vertical touching from the front (screw and spring-loaded terminals)				
Temperature compensation	Acc. to IEC 60947-4-1	°C	-20 ... +60				
Phase failure sensitivity	Acc. to IEC 60947-4-1		Yes (does not apply to 3RV23, 3RV2...-.....-0DA0 motor starter protectors)				No
Protection of motors in hazardous environments			Yes (only for 3RV20 motor starter protectors, not for 3RV20..-.....-0BA0 and -0DA0)				No
• EC type-examination certificate number according to European Directive 2014/34/EU (ATEX)			DMT 02 ATEX F 001 Ex II (2) GD				No
• According to international standard IECEx			IECEx BVS14.0102 [Ex]				No
Isolating function	Acc. to IEC 60947-2		Yes				
Main and EMERGENCY OFF switch characteristics (with corresponding accessories)	Acc. to IEC 60204-1 (VDE 0113)		Yes				
Protective separation between main and auxiliary circuits required for PELV applications	Acc. to IEC 60947-1						
• Up to 400 V + 10%			Yes				
• Up to 415 V + 5% (higher voltages on request)			Yes				
• Up to 690 V (depends on mounted accessories)			Yes, see certificate				
Permissible mounting position			Any, acc. to IEC 60447 start command "I" right-hand side or top				
Mechanical service life (operating cycles)							
• 3RV2			100 000		Up to 52 A: 50 000, up to 80 A: 20 000	25 000	100 000
• 3RV2...-.....-0BA0			500		250	--	
Electrical endurance (operating cycles)							
• 3RV2			100 000		Up to 52 A: 50 000, up to 80 A: 20 000	25 000	100 000
• 3RV2...-.....-0BA0			500		250	--	
Max. switching frequency per hour (motor starts)		1/h	15				

General data

Type			**3RV2742**	**3RV1611-0BD10**[1]	**3RV1011**
Size			S3	S00	S00
Dimensions (W x H x D)		mm	70 x 168 x 169	45 x 90 x 70	45 x 90 x 70
Standards					
• IEC 60947-1 (VDE 0660 Part 100)			Yes		
• IEC 60947-2 (VDE 0660 Part 101)			Yes		
• UL 508/UL 60947-4-1, CSA C22.2 No.14/CSA 60947-4-1			No	Yes	
• UL 489, CSA C22.2 No. 5			Yes	No	
Number of poles			3		
Max. rated current $I_{n\ max}$ (= max. rated operational current I_e)		A	70	0.2	12
Permissible ambient temperature					
• Storage/transport		°C	-50 ... +80		
• Operation		°C	-20 ... +70 (current reduction above +60 °C)		
Permissible rated current at inside temperature of control cabinet					
• +60 °C		%	100		
• +70 °C		%	87		
Permissible rated current at ambient temperature of enclosure (applies to motor starter protector/circuit breaker inside enclosure)					
• +35 °C		%	--		100
• +60 °C		%	--		
Rated operational voltage U_e					
• Acc. to IEC		V AC	690 (with molded-plastic enclosure 500 V)		
• Acc. to UL/CSA		V AC	600		
Rated frequency		Hz	50/60		
Rated insulation voltage U_i		V	1 000	690	
Rated impulse withstand voltage U_{imp}		kV	8	6	
Utilization category					
• IEC 60947-2 (motor starter protector/circuit breaker)			A		
• IEC 60947-4-1 (motor starter)			AC-3		

[1] "Technical specifications" for 3RV1611 voltage transformer circuit breakers.

General data (continued)

Type			**3RV2742**	**3RV1611-0BD10**[1]	**3RV1011**
Size			S3	S00	S00
Dimensions (W x H x D)		mm	70 x 168 x 169	45 x 90 x 70	45 x 90 x 70
Power loss P_v per motor starter protector dependent upon rated current I_n (upper setting range) $R_{\text{per conducting path}} = \frac{P}{I^2 \times 3}$	I_n: 0.2 A	W	--	5	--
	I_n: 10 A	W	10	--	
	I_n: 15 ... 35 A	W	14	--	
	I_n: 40 ... 70 A	W	23.5	--	
	I_n: ... 1.25 A	W	--		5.5
	I_n: 1.65 ... 6.3 A	W	--		7.3
	I_n: 8 ... 12 A	W	--		9.3
Shock resistance	Acc. to IEC 60068-2-27	*g*/ms	25/11 (square and sine pulse)		
Degree of protection IP on the front	Acc. to IEC 60529		IP20		
Touch protection on the front	Acc. to IEC 60529		Finger-safe for vertical touching from the front		
Temperature compensation	Acc. to IEC 60947-4-1	°C	-20 ... +60		
Phase failure sensitivity	Acc. to IEC 60947-4-1		No	Yes	
Explosion protection – Safe operation of motors with "increased safety" type of protection EC type-examination certificate number according to directive 2014/34/EU (ATEX)			No		Yes
Isolating function	Acc. to IEC 60947-2		Yes		
Main and EMERGENCY OFF switch characteristics (with corresponding accessories)	Acc. to IEC 60204-1 (VDE 0113)		Yes		
Protective separation between main and auxiliary circuits, required for PELV applications	Acc. to IEC 60947-1				
• Up to 400 V + 10%			Yes		
• Up to 415 V + 5% (higher voltages on request)			Yes		
Permissible mounting position			Any, acc. to IEC 60447 start command "I" right-hand side or top		
Mechanical service life		Operating cycles	25 000	100 000	
Electrical endurance		Operating cycles	25 000	100 000	
Max. switching frequency per hour (motor starts)		1/h	15		

[1] "Technical specifications" for 3RV1611 voltage transformer circuit breakers.

Rated data of the auxiliary switches and

		Lateral auxiliary switch with 1 NO + 1 NC, 2 NO, 2 NC, 2 NO + 2 NC	**Signaling switch**	**Transverse auxiliary switch with**	
				1 CO	**1 NO + 1 NC, 2 NO**
Max. rated voltage					
• Acc. to NEMA (UL)	V AC	600		250	
• Acc. to NEMA (CSA)	V AC	600		250	
Uninterrupted current	A	10		5	2.5
Switching capacity		1 NO + 1 NC, 2 NO, 2 NC: A600, Q300; 2 NO + 2 NC: A300, Q300	A600, Q300	B600, R300	C300, R300

General data

Front transverse auxiliary switches

			Switching capacity for different voltages	
			1 CO	**1 NO + 1 NC, 2 NO**
Rated operational current I_e				
• At AC-15, alternating voltage				
- 24 V		A	4	2
- 230 V		A	3	0.5
• At AC-12 = I_{th}, alternating voltage				
- 24 V		A	10	2.5
- 230 V		A	10	2.5
• At DC-13, direct voltage *L/R* 200 ms				
- 24 V		A	1	1
- 48 V		A	--	0.3
- 60 V		A	--	0.15
- 110 V		A	0.22	--
- 220 V		A	0.1	--
Minimum load capacity		V	17	
		mA	1	

Front transverse solid-state compatible auxiliary switches

			Switching capacity for different voltages
			1 CO
Rated operational voltage U_e	Alternating voltage	V	125
Rated operational current I_e /AC-14	At U_e = 125 V	A	0.1
Rated operational voltage U_e	Direct voltage *L/R* 200 ms	V	60
Rated operational current I_e /DC-13	At U_e = 60 V	A	0.3
Minimum load capacity		V	5
		mA	1

Lateral auxiliary switches with signaling switch

			Switching capacity for different voltages: Lateral auxiliary switch with 1 NO + 1 NC, 2 NO, 2 NC, 2 NO + 2 NC, Signaling switch
Rated operational current I_e			
• At AC-15, alternating voltage			
- 24 V		A	6
- 230 V		A	4
- 400 V		A	3
- 690 V		A	1
• At AC-12 = I_{th}, alternating voltage			
- 24 V		A	10
- 230 V		A	10
- 400 V		A	10
- 690 V		A	10
• At DC-13, direct voltage *L/R* 200 ms			
- 24 V		A	2
- 110 V		A	0.5
- 220 V		A	0.25
- 440 V		A	0.1
Minimum load capacity		V	17
		mA	1

Auxiliary releases

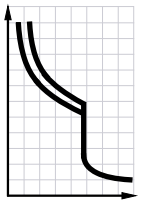
		Undervoltage releases	Shunt releases
Power consumption			
• During pick-up			
- AC voltages	VA/W	20.2/13	
- DC voltages	W	20	13 ... 80
• During uninterrupted duty			
- AC voltages	VA/W	7.2/2.4	--
- DC voltages	W	2.1	--
Response voltage			
• Tripping	V	0.35 ... 0.7 x U_s	0.7 ... 1.1 x U_s
• Pick-up	V	0.85 ... 1.1 x U_s	--
Opening time maximum	ms	20	

Short-circuit protection for auxiliary and control circuits

Melting fuses operational class gG	A	10
Miniature circuit breakers C characteristic	A	6 (prospective short-circuit current < 0.4 kA)

Selection and ordering data

CLASS 10, without auxiliary switches



3RV2011-..A10,
3RV2011-..A10-0BA0

3RV2011-..A20,
3RV2011-..AA20-0BA0

Rated current	Suitable for three-phase motors[1] with *P*	Setting range for thermal overload release	Instantaneous electronic release	Short-circuit breaking capacity at 400 V AC	**Screw terminals**	**Spring-loaded terminals**	Weight
I_n			$I >$	I_{cu}	Article No.	Article No.	
A	kW	A	A	kA			kg
Size S00							
0.16	0.04	0.11 ... 0.16	2.1	100	**3RV2011-0AA10**	**3RV2011-0AA20**	0.300
0.2	0.06	0.14 ... 0.2	2.6	100	**3RV2011-0BA10**	**3RV2011-0BA20**	0.300
0.25	0.06	0.18 ... 0.25	3.3	100	**3RV2011-0CA10**	**3RV2011-0CA20**	0.301
0.32	0.09	0.22 ... 0.32	4.2	100	**3RV2011-0DA10**	**3RV2011-0DA20**	0.295
0.4	0.09	0.28 ... 0.4	5.2	100	**3RV2011-0EA10**	**3RV2011-0EA20**	0.299
0.5	0.12	0.35 ... 0.5	6.5	100	**3RV2011-0FA10**	**3RV2011-0FA20**	0.305
0.63	0.18	0.45 ... 0.63	8.2	100	**3RV2011-0GA10**	**3RV2011-0GA20**	0.302
0.8	0.18	0.55 ... 0.8	10	100	**3RV2011-0HA10**	**3RV2011-0HA20**	0.298
1	0.25	0.7 ... 1	13	100	**3RV2011-0JA10**	**3RV2011-0JA20**	0.365
1.25	0.37	0.9 ... 1.25	16	100	**3RV2011-0KA10**	**3RV2011-0KA20**	0.365
1.6	0.55	1.1 ... 1.6	21	100	**3RV2011-1AA10**	**3RV2011-1AA20**	0.370
2	0.75	1.4 ... 2	26	100	**3RV2011-1BA10**	**3RV2011-1BA20**	0.366
2.5	0.75	1.8 ... 2.5	33	100	**3RV2011-1CA10**	**3RV2011-1CA20**	0.385
3.2	1.1	2.2 ... 3.2	42	100	**3RV2011-1DA10**	**3RV2011-1DA20**	0.370
4	1.5	2.8 ... 4	52	100	**3RV2011-1EA10**	**3RV2011-1EA20**	0.365
5	1.5	3.5 ... 5	65	100	**3RV2011-1FA10**	**3RV2011-1FA20**	0.369
6.3	2.2	4.5 ... 6.3	82	100	**3RV2011-1GA10**	**3RV2011-1GA20**	0.372
8	3	5.5 ... 8	104	100	**3RV2011-1HA10**	**3RV2011-1HA20**	0.372
10	4	7 ... 10	130	100	**3RV2011-1JA10**	**3RV2011-1JA20**	0.373
12.5	5.5	9 ... 12.5	163	100	**3RV2011-1KA10**	**3RV2011-1KA20**	0.375
16	7.5	10 ... 16	208	55	**3RV2011-4AA10**	**3RV2011-4AA20**	0.379
For special operating conditions down to -50 °C[2)3)]							
1.25	0.37	0.9 ... 1.25	16	100	**3RV2011-0KA10-0BA0**	**--**	0.340
1.6	0.55	1.1 ... 1.6	21	100	**3RV2011-1AA10-0BA0**	**3RV2011-1AA20-0BA0**	0.345
2.5	0.75	1.8 ... 2.5	33	100	**3RV2011-1CA10-0BA0**	**--**	0.347
3.2	1.1	2.2 ... 3.2	42	100	**3RV2011-1DA10-0BA0**	**--**	0.348
4	1.5	2.8 ... 4	52	100	**3RV2011-1EA10-0BA0**	**--**	0.342
5	1.5	3.5 ... 5	65	100	**3RV2011-1FA10-0BA0**	**--**	0.348
6.3	2.2	4.5 ... 6.3	82	100	**3RV2011-1GA10-0BA0**	**--**	0.351
8	3	5.5 ... 8	104	100	**3RV2011-1HA10-0BA0**	**--**	0.350
10	4	7 ... 10	130	100	**3RV2011-1JA10-0BA0**	**--**	0.353
12.5	5.5	9 ... 12.5	163	100	**3RV2011-1KA10-0BA0**	**--**	0.348
16	7.5	10 ... 16	208	55	**3RV2011-4AA10-0BA0**	**3RV2011-4AA20-0BA0**	0.354

1) Guide value for 4-pole standard motors at 50 Hz 400 V AC. The actual starting and rated data of the motor to be protected must be considered when selecting the units.

2) The 3RV2011-.....-0BA0 motor starter protectors have a mechanical service life of 500 operating cycles.

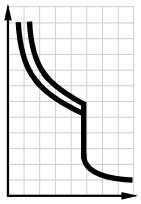
3) The motor starter protectors do not have UL/CSA approval and are not certified either according to the European explosion protection directive ATEX or according to the international explosion protection standard (IECEx).

Auxiliary switches and other accessories can be ordered separately (see page 2/196 onwards).

*** You can order this quantity or a multiple thereof.**

For motor protection *IE3/IE4 ready*

CLASS 10, without auxiliary switches



3RV2021-..A10, 3RV2021-4.A10-0BA0

3RV2021-..A20, 3RV2021-..A20-0BA0

Rated current	Suitable for three-phase motors[1] with ►	Setting range for thermal overload release	Instantaneous electronic release	Short-circuit breaking capacity at 400 V AC	Screw terminals	Spring-loaded terminals	Weight
I_n			$I >$	I_{cu}	Article No.	Article No.	
A	kW	A	A	kA			kg
Size S0							
0.16	0.04	0.11 ... 0.16	2.1	100	**3RV2021-0AA10**	--	0.280
0.2	0.06	0.14 ... 0.2	2.6	100	**3RV2021-0BA10**	--	0.285
0.25	0.06	0.18 ... 0.25	3.3	100	**3RV2021-0CA10**	--	0.300
0.32	0.09	0.22 ... 0.32	4.2	100	**3RV2021-0DA10**	--	0.287
0.4	0.09	0.28 ... 0.4	5.2	100	**3RV2021-0EA10**	--	0.285
0.5	0.12	0.35 ... 0.5	6.5	100	**3RV2021-0FA10**	--	0.285
0.63	0.18	0.45 ... 0.63	8.2	100	**3RV2021-0GA10**	**3RV2021-0GA20**	0.335
0.8	0.18	0.55 ... 0.8	10	100	**3RV2021-0HA10**	**3RV2021-0HA20**	0.330
1	0.25	0.7 ... 1	13	100	**3RV2021-0JA10**	**3RV2021-0JA20**	0.395
1.25	0.37	0.9 ... 1.25	16	100	**3RV2021-0KA10**	**3RV2021-0KA20**	0.403
1.6	0.55	1.1 ... 1.6	21	100	**3RV2021-1AA10**	**3RV2021-1AA20**	0.404
2	0.75	1.4 ... 2	26	100	**3RV2021-1BA10**	**3RV2021-1BA20**	0.398
2.5	0.75	1.8 ... 2.5	33	100	**3RV2021-1CA10**	**3RV2021-1CA20**	0.402
3.2	1.1	2.2 ... 3.2	42	100	**3RV2021-1DA10**	**3RV2021-1DA20**	0.400
4	1.5	2.8 ... 4	52	100	**3RV2021-1EA10**	**3RV2021-1EA20**	0.400
5	1.5	3.5 ... 5	65	100	**3RV2021-1FA10**	**3RV2021-1FA20**	0.408
6.3	2.2	4.5 ... 6.3	82	100	**3RV2021-1GA10**	**3RV2021-1GA20**	0.410
8	3	5.5 ... 8	104	100	**3RV2021-1HA10**	**3RV2021-1HA20**	0.430
10	4	7 ... 10	130	100	**3RV2021-1JA10**	**3RV2021-1JA20**	0.412
12.5	5.5	9 ... 12.5	163	100	**3RV2021-1KA10**	**3RV2021-1KA20**	0.407
16	7.5	10 ... 16	208	55	**3RV2021-4AA10**	**3RV2021-4AA20**	0.415
20	7.5	13 ... 20	260	55	**3RV2021-4BA10**	**3RV2021-4BA20**	0.413
22	11	16 ... 22	286	55	**3RV2021-4CA10**	**3RV2021-4CA20**	0.417
25	11	18 ... 25	325	55	**3RV2021-4DA10**	**3RV2021-4DA20**	0.420
28	15	23 ... 28	364	55	**3RV2021-4NA10**	**3RV2021-4NA20**	0.432
32[2]	15	27 ... 32	400	55	**3RV2021-4EA10**	**3RV2021-4EA20**	0.430
36[3]	18.5	30 ... 36	432	20	**3RV2021-4PA10**	--	0.387
40[3]	18.5	34 ... 40	480	20	**3RV2021-4FA10**	--	0.404
For special operating conditions down to -50 °C[4][5]							
1	0.25	0.7 ... 1	13	100	--	**3RV2021-0JA20-0BA0**	0.395
1.6	0.55	1.1 ... 1.6	21	100	--	**3RV2021-1AA20-0BA0**	0.400
2	0.75	1.4 ... 2	26	100	--	**3RV2021-1BA20-0BA0**	0.400
2.5	0.75	1.8 ... 2.5	33	100	--	**3RV2021-1CA20-0BA0**	0.404
4	1.5	2.8 ... 4	52	100	--	**3RV2021-1EA20-0BA0**	0.403
6.3	2.2	4.5 ... 6.3	82	100	--	**3RV2021-1GA20-0BA0**	0.414
8	3	5.5 ... 8	104	100	--	**3RV2021-1HA20-0BA0**	0.410
10	4	7 ... 10	130	100	--	**3RV2021-1JA20-0BA0**	0.411
12.5	5.5	9 ... 12.5	163	100	--	**3RV2021-1KA20-0BA0**	0.407
16	7.5	10 ... 16	208	55	--	**3RV2021-4AA20-0BA0**	0.420
20	7.5	13 ... 20	260	55	**3RV2021-4BA10-0BA0**	--	0.365
22	11	16 ... 22	286	55	**3RV2021-4CA10-0BA0**	--	0.352
25	11	18 ... 25	325	55	**3RV2021-4DA10-0BA0**	**3RV2021-4DA20-0BA0**	0.418
28	15	23 ... 28	364	55	--	**3RV2021-4NA20-0BA0**	0.429
32[2]	15	27 ... 32	400	55	**3RV2021-4EA10-0BA0**	**3RV2021-4EA20-0BA0**	0.430
40[3]	18.5	34 ... 40	480	20	**3RV2021-4FA10-0BA0**	--	0.385

1) Guide value for 4-pole standard motors at 50 Hz 400 V AC. The actual starting and rated data of the motor to be protected must be considered when selecting the units.

2) Suitable for use with IE3/IE4 motors up to a starting current of 256 A. For higher starting currents we recommend using 3RV2 motor starter protectors size S2.

3) The devices must not be mounted side-by-side and they must not be assembled with link modules with contactors. A lateral clearance of 9 mm is required. For use with IE3/IE4 motors we recommend using 3RV2 motor starter protectors size S2.

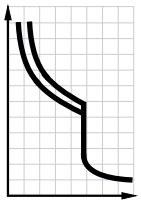
4) The 3RV2021-.....-0BA0 motor starter protectors have a mechanical service life of 500 operating cycles.

5) The motor starter protectors do not have UL/CSA approval and are not certified either according to the European explosion protection directive ATEX or according to the international explosion protection standard (IECEx).

Auxiliary switches and other accessories can be ordered separately (see page 2/196 onwards).

* You can order this quantity or a multiple thereof.

CLASS 10, without auxiliary switches



3RV2031-4.A10,
3RV2031-4.A10-0BA0

3RV2032-4.A10

Rated current	Suitable for three-phase motors[1] with *P*	Setting range for thermal overload release	Instantaneous electronic release	Short-circuit breaking capacity at 400 V AC	**Screw terminals**	Weight
I_n			$I >$	I_{cu}	Article No.	
A	kW	A	A	kA		kg
Size S2						
14	5.5	9.5 ... 14	208	65	**3RV2031-4SA10**	1.092
17	7.5	12 ... 17	260	65	**3RV2031-4TA10**	1.081
20	7.5	14 ... 20	260	65	**3RV2031-4BA10**	1.067
25	11	18 ... 25	325	65	**3RV2031-4DA10**	1.054
32	15	22 ... 32	416	65	**3RV2031-4EA10**	1.051
36	18.5	28 ... 36	520	65	**3RV2031-4PA10**	1.074
40	18.5	32 ... 40	585	65	**3RV2031-4UA10**	1.074
45	22	35 ... 45	650	65	**3RV2031-4VA10**	1.071
52	22	42 ... 52	741	65	**3RV2031-4WA10**	1.164
59	30	49 ... 59	845	65	**3RV2031-4XA10**	1.185
65	30	54 ... 65	845	65	**3RV2031-4JA10**	1.178
73	37	62 ... 73	949	65	**3RV2031-4KA10**	1.172
80[2]	37	70 ... 80	1 040	65	**3RV2031-4RA10**	1.180
For special operating conditions down to -50 °C[3][4]						
25	11	18 ... 25	325	65	**3RV2031-4DA10-0BA0**	1.100
32	15	22 ... 32	416	65	**3RV2031-4EA10-0BA0**	1.045
65	30	54 ... 65	845	65	**3RV2031-4JA10-0BA0**	1.166
Size S2, with increased switching capacity						
14	5.5	9.5 ... 14	208	100	**3RV2032-4SA10**	1.134
17	7.5	12 ... 17	260	100	**3RV2032-4TA10**	1.139
20	7.5	14 ... 20	260	100	**3RV2032-4BA10**	1.134
25	11	18 ... 25	325	100	**3RV2032-4DA10**	1.114
32	15	22 ... 32	416	100	**3RV2032-4EA10**	1.114
36	18.5	28 ... 36	520	100	**3RV2032-4PA10**	1.133
40	18.5	32 ... 40	585	100	**3RV2032-4UA10**	1.149
45	22	35 ... 45	650	100	**3RV2032-4VA10**	1.157
52	22	42 ... 52	741	100	**3RV2032-4WA10**	1.167
59	30	49 ... 59	845	100	**3RV2032-4XA10**	1.181
65	30	54 ... 65	845	100	**3RV2032-4JA10**	1.179
73	37	62 ... 73	949	100	**3RV2032-4KA10**	1.170
80[2]	37	70 ... 80	1 040	100	**3RV2032-4RA10**	1.180

1) Guide value for 4-pole standard motors at 50 Hz 400 V AC. The actual starting and rated data of the motor to be protected must be considered when selecting the units.

2) Suitable for use with IE3/IE4 motors up to a starting current of 720 A. For higher starting currents we recommend using 3RV2 motor starter protectors size S3.

3) The 3RV2031-.....-0BA0 motor starter protectors have a mechanical service life of 250 operating cycles.

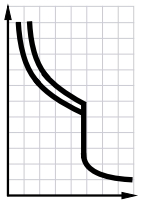
4) The motor starter protectors do not have UL/CSA approval and are not certified either according to the European explosion protection directive ATEX or according to the international explosion protection standard (IECEx).

Auxiliary switches and other accessories can be ordered separately (see page 2/196 onwards).

*** You can order this quantity or a multiple thereof.**

For motor protection *IE3/IE4 ready*

CLASS 10, without auxiliary switches



3RV204.-4.A10

Rated current	Suitable for three-phase motors[1] with *P*	Setting range for thermal overload release	Instantaneous electronic release	Short-circuit breaking capacity at 400 V AC	**Screw terminals**	Weight
I_n			$I >$	I_{cu}	Article No.	
A	kW	A	A	kA		kg
Size S3						
40	18.5	28 ... 40	520	65	**3RV2041-4FA10**	2.190
50	22	36 ... 50	650	65	**3RV2041-4HA10**	2.229
63	30	45 ... 63	819	65	**3RV2041-4JA10**	2.234
75	37	57 ... 75	975	65	**3RV2041-4KA10**	2.235
84	45	65 ... 84	1 170	65	**3RV2041-4RA10**	2.272
93	45	75 ... 93	1 300	65	**3RV2041-4YA10**	2.280
100[2]	45, 55	80 ... 100	1 300	65	**3RV2041-4MA10**	2.273
Size S3, with increased switching capacity						
40	18.5	28 ... 40	520	100	**3RV2042-4FA10**	2.193
50	22	36 ... 50	650	100	**3RV2042-4HA10**	2.219
63	30	45 ... 63	819	100	**3RV2042-4JA10**	2.243
75	37	57 ... 75	975	100	**3RV2042-4KA10**	2.256
84	45	65 ... 84	1 170	100	**3RV2042-4RA10**	2.263
93	45	75 ... 93	1 300	100	**3RV2042-4YA10**	2.279
100[2]	45, 55	80 ... 100	1 300	100	**3RV2042-4MA10**	2.266

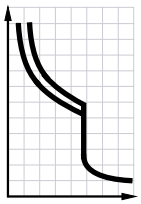
[1] Guide value for 4-pole standard motors at 50 Hz 400 V AC. The actual starting and rated data of the motor to be protected must be considered when selecting the units.

[2] Suitable for use with IE3/IE4 motors up to a starting current of 780 A. For higher starting currents we recommend using 3VA circuit breakers (see Catalog LV 10).

Auxiliary switches and other accessories can be ordered separately (see page 2/196 onwards).

* You can order this quantity or a multiple thereof.

CLASS 10, with transverse auxiliary switch (1 NO + 1 NC)



3RV2011-..A15

3RV2011-..A25,
3RV2011-1EA25-0BA0

3RV2.21-4.A15,
3RV2021-4.A15-0BA0

3RV2021-4.A25

Rated current	Suitable for three-phase motors[1] with *P*	Setting range for thermal overload release	Instantaneous electronic release	Short-circuit breaking capacity at 400 V AC	**Screw terminals**	**Spring-loaded terminals**	Weight
I_n			$I >$	I_{cu}	Article No.	Article No.	
A	kW	A	A	kA			kg
Size S00							
0.16	0.04	0.11 ... 0.16	2.1	100	**3RV2011-0AA15**	**3RV2011-0AA25**	0.310
0.2	0.06	0.14 ... 0.2	2.6	100	**3RV2011-0BA15**	**3RV2011-0BA25**	0.311
0.25	0.06	0.18 ... 0.25	3.3	100	**3RV2011-0CA15**	**3RV2011-0CA25**	0.327
0.32	0.09	0.22 ... 0.32	4.2	100	**3RV2011-0DA15**	**3RV2011-0DA25**	0.314
0.4	0.09	0.28 ... 0.4	5.2	100	**3RV2011-0EA15**	**3RV2011-0EA25**	0.330
0.5	0.12	0.35 ... 0.5	6.5	100	**3RV2011-0FA15**	**3RV2011-0FA25**	0.316
0.63	0.18	0.45 ... 0.63	8.2	100	**3RV2011-0GA15**	**3RV2011-0GA25**	0.320
0.8	0.18	0.55 ... 0.8	10	100	**3RV2011-0HA15**	**3RV2011-0HA25**	0.308
1	0.25	0.7 ... 1	13	100	**3RV2011-0JA15**	**3RV2011-0JA25**	0.375
1.25	0.37	0.9 ... 1.25	16	100	**3RV2011-0KA15**	**3RV2011-0KA25**	0.382
1.6	0.55	1.1 ... 1.6	21	100	**3RV2011-1AA15**	**3RV2011-1AA25**	0.383
2	0.75	1.4 ... 2	26	100	**3RV2011-1BA15**	**3RV2011-1BA25**	0.400
2.5	0.75	1.8 ... 2.5	33	100	**3RV2011-1CA15**	**3RV2011-1CA25**	0.380
3.2	1.1	2.2 ... 3.2	42	100	**3RV2011-1DA15**	**3RV2011-1DA25**	0.380
4	1.5	2.8 ... 4	52	100	**3RV2011-1EA15**	**3RV2011-1EA25**	0.383
5	1.5	3.5 ... 5	65	100	**3RV2011-1FA15**	**3RV2011-1FA25**	0.385
6.3	2.2	4.5 ... 6.3	82	100	**3RV2011-1GA15**	**3RV2011-1GA25**	0.410
8	3	5.5 ... 8	104	100	**3RV2011-1HA15**	**3RV2011-1HA25**	0.388
10	4	7 ... 10	130	100	**3RV2011-1JA15**	**3RV2011-1JA25**	0.390
12.5	5.5	9 ... 12.5	163	100	**3RV2011-1KA15**	**3RV2011-1KA25**	0.388
16	7.5	10 ... 16	208	55	**3RV2011-4AA15**	**3RV2011-4AA25**	0.395
For special operating conditions down to -50 °C[2)3)]							
2	0.06	0.14 ... 0.2	2.6	100	**3RV2011-1BA15-0BA0**	**--**	0.368
2.5	0.75	1.8 ... 2.5	33	100	**3RV2011-1CA15-0BA0**	**--**	0.360
4	1.5	2.8 ... 4	52	100	**3RV2011-1EA15-0BA0**	**3RV2011-1EA25-0BA0**	0.361
5	1.5	3.5 ... 5	65	100	**3RV2011-1FA15-0BA0**	**--**	0.370
6.3	2.2	4.5 ... 6.3	82	100	**3RV2011-1GA15-0BA0**	**--**	0.368
8	3	5.5 ... 8	104	100	**3RV2011-1HA15-0BA0**	**--**	0.370
12.5	5.5	9 ... 12.5	163	100	**3RV2011-1KA15-0BA0**	**--**	0.365
16	7.5	10 ... 16	208	55	**3RV2011-4AA15-0BA0**	**--**	0.370
Size S0							
16	7.5	10 ... 16	208	55	**3RV2021-4AA15**	**3RV2021-4AA25**	0.427
20	7.5	13 ... 20	260	55	**3RV2021-4BA15**	**3RV2021-4BA25**	0.427
22	11	16 ... 22	286	55	**3RV2021-4CA15**	**3RV2021-4CA25**	0.434
25	11	18 ... 25	325	55	**3RV2021-4DA15**	**3RV2021-4DA25**	0.435
28	15	23 ... 28	364	55	**3RV2021-4NA15**	**3RV2021-4NA25**	0.445
32[4)]	15	27 ... 32	400	55	**3RV2021-4EA15**	**3RV2021-4EA25**	0.470
36[5)]	18.5	30 ... 36	432	20	**3RV2021-4PA15**	**--**	0.425
40[5)]	18.5	34 ... 40	480	20	**3RV2021-4FA15**	**--**	0.402
For special operating conditions down to -50 °C[2)3)]							
20	7.5	13 ... 20	260	55	**3RV2021-4BA15-0BA0**	**--**	0.378
32[4)]	15	27 ... 32	400	55	**3RV2021-4EA15-0BA0**	**--**	0.393

1) Guide value for 4-pole standard motors at 50 Hz 400 V AC. The actual starting and rated data of the motor to be protected must be considered when selecting the units.

2) The 3RV20.1-.....-0BA0 motor starter protectors in sizes S00 and S0 have a mechanical service life of 500 operating cycles.

3) The motor starter protectors do not have UL/CSA approval and are not certified either according to the European explosion protection directive ATEX or according to the international explosion protection standard (IECEx).

4) Suitable for use with IE3/IE4 motors up to a starting current of 256 A. For higher starting currents we recommend using 3RV2 motor starter protectors size S2.

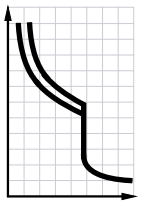
5) The devices must not be mounted side-by-side and they must not be assembled with link modules with contactors. A lateral clearance of 9 mm is required. For use with IE3/IE4 motors we recommend using 3RV2 motor starter protectors size S2.

Auxiliary switches and other accessories can be ordered separately (see page 2/196 onwards).

*** You can order this quantity or a multiple thereof.**

For motor protection *IE3/IE4 ready*

CLASS 10, with integrated auxiliary switch (1 NO + 1 NC)



3RV2031-4..15,
3RV2031-4.A15-0BA0

3RV2032-4.A15

3RV2041-4.A15

Rated current	Suitable for three-phase motors[1] with *P*	Setting range for thermal overload release	Instantaneous electronic release	Short-circuit breaking capacity at 400 V AC	**Screw terminals**	Weight
I_n			$I >$	I_{cu}	Article No.	
A	kW	A	A	kA		kg
Size S2						
14	5.5	9.5 ... 14	208	65	**3RV2031-4SA15**	1.081
17	7.5	12 ... 17	260	65	**3RV2031-4TA15**	1.085
20	7.5	14 ... 20	260	65	**3RV2031-4BA15**	1.075
25	11	18 ... 25	325	65	**3RV2031-4DA15**	1.072
32	15	22 ... 32	416	65	**3RV2031-4EA15**	1.065
36	18.5	28 ... 36	520	65	**3RV2031-4PA15**	1.080
40	18.5	32 ... 40	585	65	**3RV2031-4UA15**	1.085
45	22	35 ... 45	650	65	**3RV2031-4VA15**	1.068
52	22	42 ... 52	741	65	**3RV2031-4WA15**	1.169
59	30	49 ... 59	845	65	**3RV2031-4XA15**	1.190
65	30	54 ... 65	845	65	**3RV2031-4JA15**	1.207
73	37	62 ... 73	949	65	**3RV2031-4KA15**	1.147
80[2]	37	70 ... 80	1 040	65	**3RV2031-4RA15**	1.190
For special operating conditions down to -50 °C[3][4]						
14	5.5	9.5 ... 14	208	65	**3RV2031-4SA15-0BA0**	1.088
20	7.5	14 ... 20	260	65	**3RV2031-4BA15-0BA0**	1.082
32	15	22 ... 32	416	65	**3RV2031-4EA15-0BA0**	1.068
45	22	35 ... 45	650	65	**3RV2031-4VA15-0BA0**	1.079
Size S2, with increased switching capacity						
14	5.5	9.5 ... 14	208	10	**3RV2032-4SA15**	1.145
17	7.5	12 ... 17	260	100	**3RV2032-4TA15**	1.152
20	7.5	14 ... 20	260	100	**3RV2032-4BA15**	1.141
25	11	18 ... 25	325	100	**3RV2032-4DA15**	1.117
32	15	22 ... 32	416	100	**3RV2032-4EA15**	1.130
36	18.5	28 ... 36	520	100	**3RV2032-4PA15**	1.149
40	18.5	32 ... 40	585	100	**3RV2032-4UA15**	1.159
45	22	35 ... 45	650	100	**3RV2032-4VA15**	1.162
52	22	42 ... 52	741	100	**3RV2032-4WA15**	1.177
59	30	49 ... 59	845	100	**3RV2032-4XA15**	1.189
65	30	54 ... 65	845	100	**3RV2032-4JA15**	1.186
73	37	62 ... 73	949	100	**3RV2032-4KA15**	1.183
80[2]	37	70 ... 80	1 040	100	**3RV2032-4RA15**	1.186
Size S3						
40	18.5	28 ... 40	520	65	**3RV2041-4FA15**	2.200
50	22	36 ... 50	650	65	**3RV2041-4HA15**	2.225
63	30	45 ... 63	819	65	**3RV2041-4JA15**	2.251
75	37	57 ... 75	975	65	**3RV2041-4KA15**	2.258
84	45	65 ... 84	1 170	65	**3RV2041-4RA15**	2.273
93	45	75 ... 93	1 300	65	**3RV2041-4YA15**	2.295
100[5]	45, 55	80 ... 100	1 300	65	**3RV2041-4MA15**	2.292

[1] Guide value for 4-pole standard motors at 50 Hz 400 V AC. The actual starting and rated data of the motor to be protected must be considered when selecting the units.

[2] Suitable for use with IE3/IE4 motors up to a starting current of 720 A. For higher starting currents we recommend using 3RV2 motor starter protectors size S3.

[3] The 3RV2031-.....-0BA0 motor starter protectors have a mechanical service life of 250 operating cycles.

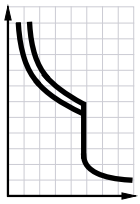
[4] The motor starter protectors do not have UL/CSA approval and are not certified either according to the European explosion protection directive ATEX or according to the international explosion protection standard (IECEx).

[5] Suitable for use with IE3/IE4 motors up to a starting current of 780 A. For higher starting currents we recommend using 3VA circuit breakers (see Catalog LV 10).

Auxiliary switches and other accessories can be ordered separately (see page 2/196 onwards).

* You can order this quantity or a multiple thereof.

CLASS 20, without auxiliary switches



3RV2031-4.B10,
14 to 45 A;
3RV2031-4.B10-0BA0;
32 to 40 A

3RV2031-4.B10,
52 to 65 A

3RV2042-4.B10,
40 to 100 A

Rated current	Suitable for three-phase motors[1] with *P*	Setting range for thermal overload release	Instantaneous electronic release	Short-circuit breaking capacity at 400 V AC	**Screw terminals**	Weight
I_n			$I >$	I_{cu}	Article No.	
A	kW	A	A	kA		kg
Size S2						
14	5.5	9.5 ... 14	208	65	**3RV2031-4SB10**	1.088
17	7.5	12 ... 17	260	65	**3RV2031-4TB10**	1.108
20	7.5	14 ... 20	260	65	**3RV2031-4BB10**	1.082
25	11	18 ... 25	325	65	**3RV2031-4DB10**	1.080
32	15	22 ... 32	416	65	**3RV2031-4EB10**	1.084
36	18.5	28 ... 36	520	65	**3RV2031-4PB10**	1.105
40	18.5	32 ... 40	585	65	**3RV2031-4UB10**	1.114
45	22	35 ... 45	650	65	**3RV2031-4VB10**	1.112
52	22	42 ... 52	741	65	**3RV2031-4WB10**	1.212
59	30	49 ... 59	845	65	**3RV2031-4XB10**	1.214
65	30	54 ... 65	845	65	**3RV2031-4JB10**	1.220
For special operating conditions down to -50 °C[2)3)]						
32	15	22 ... 32	416	65	**3RV2031-4EB10-0BA0**	1.096
36	18.5	28 ... 36	520	65	**3RV2031-4PB10-0BA0**	1.105
40	18.5	32 ... 40	585	65	**3RV2031-4UB10-0BA0**	1.114
Size S3, with increased switching capacity						
40	18.5	28 ... 40	520	100	**3RV2042-4FB10**	2.200
50	22	36 ... 50	650	100	**3RV2042-4HB10**	2.229
63	30	45 ... 63	819	100	**3RV2042-4JB10**	2.246
75	37	57 ... 75	975	100	**3RV2042-4KB10**	2.268
84	45	65 ... 84	1 170	100	**3RV2042-4RB10**	2.300
93	45	75 ... 93	1 300	100	**3RV2042-4YB10**	2.307
100[4)]	45, 55	80 ... 100	1 300	100	**3RV2042-4MB10**	2.281

1) Guide value for 4-pole standard motors at 50 Hz 400 V AC. The actual starting and rated data of the motor to be protected must be considered when selecting the units.

2) The 3RV2031-.....-0BA0 motor starter protectors have a mechanical service life of 250 operating cycles.

3) The motor starter protectors do not have UL/CSA approval and are not certified either according to the European explosion protection directive ATEX or according to the international explosion protection standard (IECEx).

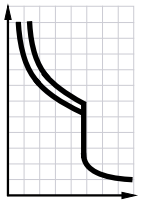
4) Suitable for use with IE3/IE4 motors up to a starting current of 780 A. For higher starting currents we recommend using 3VA circuit breakers (see Catalog LV 10).

Auxiliary switches and other accessories can be ordered separately (see page 2/196 onwards).

*** You can order this quantity or a multiple thereof.**

For motor protection ***IE3/IE4* ready**

CLASS 20, with integrated auxiliary switch (1 NO + 1 NC)



3RV2031-4.B15,
14 to 45 A

3RV2031-4.B15,
52 to 65 A

Rated current	Suitable for three-phase motors[1] with *P*	Setting range for thermal overload release	Instantaneous electronic release	Short-circuit breaking capacity at 400 V AC	**Screw terminals**	Weight
I_n			$I >$	I_{cu}	Article No.	
A	kW	A	A	kA		kg
Size S2						
14	5.5	9.5 ... 14	208	65	**3RV2031-4SB15**	1.091
17	7.5	12 ... 17	260	65	**3RV2031-4TB15**	1.114
20	7.5	14 ... 20	260	65	**3RV2031-4BB15**	1.097
25	11	18 ... 25	325	65	**3RV2031-4DB15**	1.088
32	15	22 ... 32	416	65	**3RV2031-4EB15**	1.099
36	18.5	28 ... 36	520	65	**3RV2031-4PB15**	1.133
40	18.5	32 ... 40	585	65	**3RV2031-4UB15**	1.129
45	22	35 ... 45	650	65	**3RV2031-4VB15**	1.122
52	22	42 ... 52	741	65	**3RV2031-4WB15**	1.220
59	30	49 ... 59	845	65	**3RV2031-4XB15**	1.233
65	30	54 ... 65	845	65	**3RV2031-4JB15**	1.238

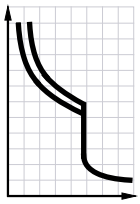
[1] Guide value for 4-pole standard motors at 50 Hz 400 V AC. The actual starting and rated data of the motor to be protected must be considered when selecting the units.

Auxiliary switches and other accessories can be ordered separately (see page 2/196 onwards).

*** You can order this quantity or a multiple thereof.**

Selection and ordering data

CLASS 10, with overload relay function (Automatic RESET), without auxiliary switches



3RV2111-..A10

3RV2121-4.A10

Rated current	Suitable for three-phase motors[1] with *P*	Setting range for thermal overload release	Instantaneous electronic release	Short-circuit breaking capacity at 400 V AC	Screw terminals	Weight
I_n			$I >$	I_{cu}	Article No.	
A	kW	A	A	kA		kg
Size S00[2]						
0.16	0.04	0.11 ... 0.16	2.1	100	**3RV2111-0AA10**	0.360
0.2	0.06	0.14 ... 0.2	2.6	100	**3RV2111-0BA10**	0.337
0.25	0.06	0.18 ... 0.25	3.3	100	**3RV2111-0CA10**	0.334
0.32	0.09	0.22 ... 0.32	4.2	100	**3RV2111-0DA10**	0.340
0.4	0.09	0.28 ... 0.4	5.2	100	**3RV2111-0EA10**	0.339
0.5	0.12	0.35 ... 0.5	6.5	100	**3RV2111-0FA10**	0.341
0.63	0.18	0.45 ... 0.63	8.2	100	**3RV2111-0GA10**	0.338
0.8	0.18	0.55 ... 0.8	10	100	**3RV2111-0HA10**	0.338
1	0.25	0.7 ... 1	13	100	**3RV2111-0JA10**	0.401
1.25	0.37	0.9 ... 1.25	16	100	**3RV2111-0KA10**	0.404
1.6	0.55	1.1 ... 1.6	21	100	**3RV2111-1AA10**	0.407
2	0.75	1.4 ... 2	26	100	**3RV2111-1BA10**	0.407
2.5	0.75	1.8 ... 2.5	33	100	**3RV2111-1CA10**	0.406
3.2	1.1	2.2 ... 3.2	42	100	**3RV2111-1DA10**	0.407
4	1.5	2.8 ... 4	52	100	**3RV2111-1EA10**	0.406
5	1.5	3.5 ... 5	65	100	**3RV2111-1FA10**	0.411
6.3	2.2	4.5 ... 6.3	82	100	**3RV2111-1GA10**	0.411
8	3	5.5 ... 8	104	100	**3RV2111-1HA10**	0.432
10	4	7 ... 10	130	100	**3RV2111-1JA10**	0.412
12.5	5.5	9 ... 12.5	163	100	**3RV2111-1KA10**	0.409
16	7.5	10 ... 16	208	55	**3RV2111-4AA10**	0.414
Size S0[2]						
16	7.5	10 ... 16	208	55	**3RV2121-4AA10**	0.424
20	7.5	13 ... 20	260	55	**3RV2121-4BA10**	0.420
22	11	16 ... 22	286	55	**3RV2121-4CA10**	0.422
25	11	18 ... 25	325	55	**3RV2121-4DA10**	0.429
28	15	23 ... 28	364	55	**3RV2121-4NA10**	0.460
32[3]	15	27 ... 32	400	55	**3RV2121-4EA10**	0.436

[1] Guide value for 4-pole standard motors at 50 Hz 400 V AC. The actual starting and rated data of the motor to be protected must be considered when selecting the units.

[2] Accessories for mounting on the right and 3RV1915 3-phase busbars cannot be used.

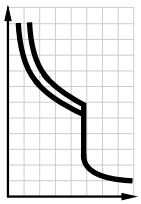
[3] Suitable for use with IE3/IE4 motors up to a starting current of 256 A. For higher starting currents we recommend using 3RV2 motor starter protectors size S2.

Auxiliary switches and other accessories can be ordered separately (see page 2/196 onwards).

*** You can order this quantity or a multiple thereof.**

For motor protection with overload relay function

CLASS 10, with overload relay function (Automatic RESET), without auxiliary switches



3RV2131-4.A10

3RV2142-4.A10

Rated current	Suitable for three-phase motors[1] with *P*	Setting range for thermal overload release	Instantaneous electronic release	Short-circuit breaking capacity at 400 V AC	Screw terminals	Weight
I_n			$I >$	I_{cu}	Article No.	
A	kW	A	A	kA		kg
Size S2[2]						
14	5.5	9.5 ... 14	208	65	**3RV2131-4SA10**	1.143
17	7.5	12 ... 17	260	65	**3RV2131-4TA10**	1.142
20	7.5	14 ... 20	260	65	**3RV2131-4BA10**	1.135
25	11	18 ... 25	325	65	**3RV2131-4DA10**	1.122
32	15	22 ... 32	416	65	**3RV2131-4EA10**	1.122
36	18.5	28 ... 36	520	65	**3RV2131-4PA10**	1.131
40	18.5	32 ... 40	585	65	**3RV2131-4UA10**	1.129
45	22	35 ... 45	650	65	**3RV2131-4VA10**	1.124
52	32	42 ... 52	741	65	**3RV2131-4WA10**	1.220
59	30	49 ... 59	845	65	**3RV2131-4XA10**	1.247
65	30	54 ... 65	845	65	**3RV2131-4JA10**	1.241
73	37	62 ... 73	949	65	**3RV2131-4KA10**	1.235
80[3]	37	70 ... 80	1 040	65	**3RV2131-4RA10**	1.245
Size S3, with increased switching capacity[2]						
40	18.5	28 ... 40	520	100	**3RV2142-4FA10**	2.260
50	22	36 ... 50	650	100	**3RV2142-4HA10**	2.301
63	30	45 ... 63	819	100	**3RV2142-4JA10**	2.293
75	37	57 ... 75	975	100	**3RV2142-4KA10**	2.301
84	45	65 ... 84	1 170	100	**3RV2142-4RA10**	2.339
93	45	75 ... 93	1 300	100	**3RV2142-4YA10**	2.341
100[4]	45, 55	80 ... 100	1 300	100	**3RV2142-4MA10**	2.325

1) Guide value for 4-pole standard motors at 50 Hz 400 V AC. The actual starting and rated data of the motor to be protected must be considered when selecting the units.

2) Accessories for mounting on the right cannot be used.

3) Suitable for use with IE3/IE4 motors up to a starting current of 720 A. For higher starting currents we recommend using 3RV2 motor starter protectors size S3.

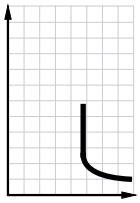
4) Suitable for use with IE3/IE4 motors up to a starting current of 780 A. For higher starting currents we recommend using 3VA circuit breakers (see Catalog LV 10).

Auxiliary switches and other accessories can be ordered separately (see page 2/196 onwards).

* You can order this quantity or a multiple thereof.

Selection and ordering data

Without auxiliary switches



3RV2311-..C10

3RV2311-..C20,
3RV2311-4AC20-0BA0

Rated current	Suitable for three-phase motors[1] with *P*	Thermal overload release[2]	Instantaneous electronic release	Short-circuit breaking capacity at 400 V AC	**Screw terminals**	**Spring-loaded terminals**	Weight
I_n			$I >$	I_{cu}	Article No.	Article No.	
A	kW	A	A	kA			kg
Size S00							
0.16	0.04	Without	2.1	100	**3RV2311-0AC10**	**3RV2311-0AC20**	0.340
0.2	0.06	Without	2.6	100	**3RV2311-0BC10**	**3RV2311-0BC20**	0.293
0.25	0.06	Without	3.3	100	**3RV2311-0CC10**	**3RV2311-0CC20**	0.300
0.32	0.09	Without	4.2	100	**3RV2311-0DC10**	**3RV2311-0DC20**	0.293
0.4	0.09	Without	5.2	100	**3RV2311-0EC10**	**3RV2311-0EC20**	0.292
0.5	0.12	Without	6.5	100	**3RV2311-0FC10**	**3RV2311-0FC20**	0.294
0.63	0.18	Without	8.2	100	**3RV2311-0GC10**	**3RV2311-0GC20**	0.292
0.8	0.18	Without	10	100	**3RV2311-0HC10**	**3RV2311-0HC20**	0.293
1	0.25	Without	13	100	**3RV2311-0JC10**	**3RV2311-0JC20**	0.365
1.25	0.37	Without	16	100	**3RV2311-0KC10**	**3RV2311-0KC20**	0.360
1.6	0.55	Without	21	100	**3RV2311-1AC10**	**3RV2311-1AC20**	0.364
2	0.75	Without	26	100	**3RV2311-1BC10**	**3RV2311-1BC20**	0.363
2.5	0.75	Without	33	100	**3RV2311-1CC10**	**3RV2311-1CC20**	0.364
3.2	1.1	Without	42	100	**3RV2311-1DC10**	**3RV2311-1DC20**	0.366
4	1.5	Without	52	100	**3RV2311-1EC10**	**3RV2311-1EC20**	0.361
5	1.5	Without	65	100	**3RV2311-1FC10**	**3RV2311-1FC20**	0.400
6.3	2.2	Without	82	100	**3RV2311-1GC10**	**3RV2311-1GC20**	0.375
8	3	Without	104	100	**3RV2311-1HC10**	**3RV2311-1HC20**	0.367
10	4	Without	130	100	**3RV2311-1JC10**	**3RV2311-1JC20**	0.350
12.5	5.5	Without	163	100	**3RV2311-1KC10**	**3RV2311-1KC20**	0.380
16	7.5	Without	208	55	**3RV2311-4AC10**	**3RV2311-4AC20**	0.377
For special operating conditions down to -50 °C[3][4]							
16	7.5	Without	208	55	--	**3RV2311-4AC20-0BA0**	0.375

[1] Guide value for 4-pole standard motors at 50 Hz 400 V AC. The actual starting and rated data of the motor to be protected must be considered when selecting the units.

[2] For overload protection of the motors, appropriate overload relays must be used.

[3] The 3RV2311-.....-0BA0 motor starter protectors have a mechanical service life of 500 operating cycles.

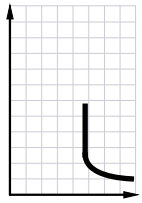
[4] The motor starter protectors do not have UL/CSA approval and are not certified either according to the European explosion protection directive ATEX or according to the international explosion protection standard (IECEx).

Auxiliary switches and other accessories can be ordered separately (see page 2/196 onwards).

*** You can order this quantity or a multiple thereof.**

For starter combinations *IE3/IE4* ready

Without auxiliary switches



3RV2321-..C10

3RV2321-..C20,
3RV2321-4AC20-0BA0

Rated current	Suitable for three-phase motors[1] with *P*	Thermal overload release[2]	Instantaneous electronic release	Short-circuit breaking capacity at 400 V AC	**Screw terminals**	**Spring-loaded terminals**	Weight
I_n				I_{cu}	Article No.	Article No.	
A	kW	A	A	kA			kg
Size S0							
1.6	0.55	Without	21	100	**3RV2321-1AC10**	**3RV2321-1AC20**	0.408
2	0.75	Without	26	100	**3RV2321-1BC10**	**3RV2321-1BC20**	0.401
2.5	0.75	Without	33	100	**3RV2321-1CC10**	**3RV2321-1CC20**	0.400
3.2	1.1	Without	42	100	**3RV2321-1DC10**	**3RV2321-1DC20**	0.403
4	1.5	Without	52	100	**3RV2321-1EC10**	**3RV2321-1EC20**	0.396
5	1.5	Without	65	100	**3RV2321-1FC10**	**3RV2321-1FC20**	0.404
6.3	2.2	Without	82	100	**3RV2321-1GC10**	**3RV2321-1GC20**	0.408
8	3	Without	104	100	**3RV2321-1HC10**	**3RV2321-1HC20**	0.410
10	4	Without	130	100	**3RV2321-1JC10**	**3RV2321-1JC20**	0.407
12.5	5.5	Without	163	100	**3RV2321-1KC10**	**3RV2321-1KC20**	0.440
16	7.5	Without	208	55	**3RV2321-4AC10**	**3RV2321-4AC20**	0.412
20	7.5	Without	260	55	**3RV2321-4BC10**	**3RV2321-4BC20**	0.410
22	11	Without	286	55	**3RV2321-4CC10**	**3RV2321-4CC20**	0.400
25	11	Without	325	55	**3RV2321-4DC10**	**3RV2321-4DC20**	0.414
28	15	Without	364	55	**3RV2321-4NC10**	**3RV2321-4NC20**	0.427
32[3]	15	Without	400	55	**3RV2321-4EC10**	**3RV2321-4EC20**	0.428
36[4]	18.5	Without	432	20	**3RV2321-4PC10**	--	0.300
40[4]	18.5	Without	480	20	**3RV2321-4FC10**	--	0.400
For special operating conditions down to -50 °C[5][6]							
16	7.5	Without	208	55	--	**3RV2321-4AC20-0BA0**	0.412

[1] Guide value for 4-pole standard motors at 50 Hz 400 V AC. The actual starting and rated data of the motor to be protected must be considered when selecting the units.

[2] For overload protection of the motors, appropriate overload relays must be used.

[3] Suitable for use with IE3/IE4 motors up to a starting current of 256 A. For higher starting currents we recommend using 3RV2 motor starter protectors size S2.

[4] The devices must not be mounted side-by-side and they must not be assembled with link modules with contactors. A lateral clearance of 9 mm is required. For use with IE3/IE4 motors we recommend using 3RV2 motor starter protectors size S2.

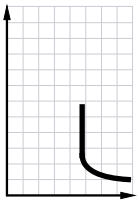
[5] The 3RV2321-.....-0BA0 motor starter protectors have a mechanical service life of 500 operating cycles.

[6] The motor starter protectors do not have UL/CSA approval and are not certified either according to the European explosion protection directive ATEX or according to the international explosion protection standard (IECEx).

Auxiliary switches and other accessories can be ordered separately (see page 2/196 onwards).

* You can order this quantity or a multiple thereof.

Without auxiliary switches



3RV2331-4.C10,
14 to 45 A

3RV2331-4.C10,
52 to 80 A

3RV2332-4.C10,
14 to 45 A

3RV2332-4.C10,
52 to 80 A

3RV234.-4.C10,
40 to 100 A

Rated current	Suitable for three-phase motors[1] with *P*	Thermal overload release[2]	Instantaneous electronic release	Short-circuit breaking capacity at 400 V AC	**Screw terminals**	Weight
I_n			$I >$	I_{cu}	Article No.	
A	kW	A	A	kA		kg
Size S2						
14	5.5	Without	208	65	**3RV2331-4SC10**	1.056
17	7.5	Without	260	65	**3RV2331-4TC10**	1.070
20	7.5	Without	260	65	**3RV2331-4BC10**	1.061
25	11	Without	325	65	**3RV2331-4DC10**	1.044
32	15	Without	416	65	**3RV2331-4EC10**	1.040
36	18.5	Without	520	65	**3RV2331-4PC10**	1.052
40	18.5	Without	585	65	**3RV2331-4UC10**	1.052
45	22	Without	650	65	**3RV2331-4VC10**	1.050
52	22	Without	741	65	**3RV2331-4WC10**	1.152
59	30	Without	845	65	**3RV2331-4XC10**	1.173
65	30	Without	845	65	**3RV2331-4JC10**	1.165
73	37	Without	949	65	**3RV2331-4KC10**	1.162
80[3]	37	Without	1 040	65	**3RV2331-4RC10**	1.168
Size S2, with increased switching capacity						
14	5.5	Without	208	100	**3RV2332-4SC10**	1.132
17	7.5	Without	260	100	**3RV2332-4TC10**	1.130
20	7.5	Without	260	100	**3RV2332-4BC10**	1.121
25	11	Without	325	100	**3RV2332-4DC10**	1.103
32	15	Without	416	100	**3RV2332-4EC10**	1.111
36	18.5	Without	520	100	**3RV2332-4PC10**	1.131
40	18.5	Without	585	100	**3RV2332-4UC10**	1.138
45	22	Without	650	100	**3RV2332-4VC10**	1.148
52	22	Without	741	100	**3RV2332-4WC10**	1.149
59	30	Without	845	100	**3RV2332-4XC10**	1.169
65	30	Without	845	100	**3RV2332-4JC10**	1.167
73	37	Without	949	100	**3RV2332-4KC10**	1.163
80[3]	37	Without	1 040	100	**3RV2332-4RC10**	1.167
Size S3						
40	18.5	Without	520	65	**3RV2341-4FC10**	2.175
50	22	Without	650	65	**3RV2341-4HC10**	2.214
63	30	Without	819	65	**3RV2341-4JC10**	2.208
75	37	Without	975	65	**3RV2341-4KC10**	2.236
84	45	Without	1 170	65	**3RV2341-4RC10**	2.248
93	45	Without	1 300	65	**3RV2341-4YC10**	2.269
100[4]	45, 55	Without	1 300	65	**3RV2341-4MC10**	2.251
Size S3, with increased switching capacity						
40	18.5	Without	520	100	**3RV2342-4FC10**	2.175
50	22	Without	650	100	**3RV2342-4HC10**	2.208
63	30	Without	819	100	**3RV2342-4JC10**	2.216
75	37	Without	975	100	**3RV2342-4KC10**	2.234
84	45	Without	1 170	100	**3RV2342-4RC10**	2.240
93	45	Without	1 300	100	**3RV2342-4YC10**	2.259
100[4]	45, 55	Without	1 300	100	**3RV2342-4MC10**	2.252

[1] Guide value for 4-pole standard motors at 50 Hz 400 V AC. The actual starting and rated data of the motor to be protected must be considered when selecting the units.

[2] For overload protection of the motors, appropriate overload relays must be used.

[3] Suitable for use with IE3/IE4 motors up to a starting current of 720 A. For higher starting currents we recommend using 3RV2 motor starter protectors size S3.

[4] Suitable for use with IE3/IE4 motors up to a starting current of 780 A. For higher starting currents we recommend using 3VA circuit breakers (see Catalog LV 10).

Auxiliary switches and other accessories can be ordered separately (see page 2/196 onwards).

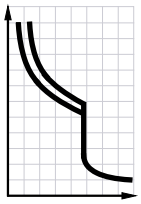
*** You can order this quantity or a multiple thereof.**

For transformer protection

Selection and ordering data

CLASS 10, without auxiliary switches

Motor starter protectors for the protection of transformers with high inrush current



3RV2411-..A10,
3RV2411-..A10-0BA0

3RV2411-..A20

Rated current	Setting range for thermal overload release	Instantaneous electronic release	Short-circuit breaking capacity at 400 V AC	**Screw terminals**	**Spring-loaded terminals**	Weight
I_n		$I >$	I_{cu}	Article No.	Article No.	
A	A	A	kA			kg
Size S00						
0.16	0.11 ... 0.16	3.3	100	**3RV2411-0AA10**	**3RV2411-0AA20**	0.297
0.2	0.14 ... 0.2	4.2	100	**3RV2411-0BA10**	**3RV2411-0BA20**	0.300
0.25	0.18 ... 0.25	5.2	100	**3RV2411-0CA10**	**3RV2411-0CA20**	0.298
0.32	0.22 ... 0.32	6.5	100	**3RV2411-0DA10**	**3RV2411-0DA20**	0.297
0.4	0.28 ... 0.4	8.2	100	**3RV2411-0EA10**	**3RV2411-0EA20**	0.299
0.5	0.35 ... 0.5	10	100	**3RV2411-0FA10**	**3RV2411-0FA20**	0.298
0.63	0.45 ... 0.63	13	100	**3RV2411-0GA10**	**3RV2411-0GA20**	0.363
0.8	0.55 ... 0.8	16	100	**3RV2411-0HA10**	**3RV2411-0HA20**	0.364
1	0.7 ... 1	21	100	**3RV2411-0JA10**	**3RV2411-0JA20**	0.366
1.25	0.9 ... 1.25	26	100	**3RV2411-0KA10**	**3RV2411-0KA20**	0.366
1.6	1.1 ... 1.6	33	100	**3RV2411-1AA10**	**3RV2411-1AA20**	0.366
2	1.4 ... 2	42	100	**3RV2411-1BA10**	**3RV2411-1BA20**	0.368
2.5	1.8 ... 2.5	52	100	**3RV2411-1CA10**	**3RV2411-1CA20**	0.364
3.2	2.2 ... 3.2	65	100	**3RV2411-1DA10**	**3RV2411-1DA20**	0.371
4	2.8 ... 4	82	100	**3RV2411-1EA10**	**3RV2411-1EA20**	0.366
5	3.5 ... 5	104	100	**3RV2411-1FA10**	**3RV2411-1FA20**	0.369
6.3	4.5 ... 6.3	130	100	**3RV2411-1GA10**	**3RV2411-1GA20**	0.373
8	5.5 ... 8	163	100	**3RV2411-1HA10**	**3RV2411-1HA20**	0.375
10	7 ... 10	208	100	**3RV2411-1JA10**	**3RV2411-1JA20**	0.381
12.5	9 ... 12.5	260	100	**3RV2411-1KA10**	**3RV2411-1KA20**	0.372
16	10 ... 16	286	55	**3RV2411-4AA10**	**3RV2411-4AA20**	0.379
Without phase asymmetry/failure detection for 1-, 2- and 3-phase loads[1]						
0.4	0.28 ... 0.4	8.2	100	--	**3RV2411-0EA20-0DA0**	0.302
1.6	1.1 ... 1.6	33	100	--	**3RV2411-1AA20-0DA0**	0.370
2	1.4 ... 2	42	100	--	**3RV2411-1BA20-0DA0**	0.365
2.5	1.8 ... 2.5	52	100	--	**3RV2411-1CA20-0DA0**	0.365
3.2	2.2 ... 3.2	65	100	--	**3RV2411-1DA20-0DA0**	0.365
4	2.8 ... 4	82	100	--	**3RV2411-1EA20-0DA0**	0.373
5	3.5 ... 5	104	100	--	**3RV2411-1FA20-0DA0**	0.371
6.3	4.5 ... 6.3	130	100	--	**3RV2411-1GA20-0DA0**	0.370
8	5.5 ... 8	163	100	--	**3RV2411-1HA20-0DA0**	0.420
10	7 ... 10	208	100	--	**3RV2411-1JA20-0DA0**	0.380
For special operating conditions down to -50 °C[2)3)]						
2.5	1.8 ... 2.5	52	100	**3RV2411-1CA10-0BA0**	--	0.345
6.3	4.5 ... 6.3	130	100	**3RV2411-1GA10-0BA0**	--	0.349
8	5.5 ... 8	163	100	**3RV2411-1HA10-0BA0**	--	0.349
10	7 ... 10	208	100	**3RV2411-1JA10-0BA0**	--	0.360
16	10 ... 16	286	55	**3RV2411-4AA10-0BA0**	--	0.355

1) The motor starter protectors do not have UL/CSA approval and are not certified either according to the European explosion protection directive ATEX or according to the international explosion protection standard (IECEx).

2) The motor starter protectors have IEC approval, but not UL/CSA approval.

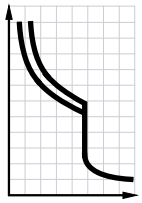
3) The 3RV2411-.....-0BA0 motor starter protectors have a mechanical service life of 500 operating cycles.

Auxiliary switches and other accessories can be ordered separately (see page 2/196 onwards).

* You can order this quantity or a multiple thereof.

CLASS 10, without auxiliary switches

Motor starter protectors for the protection of transformers with high inrush current



3RV2421-..A10,
3RV2421-4BA10-0BA0,
32 A

3RV2421-4.A20;
3RV2421-4.A20-0DA0,
16 and 20 A

Rated current	Setting range for thermal overload release	Instantaneous electronic release	Short-circuit breaking capacity at 400 V AC	Screw terminals	Spring-loaded terminals	Weight
I_n		$I >$	I_{cu}	Article No.	Article No.	
A	A	A	kA			kg
Size S0						
0.16	0.11 ... 0.16	3.3	100	**3RV2421-0AA10**	--	0.291
0.2	0.14 ... 0.2	4.2	100	**3RV2421-0BA10**	--	0.291
0.25	0.18 ... 0.25	5.2	100	**3RV2421-0CA10**	--	0.290
0.32	0.22 ... 0.32	6.5	100	**3RV2421-0DA10**	--	0.285
0.4	0.28 ... 0.4	8.2	100	**3RV2421-0EA10**	--	0.284
0.5	0.35 ... 0.5	10	100	**3RV2421-0FA10**	--	0.285
0.63	0.45 ... 0.63	13	100	**3RV2421-0GA10**	--	0.350
0.8	0.55 ... 0.8	16	100	**3RV2421-0HA10**	--	0.350
1	0.7 ... 1	21	100	**3RV2421-0JA10**	--	0.353
1.25	0.9 ... 1.25	26	100	**3RV2421-0KA10**	--	0.350
1.6	1.1 ... 1.6	33	100	**3RV2421-1AA10**	--	0.370
2	1.4 ... 2	42	100	**3RV2421-1BA10**	--	0.357
2.5	1.8 ... 2.5	52	100	**3RV2421-1CA10**	--	0.340
3.2	2.2 ... 3.2	65	100	**3RV2421-1DA10**	--	0.359
4	2.8 ... 4	82	100	**3RV2421-1EA10**	--	0.350
5	3.5 ... 5	104	100	**3RV2421-1FA10**	--	0.355
6.3	4.5 ... 6.3	130	100	**3RV2421-1GA10**	--	0.357
8	5.5 ... 8	163	100	**3RV2421-1HA10**	--	0.355
10	7 ... 10	208	100	**3RV2421-1JA10**	--	0.363
12.5	9 ... 12.5	260	100	**3RV2421-1KA10**	--	0.370
16	10 ... 16	286	55	**3RV2421-4AA10**	**3RV2421-4AA20**	0.363
20	13 ... 20	325	55	**3RV2421-4BA10**	**3RV2421-4BA20**	0.360
22	16 ... 22	364	55	**3RV2421-4CA10**	**3RV2421-4CA20**	0.375
25	18 ... 25	400	55	**3RV2421-4DA10**	**3RV2421-4DA20**	0.378
Without phase asymmetry/failure detection for 1-, 2- and 3-phase loads[1]						
16	10 ... 16	286	55	--	**3RV2421-4AA20-0DA0**	0.416
20	13 ... 20	325	55	--	**3RV2421-4BA20-0DA0**	0.415
For special operating conditions down to -50 °C[2)3)]						
32	22 ... 32	656	65	**3RV2421-4BA10-0BA0**	--	0.356

1) The motor starter protectors do not have UL/CSA approval and are not certified either according to the European explosion protection directive ATEX or according to the international explosion protection standard (IECEx).

2) The motor starter protectors have IEC approval, but not UL/CSA approval.

3) The 3RV2431-.....-0BA0 motor starter protectors have a mechanical service life of 250 operating cycles.

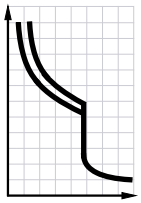
Auxiliary switches and other accessories can be ordered separately (see page 2/196 onwards).

*** You can order this quantity or a multiple thereof.**

For transformer protection

CLASS 10, without auxiliary switches

Motor starter protectors for the protection of transformers with high inrush current



3RV2431-4.A10,
14 to 40 A;
3RV2431-4EA10-0BA0,
32 A

3RV2431-4.A10,
45 to 65 A

Rated current	Setting range for thermal overload release	Instantaneous electronic release	Short-circuit breaking capacity at 400 V AC	Screw terminals	Spring-loaded terminals	Weight
I_n		$I >$	I_{cu}	Article No.	Article No.	
A	A	A	kA			kg
Size S2						
14	9.5 ... 14	328	65	**3RV2431-4SA10**	--	1.067
17	12 ... 17	410	65	**3RV2431-4TA10**	--	1.058
20	14 ... 20	410	65	**3RV2431-4BA10**	--	1.063
25	18 ... 25	512	65	**3RV2431-4DA10**	--	1.072
32	22 ... 32	656	65	**3RV2431-4EA10**	--	1.056
36	28 ... 36	820	65	**3RV2431-4PA10**	--	1.054
40	32 ... 40	820	65	**3RV2431-4UA10**	--	1.052
45	35 ... 45	922	65	**3RV2431-4VA10**	--	1.162
52	42 ... 52	1 025	65	**3RV2431-4WA10**	--	1.151
59	49 ... 59	1 040	65	**3RV2431-4XA10**	--	1.186
65	54 ... 65	1 040	65	**3RV2431-4JA10**	--	1.182
For special operating conditions down to -50 °C [1)2)]						
32	22 ... 32	656	65	**3RV2431-4EA10-0BA0**	--	1.048

1) The motor starter protectors do not have UL/CSA approval and are not certified either according to the European explosion protection directive ATEX or according to the international explosion protection standard (IECEx).

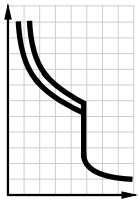
2) The 3RV2431-.....-0BA0 motor starter protectors have a mechanical service life of 250 operating cycles.

Auxiliary switches and other accessories can be ordered separately (see page 2/196 onwards).

* You can order this quantity or a multiple thereof.

CLASS 10, with transverse auxiliary switch (1 NO + 1 NC)

Motor starter protectors for the protection of transformers with high inrush current



3RV2411-..A15

3RV2421-4.A15

Rated current	Setting range for thermal overload release	Instantaneous electronic release	Short-circuit breaking capacity at 400 V AC	Screw terminals	Weight
I_n		$I >$	I_{cu}	Article No.	
A	A	A	kA		kg
Size S00					
0.16	0.11 ... 0.16	3.3	100	**3RV2411-0AA15**	0.292
0.2	0.14 ... 0.2	4.2	100	**3RV2411-0BA15**	0.293
0.25	0.18 ... 0.25	5.2	100	**3RV2411-0CA15**	0.273
0.32	0.22 ... 0.32	6.5	100	**3RV2411-0DA15**	0.296
0.4	0.28 ... 0.4	8.2	100	**3RV2411-0EA15**	0.240
0.5	0.35 ... 0.5	10	100	**3RV2411-0FA15**	0.294
0.63	0.45 ... 0.63	13	100	**3RV2411-0GA15**	0.357
0.8	0.55 ... 0.8	16	100	**3RV2411-0HA15**	0.359
1	0.7 ... 1	21	100	**3RV2411-0JA15**	0.358
1.25	0.9 ... 1.25	26	100	**3RV2411-0KA15**	0.360
1.6	1.1 ... 1.6	33	100	**3RV2411-1AA15**	0.362
2	1.4 ... 2	42	100	**3RV2411-1BA15**	0.355
2.5	1.8 ... 2.5	52	100	**3RV2411-1CA15**	0.350
3.2	2.2 ... 3.2	65	100	**3RV2411-1DA15**	0.366
4	2.8 ... 4	82	100	**3RV2411-1EA15**	0.376
5	3.5 ... 5	104	100	**3RV2411-1FA15**	0.360
6.3	4.5 ... 6.3	130	100	**3RV2411-1GA15**	0.360
8	5.5 ... 8	163	100	**3RV2411-1HA15**	0.366
10	7 ... 10	208	100	**3RV2411-1JA15**	0.374
12.5	9 ... 12.5	260	100	**3RV2411-1KA15**	0.366
16	10 ... 16	286	55	**3RV2411-4AA15**	0.367
Size S0					
16	10 ... 16	286	55	**3RV2421-4AA15**	0.375
20	13 ... 20	325	55	**3RV2421-4BA15**	0.379
22	16 ... 22	364	55	**3RV2421-4CA15**	0.388
25	18 ... 25	400	55	**3RV2421-4DA15**	0.400

Auxiliary switches and other accessories can be ordered separately (see page 2/196 onwards).

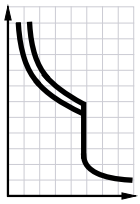
*** You can order this quantity or a multiple thereof.**

For system protection NEW

Selection and ordering data

CLASS 10, without auxiliary switches

The motor starter protectors are suitable for 1-, 2- and 3-phase loads and do not feature phase asymmetry and phase failure detection. They do not have UL/CSA approval and are not certified either according to the European explosion protection directive ATEX or according to the international explosion protection standard (IECEx).



3RV2021-..A10-0DA0

3RV2021-1EA20-0DA0

3RV2041-4.A10-0DA0

Rated current	Suitable for three-phase motors[1] with ▶	Setting range for thermal overload release	Instantaneous electronic release	Short-circuit breaking capacity at 400 V AC	Screw terminals	Spring-loaded terminals	Weight
I_n			$I >$	I_{cu}	Article No.	Article No.	
A	kW	A	A	kA			kg
Size S0							
4	1.5	2.8 ... 4	52	100	**3RV2021-1EA10-0DA0**	**3RV2021-1EA20-0DA0**	0.420
6.3	2.2	4.5 ... 6.3	82	100	**3RV2021-1GA10-0DA0**	--	0.355
8	3	5.5 ... 8	104	100	**3RV2021-1HA10-0DA0**	--	0.360
10	4	7 ... 10	130	100	**3RV2021-1JA10-0DA0**	--	0.360
12.5	5.5	9 ... 12.5	163	100	**3RV2021-1KA10-0DA0**	--	0.365
16	7.5	10 ... 16	208	55	**3RV2021-4AA10-0DA0**	--	0.365
20	7.5	13 ... 20	260	55	**3RV2021-4BA10-0DA0**	--	0.357
25	11	18 ... 25	325	55	**3RV2021-4DA10-0DA0**	--	0.370
32	15	27 ... 32	400	55	**3RV2021-4EA10-0DA0**	--	0.380
Size S3							
40	18.5	28 ... 40	520	65	**3RV2041-4FA10-0DA0**	--	2.196
50	22	36 ... 50	650	65	**3RV2041-4HA10-0DA0**	--	2.225
63	30	45 ... 63	819	65	**3RV2041-4JA10-0DA0**	--	2.233
84	45	65 ... 84	1 170	65	**3RV2041-4RA10-0DA0**	--	2.265
100	45, 55	80 ... 100	1 300	65	**3RV2041-4MA10-0DA0**	--	2.264

[1] Guide value for 4-pole standard motors at 50 Hz 400 V AC. The actual starting and rated data of the motor to be protected must be considered when selecting the units.

Auxiliary switches and other accessories can be ordered separately (see page 2/196 onwards).

* You can order this quantity or a multiple thereof.

Overview

Mounting location and function

The 3RV2 motor starter protectors/circuit breakers have three main contact elements. In order to achieve maximum flexibility, auxiliary switches, signaling switches, auxiliary releases and isolator modules can be supplied separately.

These components are easily fitted to the switches without the use of any tools according to requirements.

Overview graphic, see page 2/163.

Front side Notes: • A maximum of four auxiliary contacts with auxiliary switches can be mounted on each motor starter protector/circuit breaker. • Transverse auxiliary switches cannot be used for circuit breaker 3RV2742 (size S3).	**Transverse auxiliary switches, solid-state compatible transverse auxiliary switches** 1 NO + 1 NC or 2 NO or 1 CO	An auxiliary switch can be inserted transversely on the front. The overall width of the motor starter protectors/circuit breakers remains unchanged.
Left-hand side Notes: • A maximum of four auxiliary contacts with auxiliary switches can be mounted on each motor starter protector/circuit breaker. • Lateral auxiliary switches (two contacts) and signaling switches can be mounted separately or together. • Signaling switches cannot be used for 3RV1011, 3RV27 and 3RV28 motor starter protectors/circuit breakers. • Only lateral auxiliary switches can be used for 3RV2742 (size S3).	**Lateral auxiliary switches (2 contacts)** 1 NO + 1 NC or 2 NO or 2 NC	One of the three lateral auxiliary switches can be mounted on the left side per motor starter protector/circuit breaker. The contacts of the auxiliary switch close and open together with the main contacts of the motor starter protector/circuit breaker. The width of the lateral auxiliary switch with two contacts is 9 mm.
	Lateral auxiliary switches (4 contacts) 2 NO + 2 NC	One lateral auxiliary switch with four contacts can be mounted on the left side per motor starter protector/circuit breaker. The contacts of the auxiliary switch close and open together with the main contacts of the motor starter protector/circuit breaker. The width of the lateral auxiliary switch with four contacts is 18 mm.
	Signaling switches Tripping 1 NO + 1 NC Short circuit 1 NO + 1 NC	One signaling switch can be mounted on the left side of each motor starter protector. The signaling switch has two contact systems. One contact system always signals tripping irrespective of whether this was caused by a short circuit, an overload or an auxiliary release. The other contact system only switches in the event of a short circuit. There is no signaling as a result of switching off with the actuator. In order to be able to switch on the motor starter protector again after a short circuit, the signaling switch must be reset manually after the error cause has been eliminated. The width of the signaling switch is 18 mm.
Right-hand side Notes: • One auxiliary release can be mounted per motor starter protector/circuit breaker. • Accessories cannot be mounted on the right-hand side of the 3RV21 motor starter protectors for motor protection with overload relay function.	**Auxiliary releases**	
	Shunt releases	For remote-controlled tripping of the motor starter protector/circuit breaker. The release coil should only be energized for short periods (see circuit diagrams).
	or	
	Undervoltage releases	Trips the motor starter protector/circuit breaker when the voltage is interrupted and prevents the motor from being restarted accidentally when the voltage is restored. Used for remote-controlled tripping of the motor starter protector/circuit breaker. Particularly suitable for EMERGENCY OFF disconnection by way of corresponding EMERGENCY OFF pushbuttons according to IEC 60204-1.
	or	
	Undervoltage releases with leading auxiliary contacts 2 NO Own version for 3RV1011	Function and use as for the undervoltage release without leading auxiliary contacts, but with the following additional function: the auxiliary contacts will open in switch position OFF to deenergize the coil of the undervoltage release, thus interrupting energy consumption. In the "tripped" position, these auxiliary contacts are not guaranteed to open. The leading contacts permit the motor starter protector/circuit breaker to reclose. The width of the auxiliary release is 18 mm.
Top Notes: • Isolator modules cannot be used for 3RV1011, 3RV27 and 3RV28 motor starter protectors/ circuit breakers. • The isolator module for size S2 can be used only with 3RV2 motor starter protectors/circuit breakers up to max. 65 A. • The isolator module cannot be used with the transverse auxiliary switch.	**Isolator modules**	Isolator modules can be mounted to the upper connection side of the motor starter protectors. The supply cable is connected to the motor starter protector through the isolator module. The plug can only be unplugged when the motor starter protector is open and isolates all 3 poles of the motor starter protector from the network. The shock-protected isolation point is clearly visible and secured with a padlock to prevent reinsertion of the plug.

For a complete overview of which accessories can be used for the various motor starter protectors/circuit breakers, see page 2/162.

Selection and ordering data

	Version	For motor starter protectors/ circuit breakers	Spring-loaded terminals	Weight
		Size	Article No.	kg
Auxiliary switches[1]				
 3RV2901-2E	**Transverse auxiliary switches**[2] For front mounting			
	1 CO	S00 ... S3	--	
	1 NO + 1 NC		**3RV2901-2E**	0.017
	2 NO		**3RV2901-2F**	0.018
 3RV2901-2A	**Lateral auxiliary switches** For mounting on the left			
	1 NO + 1 NC	S00 ... S3	**3RV2901-2A**	0.045
	2 NO		**3RV2901-2B**	0.045
	2 NC		**3RV2901-2C**	0.045
	2 NO + 2 NC		--	
Signaling switches[3]				
 3RV2921-2M	**Signaling switches** One signaling switch can be mounted on the left per motor starter protector. Separate tripped and short-circuit alarms, 1 NO + 1 NC each	S00[4] ... S3	**3RV2921-2M**	0.100

1) Each motor starter protector/circuit breaker can be fitted with one transverse and one lateral auxiliary switch. The lateral auxiliary switch with 2 NO + 2 NC is used without a transverse auxiliary switch.

2) Not for 3RV2742 circuit breakers.

* You can order this quantity or a multiple thereof.

3RV2902-2AV0

3RV2902-2DB0

Rated control supply voltage U_s					For motor starter protectors/ circuit breakers	**Spring-loaded terminals**	Weight
AC 50 Hz	AC 60 Hz	AC 50/60 Hz 100% ON period[1]	AC/DC 50/60 Hz, DC 5 s ON period[2]	DC		Article No.	
V	V	V	V	V	Size		kg
Auxiliary releases[3]							
Undervoltage releases							
--	--	--	--	24	S00 ... S3	**--**	
24	24	--	--	--	S00 ... S3	**--**	
110	120	--	--	--	S00 ... S3	**--**	
--	208	--	--	--	S00 ... S3	**--**	
230	240	--	--	--	S00 ... S3	**3RV2902-2AP0**	0.133
400	440	--	--	--	S00 ... S3	**3RV2902-2AV0**	0.132
415	480	--	--	--	S00 ... S3	**--**	
500	600	--	--	--	S00 ... S3	**--**	
Undervoltage releases with leading auxiliary contacts 2 NO							
24	24	--	--	--	S00[4] ... S3	**--**	
230	240	--	--	--	S00[4] ... S3	**3RV2922-2CP0**	0.136
400	440	--	--	--	S00[4] ... S3	**3RV2922-2CV0**	0.138
415	480	--	--	--	S00[4] ... S3	**3RV2922-2CV1**	0.139
Shunt releases							
--	--	20 ... 24	20 ... 70	--	S00 ... S3	**3RV2902-2DB0**	0.138
--	--	90 ... 110	70 ... 190	--	S00 ... S3	**3RV2902-2DF0**	0.180
--	--	210 ... 240	190 ... 330	--	S00 ... S3	**3RV2902-2DP0**	0.133
--	--	350 ... 415	330 ... 500	--	S00 ... S3	**--**	
--	--	500	500	--	S00 ... S3	**--**	

1) The voltage range is valid for 100% (infinite) ON period. The response voltage lies at 0.9 of the lower limit of the voltage range.

2) The voltage range is valid for 5 s ON period at 50/60 Hz AC and DC. The response voltage lies at 0.85 of the lower limit of the voltage range.

3) One auxiliary release can be mounted on the right per motor starter protector/circuit breaker (does not apply to 3RV21 motor starter protectors/circuit breakers with overload relay function).

4) Not for 3RV1011 motor starter protectors.

*** You can order this quantity or a multiple thereof.**

2

Overview

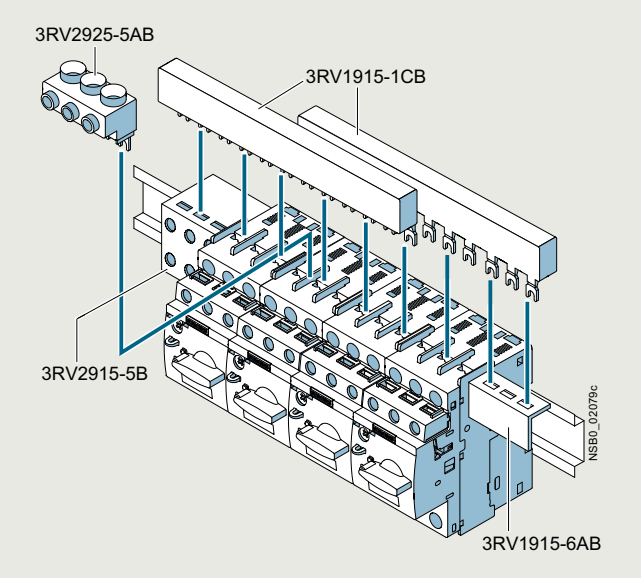
Insulated 3-phase busbar system

3-phase busbar systems provide an easy, time-saving and clearly arranged means of feeding 3RV2 motor starter protectors/circuit breakers with screw terminals. Different versions are available for sizes S00 to S2 and can be used for the various different types of motor starter protectors/circuit breakers (size S0 up to 32 A).

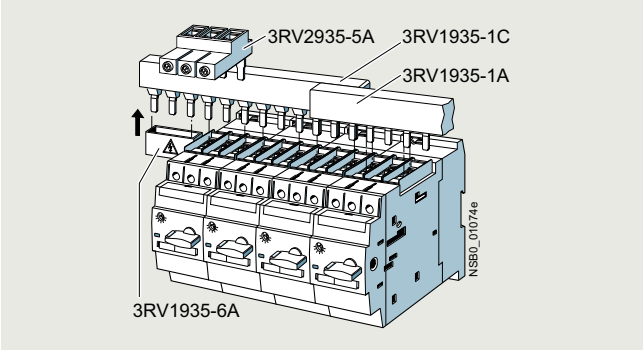
The 3RV1915 3-phase busbar systems are generally unsuitable for the 3RV21 motor starter protectors with sizes S00 and S0 for motor protection with overload relay function.

The busbars are suitable for between two and five motor starter protectors/circuit breakers. However, any kind of extension is possible by clamping the connection tags of an additional busbar (rotated by 180°) underneath the terminals of the respective last motor starter protector/circuit breaker.

A combination of motor starter protectors/circuit breakers of size S00 and S0 is possible. The motor starter protectors/circuit breakers are supplied by appropriate infeed terminals.



SIRIUS 3-phase busbar system size S00/S0



SIRIUS 3-phase busbar system size S2

The 3-phase busbar systems are finger-safe. They are designed for any short-circuit stress which can occur at the output side of connected motor starter protectors/circuit breakers.

The 3-phase busbar systems can also be used to construct "Starters (Type E)" according to UL/CSA and for 3RV27 and 3RV28 circuit breakers according to UL 489. However, special infeed terminals, 3RV2925-5EB for sizes S00/S0 and 3RV2935-5E for size S2, must be used for this purpose, see page 2/200.

Selection and ordering data

3-phase busbars

For feeding several motor starter protectors with screw terminals, mounted side by side on standard mounting rails, insulated, with touch protection

Modular spacing	Number of motor starter protectors that can be connected: Without lateral accessories	With lateral auxiliary switch	Incl. auxiliary release	Rated current I_n at 690 V	For motor starter protectors/circuit breakers	Article No.	Weight
mm				A	Size		kg
45[1][2]	2	--	--	63	S00, S0[3]	**3RV1915-1AB**	0.043
	3	--	--	63	S00, S0[3]	**3RV1915-1BB**	0.069
	4	--	--	63	S00, S0[3]	**3RV1915-1CB**	0.097
	5	--	--	63	S00, S0[3]	**3RV1915-1DB**	0.114
55[1][4]	--	2	--	63	S00, S0[3]	**3RV1915-2AB**	0.051
	--	3	--	63	S00, S0[3]	**3RV1915-2BB**	0.079
	--	4	--	63	S00, S0[3]	**3RV1915-2CB**	0.111
	--	5	--	63	S00, S0[3]	**3RV1915-2DB**	0.140
	2	--	--	108	S2	**3RV1935-1A**	0.120
	3	--	--	108	S2	**3RV1935-1B**	0.197
	4	--	--	108	S2	**3RV1935-1C**	0.290
63[1][5]	--	--	2	63	S00, S0[3]	**3RV1915-3AB**	0.052
	--	--	4	63	S00, S0[3]	**3RV1915-3CB**	0.121
75[5]	--	2	2	108	S2	**3RV1935-3A**	0.166
	--	3	3	108	S2	**3RV1935-3B**	0.263
	--	4	4	108	S2	**3RV1935-3C**	0.369


3RV1915-1AB


3RV1915-1BB


3RV1915-1CB


3RV1915-1DB

1) Not suitable for 3RV21 motor starter protectors of sizes S00 and S0 with overload relay function.
2) For 3RV2 motor starter protectors without accessories mounted on the side.
3) Approved for motor starter protectors size S0 with $I_n \leq 32$ A.
4) For 3RV2 motor starter protectors with auxiliary switches with 1 NO + 1 NC, 2 NO and 2 NC mounted on the left (9 mm wide).
5) For 3RV2 motor starter protectors with mounted accessories (18 mm wide). Auxiliary switches with 2 NO + 2 NC or signaling switch (mounted on the left) or with auxiliary release (mounted on the right).

Connecting pieces for 3-phase busbars

Version	Modular spacing	For motor starter protectors/circuit breakers	Article No.	Weight
	mm	Size		kg
For connecting 3-phase busbars for 3RV2 motor starter protectors of size S00/S0 (left) to the 3RV1011 motor starter protector (right)	45	S00, S0	**3RV1915-5DB**	0.045


3RV1915-5DB

3-phase infeed terminals

Conductor cross-section: Solid or stranded	Finely stranded with end sleeve	AWG cables, solid or stranded	Tightening torque	For motor starter protectors/circuit breakers	Article No.	Weight
mm²	mm²	AWG	Nm	Size		kg
Connection from top						
2.5 ... 25	4 ... 16	10 ... 4	4	S00[2], S0	**3RV1915-5A**	0.042
2.5 ... 25	2.5 ... 16	10 ... 4	3 ... 4	S00, S0	**3RV2925-5AB**	0.044
2 x (2.5 ... 50)[1], 1 x (2.5 ... 70)[1]	2 x (2.5 ... 35)[1], 1 x (2.5 ... 50)[1]	2 x (10 ... 1/0)[1], 1 x (10 ... 2/0)[1]	4 ... 6	S2	**3RV2935-5A**	0.181
Connection from below Terminal is connected in place of a switch, take space requirement into account						
2.5 ... 25	2.5 ... 16	10 ... 4	Input: 4, output: 2 ... 2.5	S00, S0	**3RV2915-5B**	0.109


3RV2925-5AB


3RV2935-5A


3RV2915-5B

1) If two different conductor cross-sections are connected to one clamping point, both cross-sections must be in the range specified.
2) Especially suitable for 3RV1011 motor starter protectors. If the 3RV2 motor starter protector is used, the terminal block extends beyond the device width.

*** You can order this quantity or a multiple thereof.**

	Conductor cross-section			Tightening torque	For motor starter protectors/circuit breakers	Article No.	Weight
	Solid or stranded	Finely stranded with end sleeve	AWG cables, solid or stranded				
	mm²	mm²	AWG	Nm	Size		kg
3-phase infeed terminals for constructing "Starters (Type E)"							
 3RV2925-5EB	**Connection from top**						
	2.5 ... 25	2.5 … 16	10 ... 4	3 ... 4	S00, S0	**3RV2925-5EB**	0.054
 3RV2935-5E	2 x (2.5 ... 50)[1], 1 x (2.5 ... 70)[1]	2 x (2.5 ... 35)[1], 1 x (2.5 ... 50)[1]	2 x (10 ... 1/0)[1], 1 x (10 ... 2/0)[1]	4 ... 6	S2	**3RV2935-5E**	0.193

[1] If two different conductor cross-sections are connected to one clamping point, both cross-sections must be in the range specified.

	Version	For motor starter protectors/circuit breakers	Article No.	Weight
		Size		kg
Covers for connection tags				
 3RV1935-6A cover mounted on 3RV1915-1CB busbar	Touch protection for empty positions	S00, S0	**3RV1915-6AB**	0.003
		S2	**3RV1935-6A**	0.006

*** You can order this quantity or a multiple thereof.**

Selection and ordering data

Accessories

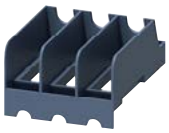
	Version	For motor starter protectors/circuit breakers Size	Article No.	Weight kg
Covers				
 3RV2 (size S3) with 3RT1946-4EA1 (below)	**Terminal covers** For cable lug and busbar connection for maintaining the required voltage clearances and as touch protection if box terminal is removed (2 units can be mounted per motor starter protector/circuit breaker)	S3	**3RT1946-4EA1**	0.037
 3RV2908-0P	**Scale covers** Sealable, for covering the set current scale	3RV20, 3RV21, 3RV24: S00 ... S3	**3RV2908-0P**	0.051
 3RT2936-4EA2	**Covers for devices with screw terminals (box terminals)** Additional touch protection to be fitted at the box terminals (two units required per device)		**Screw terminals**	
	Main current level	S2	**3RT2936-4EA2**	0.014
		S3	**3RT2946-4EA2**	0.019
Terminal covers for box terminals on 3RV2742 and Type E terminal block 3RT2946-4GA07				
 3RV2948-1LA00	Additional touch protection to be fitted at the 3RV2742 box terminals (two units required per device) and at 3RT2946-4GA07 Type E terminal block Main current level	S3	**3RV2948-1LA00**	0.021
Phase barrier for constructing limiter combinations of size S3[1]				
 3RV2948-1K	Infeed to the limiter is always on the side 2T1/4T2/6T3. At the infeed side, phase barrier 3RV2948-1K has to be used. Main current level	S3	**3RV2948-1K**	0.240
Fixing accessories				
 3RV2928-0B	**Push-in lugs** For screw fixing of the motor starter protector/circuit breaker onto mounting plates Two units are required for each motor starter protector.	S00, S0	**3RV2928-0B**	0.200
Tools for opening spring-loaded terminals				
 3RA2908-1A	**Screwdrivers** For all SIRIUS devices with spring-loaded terminals Length approx. 200 mm, 3.0 mm x 0.5 mm, titanium gray/black, partially insulated	S00 ... S3	**Spring-loaded terminals** **3RA2908-1A**	0.050

[1] Transverse auxiliary switches cannot be used.

Version	For motor starter protectors/circuit breakers Size	Article No.	Weight kg
Terminal blocks and phase barriers for "Self-Protected Combination Motor Controllers (Type E)" according to UL 508/UL 60947-4-1			

3RV2928-1H

3RT2946-4GA07



3RV2928-1K

3RV2938-1K

Note:

UL 508/UL 60947-4-1 approval demands 1-inch clearances and 2-inch creepage distances for "Self-Protected Combination Motor Controllers (Type E)". The following terminal blocks or phase barriers must be used for the 3RV20 motor starter protectors with screw terminals. This also applies to construction with the 8US busbar adapter. 3RV20 motor starter protectors with spring-loaded terminals must be assembled with the 3RV29 infeed system for approval as "Self-Protected Combination Motor Controllers (Type E)" according to UL 508/UL 60947-4-1. The 3RV1011 motor starter protectors do not have UL approval as "Starters (Type E)".

The terminal block or phase barriers cannot be used in combination with the 3RV19.5 3-phase busbars.

For construction with 3-phase busbars, see "Busbar accessories", page 2/198 onwards.

Terminal blocks Type E For increased clearances and creepage distances (1 and 2 inch)	S00[1], S0	**3RV2928-1H**	0.084
	S3[2]	**3RT2946-4GA07**	0.150
Phase barriers For increased clearances and creepage distances (1 and 2 inch)	S00[1], S0	**3RV2928-1K**	0.025
	S2	**3RV2938-1K**	0.028
Auxiliary terminals, 3-pole			
For connection of auxiliary and control cables to the main conductor connections (for one side)	S3	**3RT2946-4F**	0.032

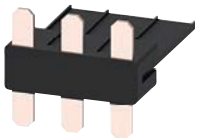
3RT2946-4F

1) Not for 3RV1011 motor starter protectors.

2) Cannot be used on 3RV2.4. motor starter protectors in combination with transverse auxiliary switches.

* You can order this quantity or a multiple thereof.

Link modules

	For 3RV2 motor starter protectors/circuit breakers	For 3RT2 contactors	Actuating voltage of contactor	Article No.	Weight
	Size	Size			kg
Link modules for motor starter protector to contactor[1]					
 3RA2921-1AA00	For connection between motor starter protector and contactor with screw terminals			**Screw terminals**	
	Single-unit packaging				
	S00/S0	S00	AC, DC	**3RA1921-1DA00**	0.030
	S00/S0	S0	AC	**3RA2921-1AA00**	0.046
	S00/S0	S0	DC, AC/DC	**3RA2921-1BA00**	0.055
	S2	S2	AC, DC, AC/DC	**3RA2931-1AA00**	0.104
	S3	S3	AC, DC, AC/DC	**3RA1941-1AA00**	0.090
 3RA2931-1AA00	**Multi-unit packaging**				
	S00/S0	S00	AC, DC	**3RA1921-1D**	0.020
	S00/S0	S0	AC	**3RA2921-1A**	0.045
	S00/S0	S0	DC, AC/DC	**3RA2921-1B**	0.053
	S2	S2	AC, DC, AC/DC	**3RA2931-1A**	0.071
	S3	S3	AC, DC, AC/DC	**3RA1941-1A**	0.073
 3RA1941-1AA00					
 3RA2911-2AA00	For connection between motor starter protector and contactor with spring-loaded terminals			**Spring-loaded terminals**	
	Single-unit packaging				
	S00	S00	AC, DC	**3RA2911-2AA00**	0.058
	S0	S0	AC[2], DC, AC/DC	**3RA2921-2AA00**	0.100
	Multi-unit packaging				
	S00	S00	AC, DC	**3RA2911-2A**	0.055
	S0	S0	AC[2], DC, AC/DC	**3RA2921-2A**	0.091
 3RA2911-1CA00	**Spacers[2]** For height compensation on AC contactors size S0 with spring-loaded terminals				
	S0	S0	Single-unit packaging	**3RA2911-1CA00**	0.015
	S0	S0	Multi-unit packaging	**3RA2911-1C**	0.015

[1] The link modules for motor starter protector to contactor cannot be used for 3RV1011, 3RV2.21-4PA1., 3RV2.21-4FA1., 3RV2.31-4K.1., 3RV2.31-4R.1., 3RV2.32-4K.1., 3RV2.32-4R.1., 3RV27 and 3RV28 motor starter protectors/circuit breakers.

[2] A spacer for height compensation on AC contactors size S0 is optionally available.

Note:

Link modules can be used in

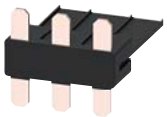
- Size S00: up to max. 16 A
- Size S0: up to max. 32 A
- Size S2: up to max. 65 A

*** You can order this quantity or a multiple thereof.**

For 3RV2 motor starter protectors/ circuit breakers Size	For 3RW30, 3RW40 soft starters; 3RF34 solid-state contactors Size	Article No.	Weight kg
Link modules for motor starter protector to soft starter[1] and motor starter protector to solid-state contactor[1]			
Connection between motor starter protector and soft starter/solid-state contactor with screw terminals		**Screw terminals**	
Single-unit packaging			
S00/S0	S00/S0	**3RA2921-1BA00**	0.055
S2[2]	S2[2]	**3RA2931-1AA00**	0.104
S3[3]	S3[3]	**3RA1941-1AA00**	0.090
Multi-unit packaging			
S00/S0	S00/S0	**3RA2921-1B**	0.053
S2[2]	S2[2]	**3RA2931-1A**	0.071
S3[3]	S3[3]	**3RA1941-1A**	0.073
Connection between motor starter protector and soft starter with spring-loaded terminals		**Spring-loaded terminals**	
Single-unit packaging			
S00	S00	**3RA2911-2GA00**	0.055
S0	S0	**3RA2921-2GA00**	0.090


3RA2921-1BA00


3RA2931-1AA00


3RA1941-1A


3RA2911-2GA00

1) The link modules from motor starter protector to soft starter and motor starter protector to solid-state contactor cannot be used for the 3RV1011, 3RV2.21-4PA1., 3RV2.21-4FA1., 3RV2.31-4K.1., 3RV2.31-4R.1., 3RV2.32-4K.1., 3RV2.32-4R.1., 3RV27 and 3RV28 motor starter protectors/circuit breakers.

2) To assemble the feeder between a motor starter protector and a soft starter in size S2, the 3RA2932-1CA00 standard mounting rail adapter must be used.

3) It is only permissible to assemble the feeder between the motor starter protector and the soft starter in size S3 on a mounting plate.

Note:

Link modules can be used in

- Size S00: up to max. 16 A
- Size S0: up to max. 32 A
- Size S2: up to max. 65 A

* You can order this quantity or a multiple thereof.

	For 3RV2 motor starter protectors/circuit breakers	For 3RT2 contactors	Actuating voltage of contactor	Article No.	Weight
	Size	Size			kg
Hybrid link modules for motor starter protector to contactor[1)]					
 3RA2911-2FA00	Mechanical and electrical connection between motor starter protector with screw terminals and contactor with spring-loaded terminals				
	Single-unit packaging				
	S00	S00	AC, DC	**3RA2911-2FA00**	0.047
	S0	S0	AC[2)], DC, AC/DC	**3RA2921-2FA00**	0.074
	Multi-unit packaging				
	S00	S00	AC, DC	**3RA2911-2F**	0.042
	S0	S0	AC[2)], DC, AC/DC	**3RA2921-2F**	0.072
 3RA2921-2FA00					
 3RA2911-1CA00	**Spacers[2)]** For height compensation on AC contactors size S0 with spring-loaded terminals				
	S0	S0	Single-unit packaging	**3RA2911-1CA00**	0.015
	S0	S0	Multi-unit packaging	**3RA2911-1C**	0.015

1) The hybrid link modules for motor starter protector to contactor cannot be used for 3RV1011, 3RV2.21-4PA1., 3RV2.21-4FA1., 3RV27 and 3RV28 motor starter protectors/circuit breakers. They are suitable only for constructing direct-on-line starters.

2) A spacer for height compensation on AC contactors size S0 is optionally available.

Note:

Link modules can be used in

- Size S00: up to max. 16 A
- Size S0: up to max. 32 A

For motor starter protectors/ circuit breakers	Version	**Screw terminals** ⊕	Weight
Type		Article No.	kg
Connection module (adapter and plug) for motor starter protectors/circuit breakers with screw terminals			
	The connection module comprises an adapter and a motor feeder connector.		
 3RT1926-4RD01	**Adapter** Ambient temperature $T_{u\,max.}$ = 60 °C		
3RV2.2	Size S0, rated operational current I_e at AC-3/400 V: 25 A	**3RT1926-4RD01**	0.035
 3RT1900-4RE01	3RV2.2 **Motor feeder connector** Size S0	**3RT1900-4RE01**	0.042

3RV29 infeed system

Overview

The 3RV29 infeed system is a convenient means of energy supply and distribution for a group of several motor starter protectors or complete load feeders with screw or spring-loaded terminals in sizes S00 and S0. Motor starter protectors or load feeders with a rated current of maximum 32 A each can be used. 3RV21 motor starter protectors/circuit breakers cannot be used in this system.

The system is based on a basic module complete with a lateral incoming unit (3-phase busbar with infeed). This infeed with spring-loaded terminals is mounted on the right or left, depending on the version, and can be supplied with a maximum conductor cross-section of 25 mm^2 (with end sleeve). A basic module has two sockets onto each of which a motor starter protector can be snapped.

Expansion modules (3-phase busbars for system expansion) are available for extending the system. The individual modules are connected through an expansion plug.

The electrical connection between the 3-phase busbars and the motor starter protectors is implemented through plug-in connectors. The complete system can be mounted on a TH 35 standard mounting rail according to IEC 60715, and can be expanded as required up to a maximum current carrying capacity of 63 A.

The system is mounted extremely quickly and easily thanks to the simple plug-in terminals. Thanks to the lateral infeed, the system also saves space in the control cabinet.

The additional height required for the infeed unit is only 30 mm. The alternative infeed possibilities on each side offer a high degree of flexibility for configuring the control cabinet: Infeed on left-hand or right-hand side as well as infeed on one side and outfeed on the other side to supply further loads are all possible. A terminal block with spring-loaded terminals in combination with a standard mounting rail enables the integration of not only SIRIUS motor starter protectors but also 1-phase, 2-phase and 3-phase components such as 5SY miniature circuit breakers or SIRIUS relay components.

The 3RV29 infeed system is approved in accordance with IEC up to 500 V. It is also UL-approved and authorized for "Self-Protected Combination Motor Controllers" (Starters (Type E)), for Starters (Type F) (Starters (Type E) + contactors) and for circuit breakers according to UL 489 (3RV27/3RV28).

Assembly kits for constructing the infeed system with spring-loaded terminals

The following versions can be ordered:

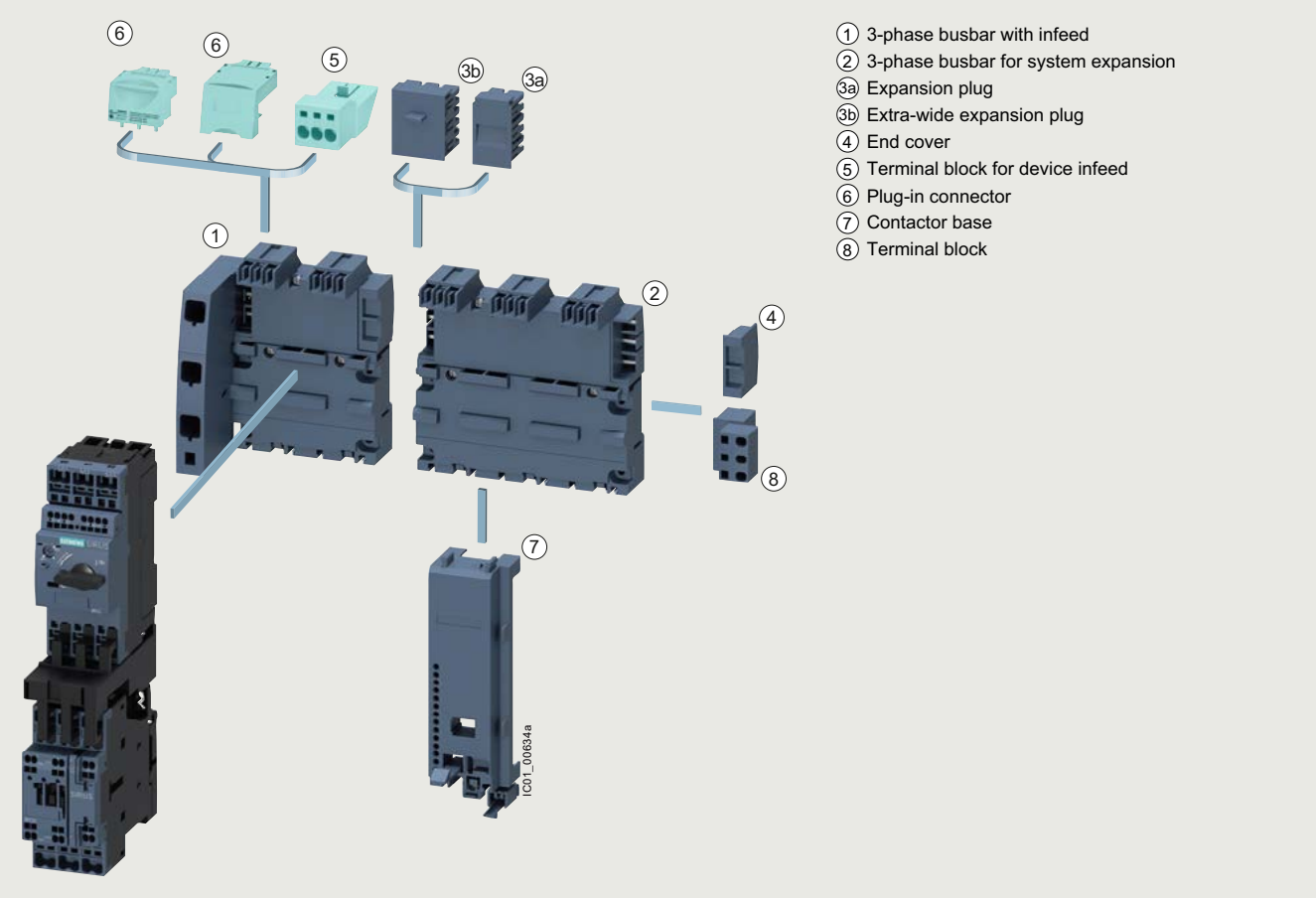
- Basic set for 2 feeders
- Expansion sets for 2 or 3 feeders

The assembly kits contain 3-phase busbars, plug-in connectors and contactor bases (see page 2/211).

Note:

Each set contains plug-in connectors for sizes S00 and S0.

Example: The basic set contains four plug-in connectors (two each for S00 and S0).



SIRIUS 3RV29 infeed system

① ***3-phase busbars with infeed***

A 3-phase busbar with infeed unit is required for connecting the incoming supply. These modules comprise one infeed module and two sockets which each accept one motor starter protector. A choice of two versions with infeed on the left or right is available. The infeed is connected to spring-loaded terminals. They permit an infeed with conductor cross-sections of up to 25 mm^2 with end sleeve. An end cover is supplied with each module.

② ***3-phase busbars for system expansion***

The 3-phase busbars for system expansion support expansion of the system. There is a choice of modules with two or three sockets. The system can be expanded as required up to a maximum current carrying capacity of 63 A. An expansion plug is supplied with each module.

③a ***Expansion plug***

The expansion plug is used for electrical connection of adjacent 3-phase busbars. The current carrying capacity of this plug equals 63 A. One expansion plug is supplied with each 3-phase busbar for system expansion. Additional expansion plugs are therefore only required as spare parts.

③b ***Extra-wide expansion plug***

The wide expansion plug makes the electrical connection between two 3-phase busbars, thus performing the same function as the 3RV2917-5BA00 expansion plug; the electrical characteristics (e.g. a current carrying capacity of 63 A) are identical.

The 3RV2917-5E expansion plug is 10 mm wider than the 3RV2917-5BA00 expansion plug, hence in the plugged state there is a distance of 10 mm between the connected 3-phase busbars. This distance can be used to lay the auxiliary current and control current wiring ("wiring duct"). The motor starter protector and contactor can be wired from underneath, which means that the complete cable duct above the system can be omitted.

④ ***End cover***

The end cover is used to cover the 3-phase busbar at the open end of the system. This cover is therefore only required once for each system. An end cover is supplied with each 3-phase busbar system with infeed. Further end covers are therefore only required as spare parts.

⑤ ***Terminal block for device infeed***

A new addition to the system is a plug for outfeeding to a device slot within a module. This offers the option not only of connecting 3-phase loads to the system, but also of integrating 1-phase loads into the infeed system.

⑥ ***Plug-in connector***

The plug-in connector is used for the electrical connection between the 3-phase busbar and the 3RV2 or 3RV1011 motor starter protector. These plug-in connectors are available for screw or spring-loaded terminals.

⑦ ***Contactor base***

Load feeders can be assembled in the system using the S00 and S0 contactor base. The contactor bases are suitable for contactors of sizes S00 and S0 with screw and spring-loaded terminals and are simply snapped onto the 3-phase busbars. Direct-on-line starters and reversing starters are possible. One contactor base is required for direct-on-line starters and two are required for reversing starters.

To assemble load feeders for reversing starters, the contactor bases can be arranged alongside each other (90 mm overall width). In this case the mechanical interlocking of the contactors is possible. The S0 contactor bases are also suitable for soft starters size S00 and S0 with screw terminals.

The infeed system is designed for mounting on a TH 35 standard mounting rail with 7.5 mm overall depth. This standard mounting rail gives the contactor base a stable mounting surface to sit on. If standard mounting rails with a depth of 15 mm are used, the spacer connected to the bottom of the contactor base must be knocked out and plugged into the standard mounting rail mating piece, which is also located on the underside. Then the contactor base also has a stable mounting surface. When standard mounting rails with a depth of 7.5 mm are used, the spacer has no function and can be removed.

The link modules are used for direct on-line starters, in which case the use of a contactor base is not absolutely necessary. Motor starter protector and contactor assemblies can then be directly snapped onto the sockets of the 3-phase busbars. For feeders of sizes S00 and S0, the corresponding 3RA1921-1...., 3RA2911-2...., 3RA2921-1.... or 3RA2921-2.... link modules should generally be used.

⑧ ***Terminal block***

The 3RV2917-5D terminal block enables the integration of not only SIRIUS motor starter protectors but also 1-phase, 2-phase and 3-phase components. The three phases can be fed out of the system using the terminal block; which means that single-phase loads can also be integrated in the system. The terminal block is plugged into the slot of the expansion plug and thus enables outfeeding from the middle or end of the infeed system. The terminal block can be rotated through 180° and be locked to the support modules of the infeed system. In addition, the 45 mm wide TH 35 3RV1917-7B standard mounting rail option for screwing onto the support plate facilitates plugging the 1-phase, 2-phase and 3-phase components onto the infeed system.

Video:
SIRIUS News SIRIUS 3RV29 infeed system – User-friendly energy supply and distribution

3RV29 infeed system

Technical specifications

More information

Equipment Manual, see
https://support.industry.siemens.com/cs/ww/en/view/60279172

General data

Type				**3RV29.7**
Size				S00, S0
Standards				
• IEC 60947-2				Yes
• IEC 60947-4-1				Yes
• UL 508/UL 60947-4-1				Yes
Rated current I_n			A	63
Permissible rated current at inside temperature of control cabinet				
Motor starter protectors	Size	Rated current	Inside temperature of control cabinet	
• 3RV2.11/3RV1011	S00	... 14 A	60 °C	% 100
		> 14 ... 16 A	40 °C	% 100
			60 °C	% 87
• 3RV2.21	S0	... 16 A	60 °C	% 100
		> 16 ... 25 A	40 °C	% 100
			60 °C	% 87
		> 25 ... 32 A	40 °C	% 87
Permissible ambient temperature				
• Storage/transport			°C	-50 ... +80
• Operation			°C	-20 ... +60
Rated operational voltage U_e				
• Acc. to IEC		10% overvoltage	V AC	500
		5% overvoltage	V AC	525
• Acc. to UL/CSA			V AC	600
Rated frequency			Hz	50/60
Rated impulse withstand voltage U_{imp}			kV	6
Short-circuit strength				corresponds to the mounted motor starter protector or load feeder. The assembly instructions must be followed, see Operating Instructions
Degree of protection IP on the front according to IEC 60529				IP20 with cover and 25 mm² conductor cross-section at the infeed terminal
Touch protection on the front according to IEC 60529				Finger-safe for vertical touching from the front with cover and 25 mm² conductor cross-section at the infeed terminal

Conductor cross-sections

Type		**3-phase busbar with infeed 3RV2917-1A, 3RV2917-1E**	**Terminal block 3RV2917-5D**	**Terminal block for device infeed 3RV2917-5FA00**
Conductor cross-sections (min./max.)				
• Solid or stranded	mm²	4 ... 25	1.5 ... 6	1 ... 10
• Finely stranded with end sleeve	mm²	4 ... 25	1.5 ... 4	1 ... 6
• Finely stranded without end sleeve	mm²	6 ... 25	1.5 ... 6	--
• AWG cables	AWG	10 ... 3	15 ... 10	18 ... 8

Selection and ordering data

Type	Version	For 3RV20, 3RV23, 3RV24, 3RV27, 3RV28, 3RV1011 motor starter protectors Size	Article No.	Weight kg
3-phase busbars with infeed				
 3RV2917-1A	**3-phase busbars with infeed** Incl. 3RV2917-6A end cover	For 2 motor starter protectors with screw or spring-loaded terminals		
		• With infeed on the left	S00, S0	**3RV2917-1A**	0.417
		• With infeed on the right	S00, S0	**3RV2917-1E**	0.435
3-phase busbars for system expansion				
 3RV2917-4A	**3-phase busbars** Incl. 3RV2917-5BA00 expansion plug	For motor starter protectors with screw or spring-loaded terminals		
		• For 2 motor starter protectors	S00, S0	**3RV2917-4A**	0.245
		• For 3 motor starter protectors	S00, S0	**3RV2917-4B**	0.435
Plug-in connectors				
 3RV2917-5AA00	**Plug-in connectors** To make contact with the 3RV2 motor starter protectors	• For spring-loaded terminals		**Spring-loaded terminals**
		- Single-unit packaging	S00[1] S0[2]	**3RV2917-5AA00** **3RV2927-5AA00**	0.059 0.071
		- Multi-unit packaging	S00[1] S0[2]	**3RV2917-5A** **3RV2927-5A**	0.054 0.065
 3RV2917-5CA00		• For screw terminals		**Screw terminals**
		- Single-unit packaging	S00[1)3)] S0[2)4)]	**3RV2917-5CA00** **3RV1927-5AA00**	0.044 0.045
		- Multi-unit packaging	S00[1)3)] S0[2)4)]	**3RV2917-5C** **3RV1927-5A**	0.038 0.039
	Plug-in connectors To make contact with the 3RV1011 motor starter protectors	• For screw terminals			
		- Single-unit packaging	S00	**3RV1917-5CA00**	0.038
		- Multi-unit packaging	S00	**3RV1917-5C**	0.034

1) I > 14 A, please note derating.
2) I > 16 A, please note derating.
3) The plug-in connector cannot be used for the 3RV2711 and 3RV2811 motor starter protectors with size S00.
4) The plug-in connector can be used for the 3RV2711, 3RV2811 (size S00) and 3RV2721, 3RV2821 (size S0) motor starter protectors.

Type	Version	For contactors Size	Article No.	Weight kg
Contactor bases				
 3RV2927-7AA00	**Contactor bases** For mounting direct-on-line or reversing starters	Single-unit packaging	S00[1]	**3RV2917-7AA00**	0.069
			S00[1], S0	**3RV2927-7AA00**	0.075

1) Not for 3RV1011 motor starter protectors.

3RV29 infeed system

	Type	Version	Article No.	Weight kg
Terminal blocks				
 3RV2917-5D	**Terminal blocks** For integration of 1-phase, 2-phase and 3-phase components	Single-unit packaging	**3RV2917-5D**	0.061
TH 35 standard mounting rails, width 45 mm				
 3RV1917-7B	**TH 35 standard mounting rails** Acc. to IEC 60715, width 45 mm For mounting on 3-phase busbars	Single-unit packaging	**3RV1917-7B**	0.016
Extra-wide expansion plugs				
 3RV2917-5E	**Extra-wide expansion plugs** As accessory	Single-unit packaging	**3RV2917-5E**	0.044
Expansion plugs				
 3RV2917-5BA00	**Expansion plugs**[1] As spare part	Single-unit packaging	**3RV2917-5BA00**	0.035
End covers				
 3RV2917-6A	**End covers**[2] As spare part	Multi-unit packaging	**3RV2917-6A**	0.700
Terminal blocks for device infeed				
 3RV2917-5FA00	**Terminal blocks for device infeed**	Single-unit packaging	**3RV2917-5FA00**	0.038

[1] The expansion plug is included in the scope of supply of the 3RV2917-4. 3-phase busbars for system expansion.

[2] The end cover is included in the scope of supply of the 3RV2917-1. 3-phase busbars with infeed system.

*** You can order this quantity or a multiple thereof.**

Version	For motor starter protectors/circuit breakers with spring-loaded terminals	Spring-loaded terminals	Weight
	Size	Article No.	kg
Assembly kits for constructing the infeed system with spring-loaded terminals[1)]			
Basic set for 2 feeders		**3RV2907-1AB00**	1.070
contains:			
• 1 x 3-phase busbars 3RV2917-1A (incl. end cover 3RV2917-6A), with infeed left, for 2 motor starter protectors with spring-loaded terminals	S00, S0		
• 2 x plug-in connectors for spring-loaded terminals 3RV2917-5AA00	S00		
• 2 x plug-in connectors for spring-loaded terminals 3RV2927-5AA00	S0		
• 2 x 3RV2927-7AA00 contactor bases	S00, S0		
Expansion set for 2 feeders		**3RV2907-4AB00**	0.820
contains:			
• 1 x 3-phase busbars 3RV2917-4A (incl. expansion plug 3RV2917-5BA00), for 2 motor starter protectors with spring-loaded terminals	S00, S0		
• 2 x plug-in connectors for spring-loaded terminals 3RV2917-5AA00	S00		
• 2 x plug-in connectors for spring-loaded terminals 3RV2927-5AA00	S0		
• 2 x 3RV2927-7AA00 contactor bases	S00, S0		
Expansion set for 3 feeders		**3RV2907-4BB00**	1.130
contains:			
• 1 x 3-phase busbars 3RV2917-4B (incl. expansion plug 3RV2917-5BA00), for 3 motor starter protectors with spring-loaded terminals	S00, S0		
• 3 x plug-in connectors for spring-loaded terminals 3RV2917-5AA00	S00		
• 3 x plug-in connectors for spring-loaded terminals 3RV2927-5AA00	S0		
• 3 x 3RV2927-7AA00 contactor bases	S00, S0		

1) Not for 3RV1011 motor starter protectors.

Overview

Type	3RP25	3RP20
Timing relays		
Enclosures:		
• 17.5 mm industry and household equipment installation	✓	--
• 22.5 mm industry	✓	--
• 45 mm industry	--	✓
Monofunction	✓	✓
Multifunction	✓	✓
Combination voltage	✓	✓
Wide voltage range	✓	✓
Application:		
• Control systems and mechanical engineering	✓	✓
• Infrastructure	--	--
Page	2/215	2/227

✓ Corresponds to or available

-- Does not correspond to or not available

Type	3UG546	3UG451., 3UG461.	3UG463.	3RR21, 3RR22, 3UG4621, 3UG4622	3UG4641	3UG4625 with 3UL23	3UG458.	3UG4501	3UG4651	Page
Monitoring relays										
DC load monitoring	✓	--	--	--	--	--	--	--	--	2/248
Line monitoring	--	✓	--	--	--	--	--	--	--	2/255
Voltage monitoring	--	--	✓	--	--	--	--	--	--	2/260
Current monitoring	--	--	--	✓	--	--	--	--	--	2/233, 2/263
Active current monitoring	--	--	--	3RR22 ✓	✓	--	--	--	--	2/233, 2/265
Power factor monitoring	--	--	--	--	✓	--	--	--	--	2/265
Residual-current monitoring	--	--	--	--	--	✓	--	--	--	2/268
Insulation monitoring	--	--	--	--	--	--	✓	--	--	2/271
Level monitoring	--	--	--	--	--	--	--	✓	--	2/275
Speed monitoring	--	--	--	--	--	--	--	--	✓	2/278

✓ Available

-- Not available







Type	3UG481.	3UG4832	3RR24	3UG4822	3UG4841	3UG4825 with 3UL23	3UG4851	Page
Monitoring relays for IO-Link								
Line monitoring	✓	--	--	--	--	--	--	2/285
Voltage monitoring	--	✓	--	--	--	--	--	2/288
Current monitoring	--	--	✓	✓	--	--	--	2/241, 2/291
Power factor and active current monitoring	--	--	✓	--	✓	--	--	2/241, 2/294
Residual-current monitoring	--	--	--	--	--	✓	--	2/298
Speed monitoring	--	--	--	--	--	--	✓	2/301

✓ Available
-- Not available


Type	3RS2	3RS70	Page
Temperature monitoring relays			
Temperature monitoring	✓	--	2/305
Temperature monitoring relays for IO-Link			
Temperature monitoring for IO-Link	✓	--	2/305

✓ Available
-- Not available

Connection methods

The monitoring and control devices are available with screw or spring-loaded terminals.

SIRIUS 3RP25 timing relays, 3UG458 insulation monitoring relays, SIRIUS 3RS2 temperature monitoring relays, SIRIUS 3RN2 thermistor motor protection and SIRIUS 3RS70 signal converters are available with screw terminals or spring-loaded terminals (push-in).

	Screw terminals
	Spring-loaded terminals, spring-loaded terminals (push-in)
	The terminals are indicated in the corresponding tables by the symbols shown on orange backgrounds.

"Increased safety" type of protection EEx e/d according to ATEX directive 2014/34/EU

The communication-capable, modularly designed SIMOCODE pro motor management system (SIRIUS Motor Management and Control Devices) protects motors of types of protection EEx e and EEx d in hazardous areas.

The SIRIUS 3RN2 thermistor motor protection relay protects motors with types of protection EEx e and EEx d in hazardous areas.

ATEX approval for operation in hazardous areas

The SIRIUS SIMOCODE pro 3UF7 motor management system is certified for the protection of motors in hazardous areas according to

- ATEX Ex I (M2); equipment group I, category M2 (mining)
- ATEX Ex II (2) GD; equipment group II, category 2 in area GD

The SIRIUS 3RN2011, 3RN2012-...30, 3RN2013 and 3RN2023 thermistor motor protection relays for PTC sensors are certified according to ATEX Ex II (2) G and D for environments with explosive gas or dust loads.

General data

Overview

7PV15, SIRIUS 3RP25 and SIRIUS 3RP20 timing relays

More information

Homepage, see www.siemens.com/sirius-timing-relays
Industry Mall, see www.siemens.com/product?3RP

Electronic timing relays are used in control, starting, and protective circuits for all switching operations involving time delays.

Their fully developed concept and space-saving, compact design make the SIRIUS 3RP timing relays ideal timer modules for control cabinet, switchgear and control manufacturers in the industry.

With their narrow design, the 7PV15 timing relays are ideal in particular for use in heating, ventilation and air-conditioning systems and in compressors. All 7PV15 timing relays in this enclosure version are suitable for snap-on mounting on TH 35 standard mounting rails according to IEC 60175. The enclosure complies with DIN 43880.

The SIRIUS 3RA28 function modules enable the assembly of starters and contactor assemblies for direct-on-line and wye-delta starting. They include the key control functions required for the particular feeder, e.g. timing and electrical interlocking. The function modules that function as timing relays are mounted quickly and simply on SIRIUS contactors – without any great wiring effort.

The SIRIUS 3RA28 solid-state time-delay auxiliary switches which can be mounted on contactors are designed for contactor coil voltages in the range from 24 to 240 V AC/DC (wide voltage range). Auxiliary switches for control and alarm signals are used specially for switching the smallest signals for electronics applications. They are used, for example, for allowing a pump or fan to run on, or for the delayed activation of a gate drive.

Simply by being plugged in place, the SIRIUS 3RT19 timing relays enable different functionalities required for the assembly of starters to be realized in the feeder. At the same time the timing relays for mounting on contactors reduce the wiring work required within the feeder and save space in the control cabinet.

Device series

SIRIUS timing relays for standard rail mounting

- SIRIUS 3RP25 timing relays, 17.5 mm and 22.5 mm, see page 2/215
- SIRIUS 3RP20 timing relays, 45 mm, see page 2/227
- 7PV15 timing relays, 17.5 mm

SIRIUS timing relays for mounting on contactors

- SIRIUS 3RA28 solid-state time-delay auxiliary switches for mounting on 3RT2 contactors and 3RH2 contactor relays,
- SIRIUS 3RA28 function modules for mounting on 3RT2 contactors and 3RH2 contactor relays
- SIRIUS 3RT19 timing relays for mounting on 3RT1 contactors

Benefits

- The right design for every application
- Clear-cut basic range with five basic units in the case of the 7PV15 timing relays, and up to seven basic units in the case of the 3RP timing relays
- Considerable logistical advantages thanks to versions with wide voltage and wide time setting range
- No tools required for assembly or disassembly on standard mounting rails
- Cadmium-free relay contacts
- Recyclable, halogen-free enclosure
- Optimum price/performance ratio
- Versions with logical separation
- Low variance: One design for distribution boards and for control cabinets
- Compliance with EMC requirements for buildings
- Environmentally friendly laser inscription instead of printing containing solvents
- Versions as snap-on modules for reducing wiring and saving space in the control cabinet
- Versions with coated printed circuit board
- Versions with screw terminals or alternatively with spring-loaded terminals

Application

Timing relays with ON-delay

- Interference pulse suppression (gating of interference pulses)
- Gradual startup of motors so as not to overload the power supply

Timing relays with OFF-delay

- Generation of overtravel functions following removal of voltage
- Gradual, delayed shutdown, e.g. of motors or fans, to allow a plant to be shut down selectively

Clock-pulse relay

- Flashing, asymmetrical

Wye-delta timing relays

- Switching over motors from wye to delta with a dead interval of 50 ms to prevent phase-to-phase short circuits

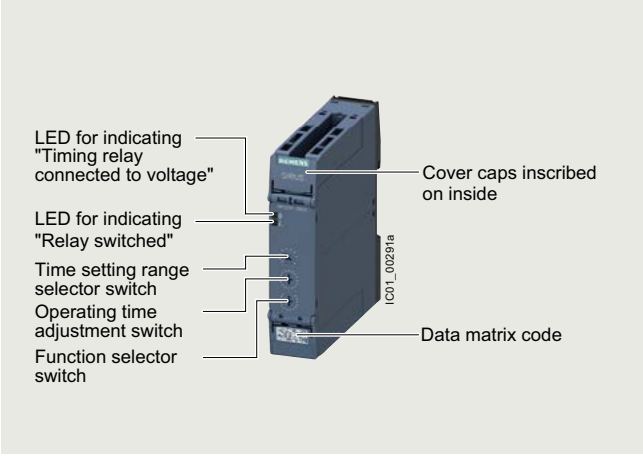
Multifunctional timing relays

- Maximum flexibility, with a device for every application
- Available with relay and semiconductor output
- Versions for railway applications for more exacting requirements (e.g. temperature range, vibration/shock resistance and EMC)

Watchdog function

- Monitoring of cyclic events

Overview



SIRIUS 3RP25 timing relay

More information

Homepage, see www.siemens.com/sirius-timing-relays
Industry Mall, see www.siemens.com/product?3RP25
Conversion tool, see www.siemens.com/conversion-tool
Simulator, see https://support.industry.siemens.com/cs/ww/en/view/103556391

Video: What are the benefits of SIRIUS 3RP25 timing relay?

Electronic timing relays for general use in control systems and mechanical engineering with:

- 1 or 2 CO, 1 NO (semiconductor) or 3 NO
- Monofunction or multifunction
- Combination voltage or wide voltage range
- Single or selectable time setting ranges
- Switch position indication and voltage indication by LED
- Versions with coated printed circuit board

Article No. scheme

Product versions		Article number															
Timing relays		**3RP25**	□	□	–	□	□	□	□	**0**	–	□	□	□	□	
Product function/ time setting ranges	Multifunction		**0**	**5**												7 time ranges 0.05 s ... 100 h
	ON-delay		**1**	**1**												1 time range 0.5 ... 10 s
			1	**2**												1 time range 1 ... 3 s
			1	**3**												1 time range 5 ... 100 s
			2	**5**												7 time ranges 0.05 s ... 100 h
			2	**7**												4 time ranges 0.05 s ... 240 s
	OFF-delay with control signal		**3**	**5**												7 time ranges 0.05 s ... 100 h
	OFF-delay without control signal, non-volatile, passing make contact		**4**	**0**												7 time ranges 0.05 s ... 600 s
	Clock-pulse relay, flashing, asymmetrical		**5**	**5**												7 time ranges 0.05 s ... 100 h
	Wye-delta function with coasting function (idling)		**6**	**0**												Wye-delta 1 ... 20 s, coasting time (idling) 600 s
	Wye-delta function		**7**	**4**												1 time range 1 ... 20 s
			7	**6**												1 time range 3 ... 60 s
Connection type	Screw terminals					**1**										
	Spring-loaded terminals (push-in)					**2**										
Contacts	1 CO						**A**									
	2 CO						**B**									
	Semiconductors (transistor NPN)						**C**									
	Semiconductors (thyristor), two-wire						**E**									
	1 NO + 1 NO (SD)						**N**									
	2 CO force-guided						**R**									
	3 NO						**S**									
Control supply voltage	24 V AC/DC							**B**	**3**							
	200 … 240 V/380 … 440 V AC							**M**	**2**							
	400 ... 440 V AC							**T**	**2**							
	12 ... 240 V AC/DC or 24 ... 240 V AC/DC (3RP2505-.RW30)							**W**	**3**							
Special versions	With coated printed circuit board											**0**	**A**	**X**	**0**	
Example		**3RP25**	**0**	**5**	**–**	**1**	**A**	**B**	**3**	**0**						

Note:

The Article No. scheme shows an overview of product versions for better understanding of the logic behind the article numbers.

For your orders, please use the article numbers quoted in the selection and ordering data.

SIRIUS 3RP25 timing relays, 17.5 mm and 22.5 mm

3RP2505 multifunctional timing relays

Two setting options for implementing the multifunctions (A-M):

(1) Determination of 13 functions by the setting A to M, with 1 CO, 1 NO, 2 CO that switch in parallel.

(2) Extended function variance by selecting the time range and determining, whether 2 CO switch in parallel or whether 1 CO switches with delay + 1 CO switches immediately (1 CO + 1 CO)

Setting the functions on the device

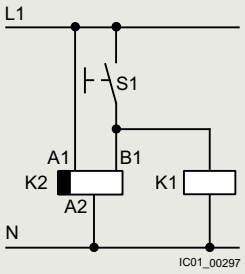
The functions of the 3RP2505 multifunctional timing relays can be set by means of the function selector switch. Whether both CO contacts are switched in parallel or one CO contact with a delay and one instantaneously and the choice of time setting range are set by means of the time setting range selector switch. The exact operating time can be adjusted with the operating time switch.

With a set of foil labels the timing relay can be legibly marked with the functions which can be selected on the timing relay. This is supplied together with the multifunctional timing relay.

The same potential must be applied to terminals A. and B.

Note:

The activation of loads parallel to the start input is permissible when using AC/DC control voltage.

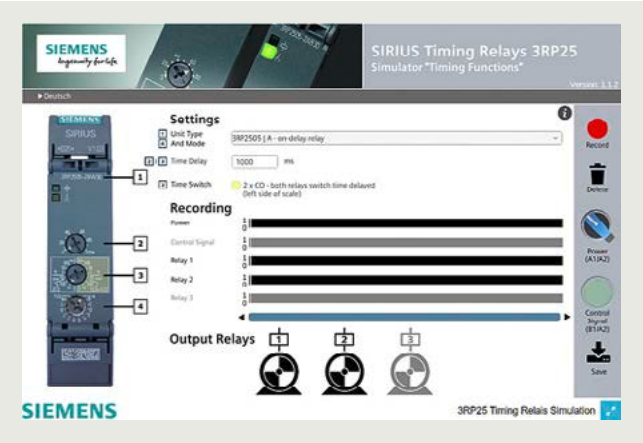


Diagram

Overview of functions

Identification letter	**13 functions** 1 CO contact (1 CO), 1 NO contact (1 NO) semiconductor, 2 CO contacts switched in parallel (2 CO) or 2 CO contacts force-guided and switched in parallel with delay (2 CO)	**27 functions** 13 functions (A - M) 2 CO contacts switched in parallel (2 CO) + 13 functions (A - M) 1 delayed CO contact + 1 instantaneous CO contact (1 CO + 1 CO) and wye-delta function
A	ON-delay	ON-delay and instantaneous contact
B	OFF-delay with control signal	OFF-delay with control signal and instantaneous contact
C	ON-delay/OFF-delay with control signal	ON-delay/OFF-delay with control signal and instantaneous contact
D	Flashing, symmetrical, starting with interval	Flashing, symmetrical, starting with interval and instantaneous contact
E	Passing make contact, interval relay	Passing make contact, interval relay and instantaneous contact
F	Retriggerable interval relay with deactivated control signal (passing break contact with control signal)	Retriggerable interval relay with deactivated control signal (passing break contact with control signal) and instantaneous contact
G	Passing make contact, with control signal, not retriggerable (pulse-forming with control signal)	Passing make contact, with control signal, not retriggerable, (pulse-forming with control signal) and instantaneous contact
H	Additive ON-delay, instantaneous OFF with control signal	Additive ON-delay, instantaneous OFF with control signal and instantaneous contact
I	Additive ON-delay with control signal	Additive ON-delay with control signal and instantaneous contact
J	Flashing, symmetrical, starting with pulse	Flashing, symmetrical, starting with pulse and instantaneous contact
K	Pulse-delayed (fixed pulse (at 1 s) and settable pulse delay)	Pulse-delayed (fixed pulse (at 1 s) and settable pulse delay) and instantaneous contact
L	Pulse-delayed with control signal (fixed pulse (at 1 s) and settable pulse delay)	Pulse-delayed with control signal (fixed pulse (at 1 s) and settable pulse delay) and instantaneous contact
M	Retriggerable interval relay with activated control signal (watchdog)	Retriggerable interval relay with activated control signal and instantaneous contact (watchdog)
--	--	Wye-delta function

Simulator



3RP25 simulator

The 3RP25 simulator visualizes different time functions in the 3RP25 timing relay. Any fault scenario can be simulated.

The tool is available free of charge, see https://support.industry.siemens.com/cs/ww/en/view/103556391.

Benefits

- Easy stock keeping and logistics thanks to low variance of devices
- Reduced space requirement in the control cabinet thanks to variants in width 17.5 mm and 22 mm
- Consistent for all functions thanks to wide voltage range from 12 to 240 V AC/DC
- Up to 27 functions according to IEC 61812 in the multifunctional timing relay with wide voltage range
- Multifunctional timing relay with semiconductor output for high switching frequencies, bounce-free and wear-free switching

Standards and approvals

- IEC 60721-3-3 "Classification of environmental conditions"
- IEC 61812-1/DIN VDE 0435 Part 2021 "Specified time relays for industrial use"
- IEC 61000-6-2, IEC 61000-6-3 and IEC 61000-6-4 "Electromagnetic compatibility"
- IEC 60947-5-1 "Low-voltage switchgear and controlgear – Electromechanical control circuit devices"

Application

Timing relays are used in control, starting, and protective circuits for all switching operations involving time delays. They guarantee a high level of functionality and a high repeat accuracy of timer settings.

Use in environments exposed to dust, condensation, rapid temperature changes and corrosion is possible thanks to the standard coating of the printed circuit board according to IPC-610. Suitable for applications in rail, agriculture, mining, woodworking, etc.

Enclosure version

All timing relays are suitable for snap-on mounting on TH 35 standard mounting rails according to IEC 60715 or for screw fixing.

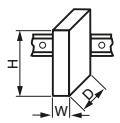
SIRIUS 3RP25 timing relays, 17.5 mm and 22.5 mm NEW

Technical specifications

More information

Technical specifications, see https://support.industry.siemens.com/cs/ww/en/ps/16354/td
Equipment Manual, see https://support.industry.siemens.com/cs/ww/en/view/103532830
Internal circuit diagrams, see CAx Download Manager https://support.industry.siemens.com/my/ww/en/CAxOnline#CAxOnline
FAQs, see https://support.industry.siemens.com/cs/ww/en/ps/16354/faq

Article number		3RP2505-.A, 3RP2505-.C, 3RP251., 3RP2525-.A, 3RP2527, 3RP253., 3RP255.	3RP2505-.B, 3RP2505-.R, 3RP2525-.B, 3RP254., 3RP256., 3RP257.
Dimensions (W x H x D)	mm	17.5 x 100 x 90	22.5 x 100 x 90



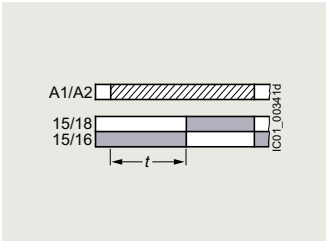
Article number		3RP25..-.AB30, 3RP25..-.AW30, 3RP25..-.AW30-0AX0 3RP25..-.BB30, 3RP25..-.BW30, 3RP25..-.BW30-0AX0 3RP25..-.NW30, 3RP25..-.SW30	3RP25..-.BT20, 3RP25..-.NM20	3RP25..-.CW30	3RP25..-.EW30	3RP25..-.RW30 3RP25..-2RW30-0AX0
General technical specifications:						
Insulation voltage for overvoltage category III acc. to IEC 60664 for pollution degree 3, rated value	V AC	300	500	300	--	300
Ambient temperature						
• During operation	°C	-25 ... +60				
• During storage	°C	-40 ... +85				
Operating range factor of the control supply voltage, rated value						
• At AC						
- At 50 Hz		0.85 ... 1.1	0.85 ... 1.1	0.8 ... 1.1	0.85 ... 1.1	0.7 ... 1.1
- At 60 Hz		0.85 ... 1.1	0.85 ... 1.1	0.8 ... 1.1	0.85 ... 1.1	0.7 ... 1.1
• At DC		0.85 ... 1.1	--	0.8 ... 1.1	0.85 ... 1.1	0.7 ... 1.1
Switching capacity current with inductive load	A	0.01 ... 3	0.01 ... 3	0.01 ... 1	0.01 ... 0.6	0.01 ... 3
Operational current of the auxiliary contacts						
• At AC-15						
- At 24 V	A	3	3	1	--	3
- At 250 V	A	3	3	1	--	3
- At 400 V	A	--	3	--	--	--
• At DC-12						
- At 24 V	A	--	--	1	--	--
- At 125 V	A	--	--	1	--	--
- At 250 V	A	--	--	1	--	--
• At DC-13						
- At 24 V	A	1	1	--	--	1
- At 125 V	A	0.2	0.2	--	--	0.2
- At 250 V	A	0.1	0.1	--	--	0.1
Thermal current	A	5	5	1	0.6	5
Mechanical service life (operating cycles)		10 000 000				
Electrical endurance (operating cycles) for AC-15 at 230 V		100 000		300 000	100 000	

Article number		3RP25..-1...0	3RP25..-2...0
Type of electrical connection for auxiliary and control circuits		**Screw terminals**	**Spring-loaded terminals (push-in)**
Design of thread of connection screw		M3	--
Tightening torque	Nm	0.6 … 0.8	--
Type of connectable conductor cross-sections			
• Solid		1 x (0.5 ... 4 mm²), 2 x (0.5 ... 2.5 mm²)	1 x (0.5 ... 4 mm²)
• Finely stranded with end sleeve		1 x (0.5 ... 4 mm²), 2 x (0.5 ... 1.5 mm²)	1 x (0.5 ... 2.5 mm²)
• For AWG cables			
- Solid		1 x (20 ... 12), 2 x (20 ... 14)	1 x (20 ... 12)
- Stranded		1 x (20 ... 12), 2 x (20 ... 14)	1 x (20 ... 12)

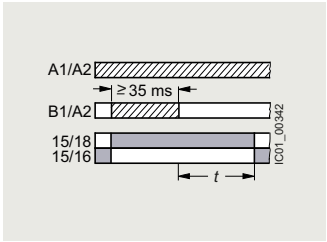
* You can order this quantity or a multiple thereof.

3RP25 function diagrams

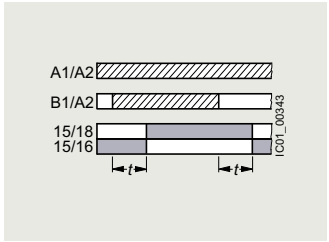
Multifunction 3RP2505-.A, 1 CO, 13 functions and 3RP2505-.C, 1 NO (semiconductor), 13 functions



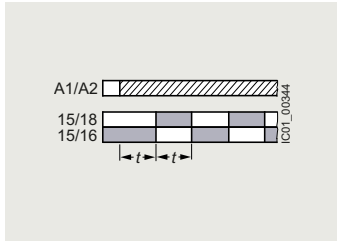
A
ON-delay



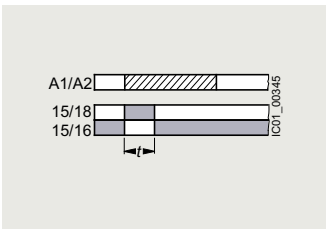
B
OFF-delay with control signal



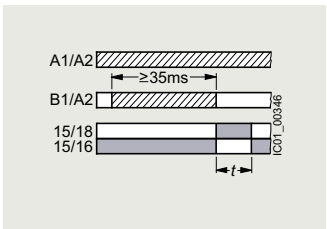
C
ON-delay/OFF-delay with control signal



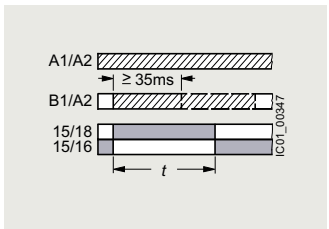
D
Flashing, symmetrical, starting with interval



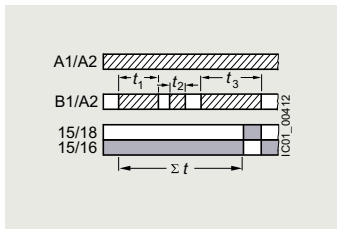
E
Passing make contact, interval relay



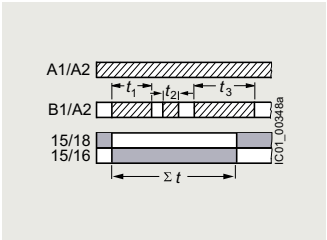
F
Retriggerable interval relay with deactivated control signal (passing break contact with control signal)



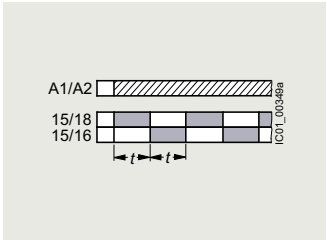
G
Passing make contact with control signal, not retriggerable (pulse-forming with control signal)



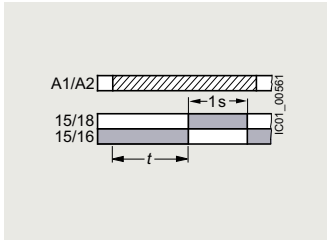
H
Additive ON-delay, instantaneous OFF with control signal



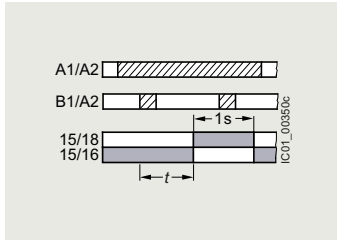
I
Additive ON-delay with control signal



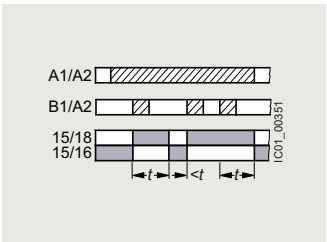
J
Flashing, symmetrical, starting with pulse



K
Pulse-delayed (fixed pulse (at 1 s) and settable pulse delay)



L
Pulse-delayed with control signal (fixed pulse (at 1 s) and settable pulse delay)



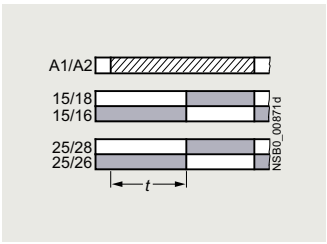
M
Retriggerable interval relay with activated control signal (watchdog)

Legend

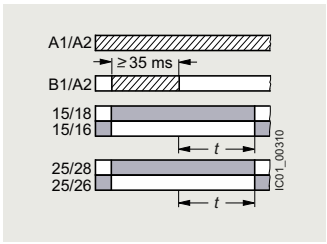
A ... M Identification letters
Timing relay energized
Contact closed
Contact open

SIRIUS 3RP25 timing relays, 17.5 mm and 22.5 mm

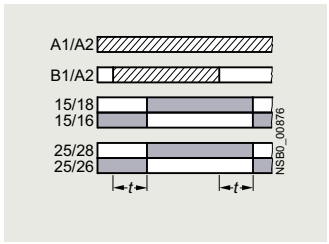
Multifunction 3RP2505-.R, 13 functions, 2 CO force-guided and switched in parallel with delay



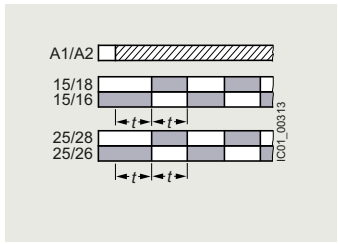
A
ON-delay



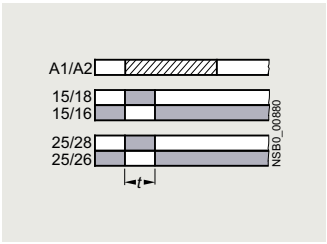
B
OFF-delay with control signal



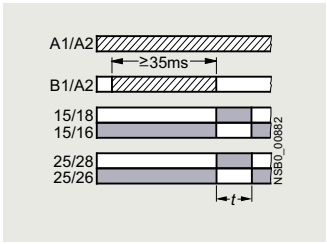
C
ON-delay/OFF-delay with control signal



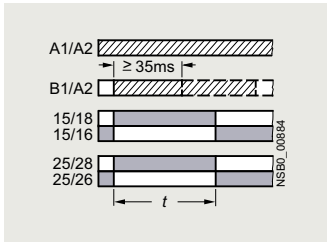
D
Flashing, symmetrical, starting with interval



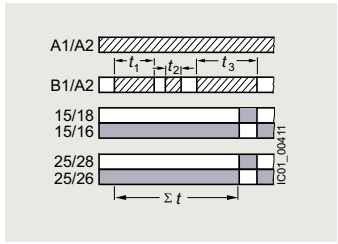
E
Passing make contact, interval relay



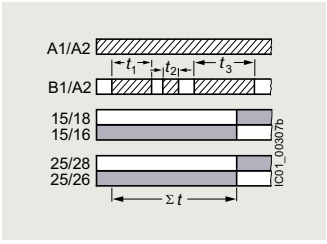
F
Retriggerable interval relay with deactivated control signal (passing break contact with control signal)



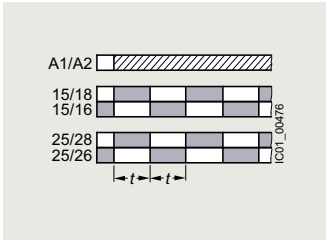
G
Passing make contact with control signal, not retriggerable (pulse-forming with control signal)



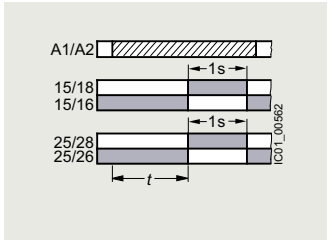
H
Additive ON-delay, instantaneous OFF with control signal



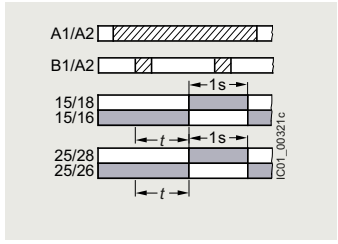
I
Additive ON-delay with control signal



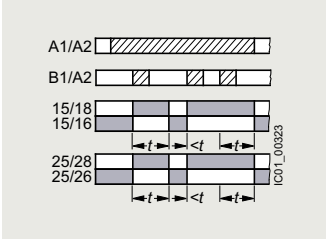
J
Flashing, symmetrical, starting with pulse



K
Pulse-delayed (fixed pulse at 1 s and settable pulse delay)



L
Pulse-delayed with control signal (fixed pulse at 1 s and settable pulse delay)



M
Retriggerable interval relay with activated control signal (watchdog)

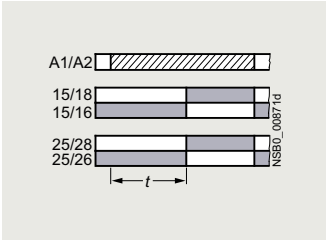
Legend

A ... M Identification letters
Timing relay energized
Contact closed
Contact open

Multifunction 3RP2505-.B, 27 functions, 2 CO

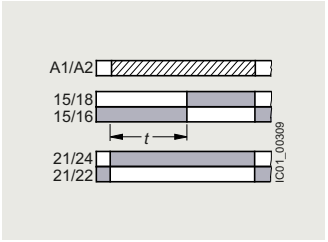
A

2 CO switched in parallel



ON-delay

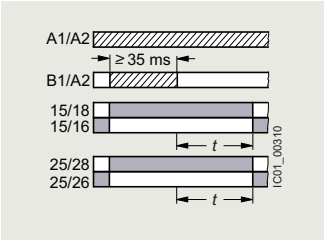
1 delayed CO contact + 1 instantaneous CO contact



ON-delay and instantaneous contact

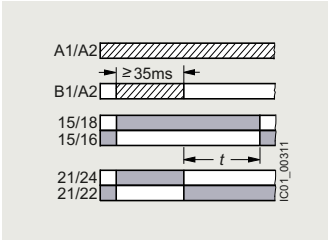
B

2 CO switched in parallel



OFF-delay with control signal

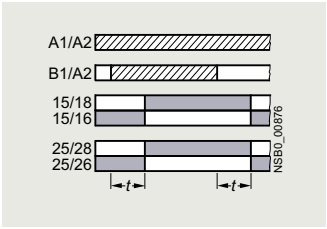
1 delayed CO contact + 1 instantaneous CO contact



OFF-delay with control signal and instantaneous contact

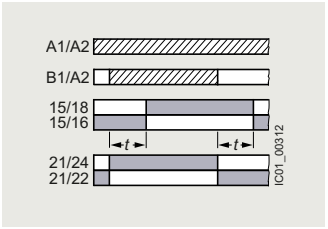
C

2 CO switched in parallel



ON-delay/OFF-delay with control signal

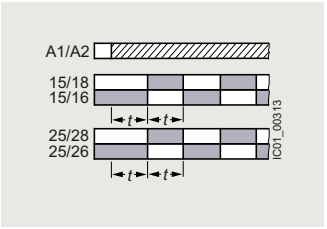
1 delayed CO contact + 1 instantaneous CO contact



ON-delay/OFF-delay with control signal and instantaneous contact

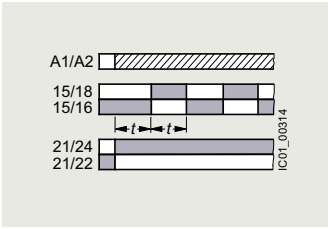
D

2 CO switched in parallel



Flashing, symmetrical, starting with interval

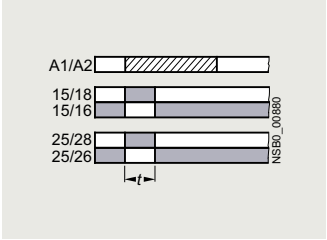
1 delayed CO contact + 1 instantaneous CO contact



Flashing, symmetrical, starting with interval and instantaneous contact

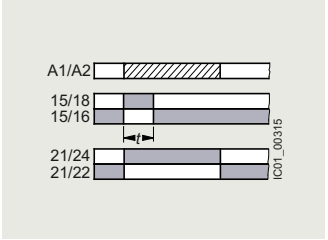
E

2 CO switched in parallel



Passing make contact, interval relay

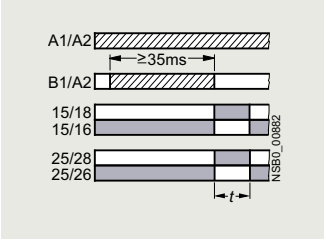
1 delayed CO contact + 1 instantaneous CO contact



Passing make contact, interval relay and instantaneous contact

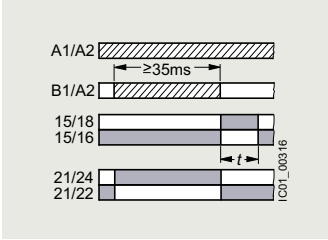
F

2 CO switched in parallel



Retriggerable interval relay with deactivated control signal (passing break contact with control signal)

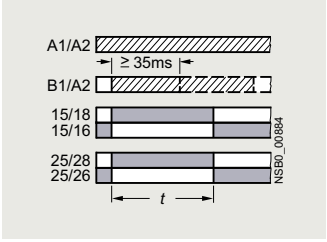
1 delayed CO contact + 1 instantaneous CO contact



Retriggerable interval relay with deactivated control signal (passing break contact with control signal) and instantaneous contact

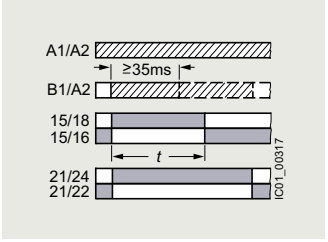
G

2 CO switched in parallel



Passing make contact with control signal, not retriggerable (pulse-forming with control signal)

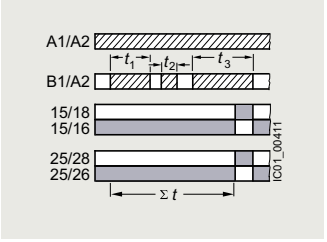
1 delayed CO contact + 1 instantaneous CO contact



Passing make contact with control signal, not retriggerable (pulse-forming with control signal) and instantaneous contact

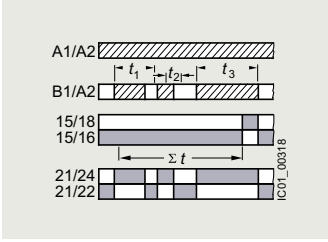
H

2 CO switched in parallel



Additive ON-delay, instantaneous OFF with control signal

1 delayed CO contact + 1 instantaneous CO contact



Additive ON-delay, instantaneous OFF with control signal and instantaneous contact

Legend

A ... H Identification letters

Timing relay energized

Contact closed

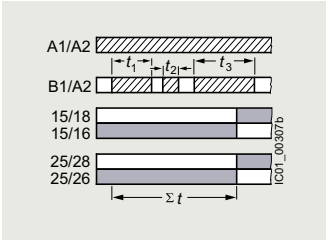
Contact open

SIRIUS 3RP25 timing relays, 17.5 mm and 22.5 mm

Multifunction 3RP2505-.B, 27 functions, 2 CO (continued)

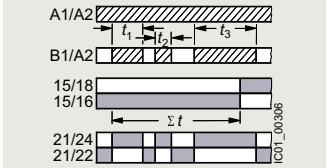
I

2 CO switched in parallel



Additive ON-delay with control signal

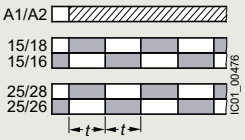
1 delayed CO contact +
1 instantaneous CO contact



Additive ON-delay with control signal and instantaneous contact

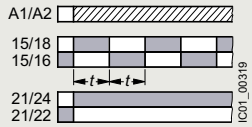
J

2 CO switched in parallel



Flashing, symmetrical, starting with pulse

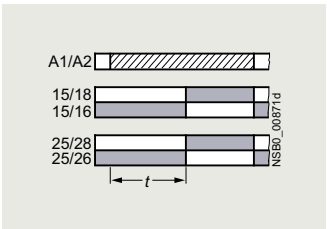
1 delayed CO contact +
1 instantaneous CO contact



Flashing, symmetrical, starting with pulse and instantaneous contact

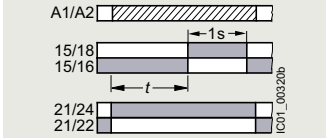
K

2 CO switched in parallel



Pulse-delayed (fixed pulse at 1 s and settable pulse delay)

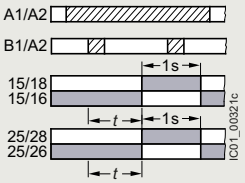
1 delayed CO contact +
1 instantaneous CO contact



Pulse-delayed (fixed pulse at 1 s and settable pulse delay) and instantaneous contact

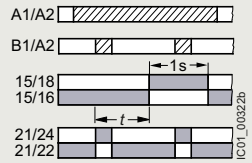
L

2 CO switched in parallel



Pulse-delayed with control signal (fixed pulse at 1 s and settable pulse delay)

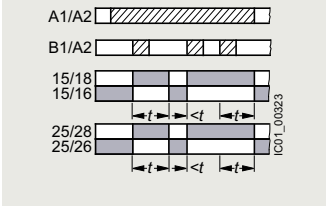
1 delayed CO contact +
1 instantaneous CO contact



Pulse-delayed with control signal (fixed pulse at 1 s and settable pulse delay) and instantaneous contact

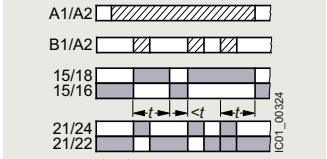
M

2 CO switched in parallel



Retriggerable interval relay with activated control signal (watchdog)

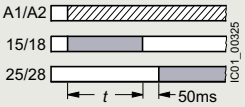
1 delayed CO contact +
1 instantaneous CO contact



Retriggerable interval relay with activated control signal and instantaneous contact (watchdog)

YΔ

2 CO contacts switched in parallel or
1 delayed CO contact +
1 instantaneous CO contact



Wye-delta function

Legend

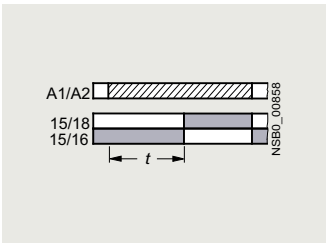
I ... M Identification letters

Timing relay energized

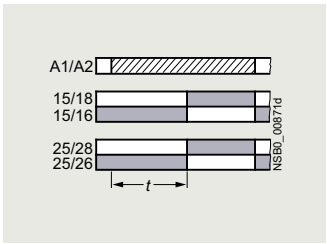
Contact closed

Contact open

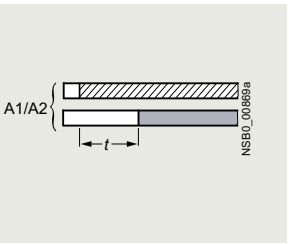
Monofunctions 3RP251. to 3RP257.[1)]



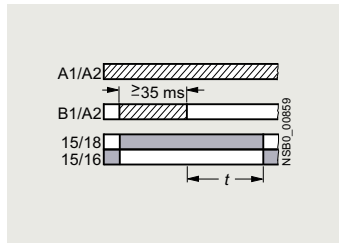
3RP251.-.AW30, 1 CO, ON-delay



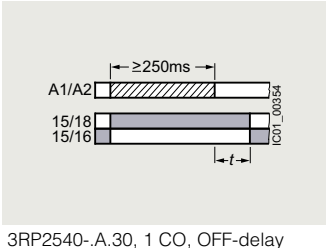
3RP2525-..W30, 2 CO, ON-delay



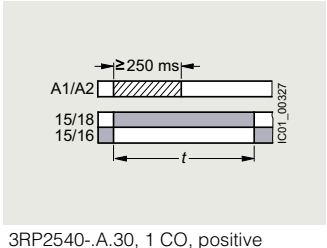
3RP2527-.EW30, 1 NO (semiconductor), ON-delay



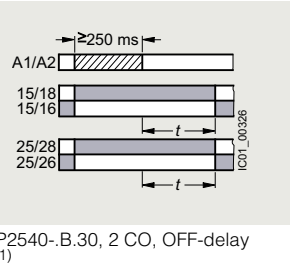
3RP2535-.AW30, 1 CO, OFF-delay with control signal



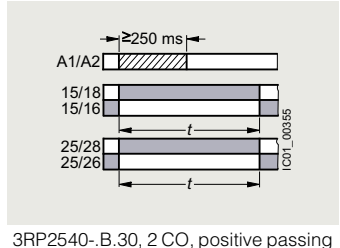
3RP2540-.A.30, 1 CO, OFF-delay (N)[1)]



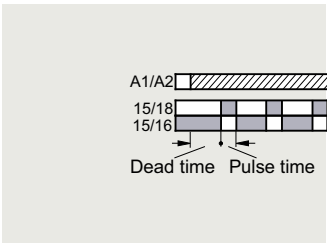
3RP2540-.A.30, 1 CO, positive passing make contact (O)[1)]



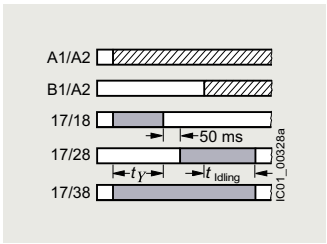
3RP2540-.B.30, 2 CO, OFF-delay (N)[1)]



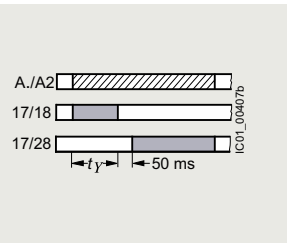
3RP2540-.B.30, 2 CO, positive passing make contact (O)[1)]



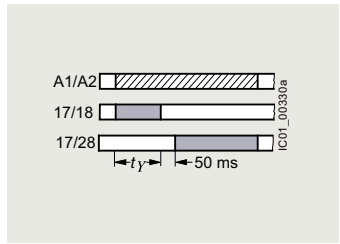
3RP2555-.AW30, 1 CO, flashing, asymmetrical, starting with interval (clock-pulse relay)



3RP2560-.SW30, 3 NO, wye-delta function with overtravel function (idling)



3RP257.-.NM20, 2 NO, wye-delta function



3RP257.-.NW30, 2 NO, wye-delta function

Legend

- Timing relay energized
- Contact closed
- Contact open

[1)] 3RP2540 has a double function:
Function N = OFF-delay
Function O = Positive passing make contact

SIRIUS 3RP25 timing relays, 17.5 mm and 22.5 mm

2

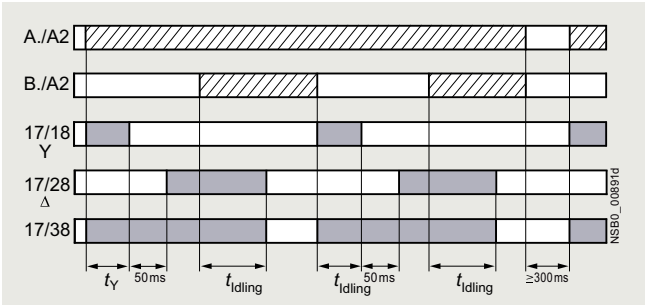
Possibilities of operation of the 3RP2560-.SW30 timing relay

Operation 1: Start contact B./A2 is open when control supply voltage A./A2 is applied

The control supply voltage is applied to A./A2 and there is no control signal on B./A2. This starts the Y/Δ timing. The idling time (coasting time) is started by applying a control signal to B./A2. When the set time t_{Idling} (30 to 600 s) has elapsed, the output relays (17/38 and 17/28) are reset. If the control signal on B./A2 is switched off (minimum OFF period 270 ms), a new timing is started.

Note:

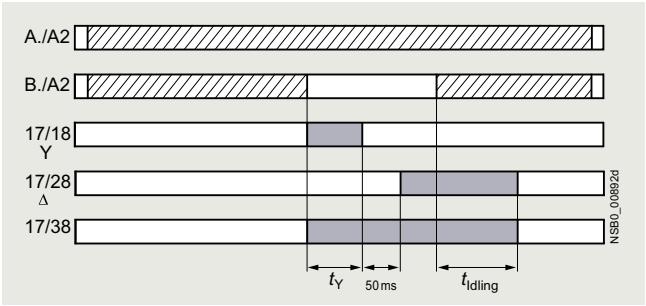
Observe response time (dead time) of 400 ms on energizing control supply voltage until contacts 17/18 and 17/38 close.



Operation 1

Operation 2: Start contact B./A2 is closed when control supply voltage A./A2 is applied

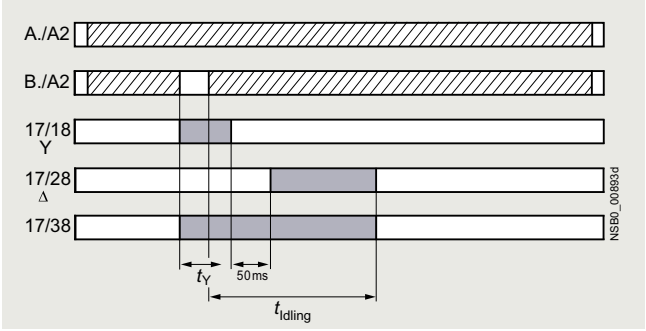
If the control signal B./A2 is already present when the control supply voltage A./A2 is applied, **no** timing is started. The timing is only started when the control signal B./A2 is switched off.



Operation 2

Operation 3: Start contact B./A2 closes while star time is running

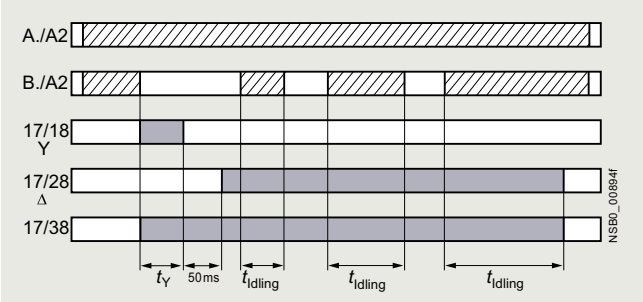
If the control signal B./A2 is applied again during the star time, the idling time starts and the timing is terminated normally.



Operation 3

Operation 4: Start contact B./A2 opens while delta time is running and is applied again

If the control signal on B./A2 is applied and switched off again during the delta time, although the idling time has not yet elapsed, the idling time (coasting time) is reset to zero. If the control signal is re-applied to B./A2, the idling time is restarted.



Operation 4

Legend

- Timing relay energized
- Contact closed
- Contact open

t_Y = Star time 1 to 20 s

t_{Idling} = Idling time (coasting time) 30 to 600 s

Note:

The following applies to all operations: The pressure switch controls the timing via B./A2.

Application example based on standard operation (operation 1): For example, use of 3RP2560 for compressor control

Frequent starting of compressors strains the network, the machine, and the increased costs for the operator. The new timing relay prevents frequent starting at times when there is high demand for compressed air. A special control circuit prevents the compressor from being switched off immediately when the required air pressure in the tank has been reached. Instead, the valve in the intake tube is closed and the compressor runs in "Idling" mode, i.e. in no-load operation for a specific time which can be set from 30 to 600 s.

If the pressure falls within this time, the motor does not have to be restarted again, but can return to nominal load operation from no-load operation.

If the pressure does not fall within this idling time, the motor is switched off.

The pressure switch controls the timing via B./A2.

The control supply voltage is applied to A./A2 and the start contact B./A2 is open, i.e. there is no control signal on B./A2 when the control supply voltage is applied. The pressure switch signals "too little pressure in system" and starts the timing by way of terminal B./A2. The compressor is started, enters Y/Δ operation, and fills the pressure tank.

When the pressure switch signals "sufficient pressure", the control signal B./A2 is applied, the idling time (coasting time) is started, and the compressor enters no-load operation for the set period of time from 30 to 600 s. The compressor is then switched off. The compressor is only restarted if the pressure switch responds again (low pressure).

Selection and ordering data


3RP2505-2AB30


3RP2505-2BB30


3RP2525-2AW30


3RP2540-2AW30


3RP2555-2AW30


3RP2576-2NW30

Number of NO contacts Instantaneous switching	Number of NO contacts Delayed switching	Number of CO contacts Instantaneous switching	Number of CO contacts Delayed switching	Semiconductor output	Adjustable time	Control supply voltage At 50/60 Hz AC	Control supply voltage At DC	Standard coating IPC-610	Article No.	Weight
						V	V			kg
13 functions										
0	0	0	1	No	0.05 s ... 100 h	24	24	No	**3RP2505-☐AB30**	0.143
						12 ... 240	12 ... 240	No	**3RP2505-☐AW30**	0.146
								Yes	**3RP2505-2AW30-0AX0**	0.140
0	1	0	0	Yes	0.05 s ... 100 h	12 ... 240	12 ... 240	No	**3RP2505-☐CW30**	0.150
13 functions, suitable for railway applications										
0	0	0	2[1]	No	0.05 s ... 100 h	24 ... 240	24 ... 240	No	**3RP2505-☐RW30**	0.180
								Yes	**3RP2505-2RW30-0AX0**	0.176
27 functions										
0	0	0	2[2]	No	0.05 s ... 100 h	24	24	No	**3RP2505-☐BB30**	0.174
						400 ... 440	--	No	**3RP2505-☐BT20**	0.174
						12 ... 240	12 ... 240	No	**3RP2505-☐BW30**	0.180
								Yes	**3RP2505-2BW30-0AX0**	0.168
ON-delay										
0	0	0	1	No	0.5 ... 10 s	12 ... 240	12 ... 240	No	**3RP2511-☐AW30**	0.138
					1 ... 30 s	12 ... 240	12 ... 240	No	**3RP2512-☐AW30**	0.137
					5 ... 100 s	12 ... 240	12 ... 240	No	**3RP2513-☐AW30**	0.138
					0.05 s ... 100 h	12 ... 240	12 ... 240	No	**3RP2525-☐AW30**	
0	0	0	2	No	0.05 s ... 100 h	24	24	No	**3RP2525-☐BB30**	0.165
						12 ... 240	12 ... 240	No	**3RP2525-☐BW30**	0.167
0	1	0	0	Yes	0.05 s ... 240 s	12 ... 240	12 ... 240	No	**3RP2527-☐EW30**	0.160
OFF-delay with control signal										
0	0	0	1	No	0.05 s ... 100 h	12 ... 240	12 ... 240	No	**3RP2535-☐AW30**	0.149
OFF-delay without control signal, non-volatile, passing make contact										
0	0	0	1[4]	No	0.05 s ... 600 s	24	24	No	**3RP2540-☐AB30**	0.153
						12 ... 240	12 ... 240	No	**3RP2540-☐AW30**	0.173
0	0	0	2[4]	No	0.05 s ... 600 s	24	24	No	**3RP2540-☐BB30**	0.167
						12 ... 240	12 ... 240	No	**3RP2540-☐BW30**	0.177
Clock-pulse relay, flashing, asymmetrical										
0	0	0	1	No	0.05 s ... 100 h	12 ... 240	12 ... 240	No	**3RP2555-☐AW30**	0.140
Wye-delta function with coasting function (idling)										
1	2	0	0	No	1 ... 20 s	12 ... 240	12 ... 240	No	**3RP2560-☐SW30**	0.189
Wye-delta function										
1	1	0	0	No	1 ... 20 s	380 ... 440[3]	--	No	**3RP2574-☐NM20**	0.159
						12 ... 240	12 ... 240	No	**3RP2574-☐NW30**	0.155
1	1	0	0	No	3 ... 60 s	380 ... 440[3]	--	No	**3RP2576-☐NM20**	0.160
						12 ... 240	12 ... 240	No	**3RP2576-☐NW30**	0.153

Type of electrical connection

- Screw terminals
- Spring-loaded terminals (push-in)

1
2

1) Force-guided contacts.

2) Optionally 1 CO delayed + 1 CO instantaneous.

3) With 3RP2574-.NM20 and 3RP2576-.NM20, connection of 200 to 240 V AC, 50/60 Hz control voltage is also possible.

4) Setting of output contacts in as-supplied state not defined (bistable relay). Application of the control supply voltage once results in contact changeover to the correct setting.

Notes:

For accessories, see page 2/226.

In the case of 3RP2505, the functions can be adjusted by means of function selector switches on the device. With a set of foil labels the timing relay can be legibly marked with the functions which can be selected on the timing relay. This is included in the scope of supply. The same potential must be applied to terminals A. and B.
For functions, see the overview of functions on page 2/216.

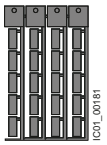
*** You can order this quantity or a multiple thereof.**

SIRIUS 3RP25 timing relays, 17.5 mm and 22.5 mm

Accessories

More information

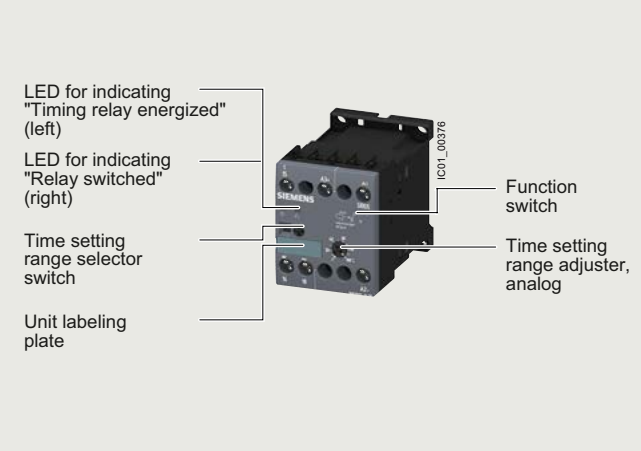
You can find information on configuring and dimensioning the accessories in the Equipment Manual, see https://support.industry.siemens.com/cs/ww/en/view/103532830

	Version	Article No.	Weight kg
Terminals for SIRIUS devices in the industrial standard mounting rail enclosure			
 3ZY1122-1BA00	**Removable terminals** • 2-pole, up to 1 x 4 mm² or 2 x 2.5 mm²	**Screw terminals** **3ZY1122-1BA00**	0.010
 3ZY1122-2BA00	• 2-pole, up to 1 x 4 mm² or 2 x 1.5 mm² (in shared end sleeve)	**Spring-loaded terminals (push-in)** **3ZY1122-2BA00**	0.008
Accessories for enclosures			
 3ZY1321-2AA00	**Sealing covers** • 17.5 mm • 22.5 mm	 **3ZY1321-1AA00** **3ZY1321-2AA00**	 0.002 0.002
 3ZY1311-0AA00	**Push-in lugs** For wall mounting	**3ZY1311-0AA00**	0.001
 3ZY1440-1AA00	**Coding pins** For removable terminals of SIRIUS devices in the industrial standard mounting rail enclosure; enable the mechanical coding of terminals	**3ZY1440-1AA00**	0.002
  3ZY1450-1AB00	**Hinged cover** Replacement cover, without terminal labeling, titanium gray • 17.5 mm wide • 22.5 mm wide	 **3ZY1450-1AA00** **3ZY1450-1AB00**	 0.002 0.004
Blank labels			
 3RT2900-1SB20	**Unit labeling plates**[1] For SIRIUS devices • 10 mm x 7 mm, titanium gray • 20 mm x 7 mm, titanium gray	 **3RT2900-1SB10** **3RT2900-1SB20**	 0.028 0.062
Tools for opening spring-loaded terminals			
 3RA2908-1A	**Screwdrivers** For all SIRIUS devices with spring-loaded terminals Length approx. 200 mm, 3.0 mm x 0.5 mm, titanium gray/black, partially insulated	**Spring-loaded terminals (push-in)** **3RA2908-1A**	0.050

[1] PC labeling system for individual inscription of unit labeling plates available from: murrplastik Systemtechnik GmbH.

* You can order this quantity or a multiple thereof.

Overview



SIRIUS 3RP20 timing relay

SIRIUS 3RP20 electronic timing relays for use in control systems and mechanical engineering with:

- 1 or 2 CO contacts
- Multifunction or monofunction
- Wide voltage range or combination voltage
- Single or selectable time setting ranges
- Switch position indication and voltage indication by LED

Standards

The timing relays comply with:

- IEC 60721-3-3 "Classification of environmental conditions"
- IEC 61812-1 "Specified time relays for industrial use"
- IEC 61000-6-2 and IEC 61000-6-4 "Electromagnetic compatibility"
- IEC 60947-5-1 "Low-voltage switchgear and controlgear – Electromechanical control circuit devices"
- IEC 60947-1, Annex N "Protective separation"

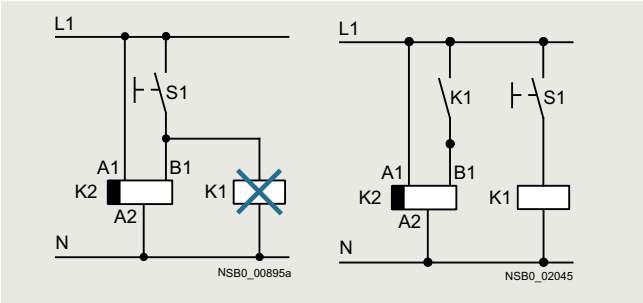
Multifunction

The functions of the 3RP2005 multifunctional timing relays can be set by means of the function selector switch. Insert labels can be used to adjust different functions of the timing relay clearly and unmistakably. The corresponding labels can be ordered as an accessory. The same potential must be applied to terminals A. and B.

For functions, see 3RP2901 label set, page 2/232.

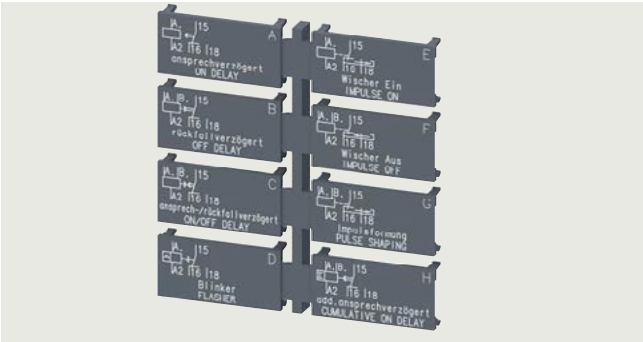
Note:

The activation of loads parallel to the start input is not permissible when using AC control voltage.



Diagrams

Accessories



Label set for marking the multifunctional relay

Article No. scheme

Product versions		Article number									
SIRIUS timing relays, 45 mm enclosure		**3RP20**	□	□	–	□	□	□	**3**	**0**	
Product function/ time setting ranges	Multifunction		**0**	**5**							15 time ranges 0.05 s... 100 h
	ON-delay		**2**	**5**							15 time ranges 0.05 s... 100 h
Connection type	Screw terminals					**1**					
	Spring-loaded terminals					**2**					
Contacts	1 CO						**A**				
	2 CO						**B**				
Control supply voltage	24 V AC/DC/100 ... 127 V AC							**Q**			Combination voltage
	24 V AC/DC/200 ... 240 V AC							**P**			Combination voltage
	24 ... 240 V AC/DC							**W**			Wide voltage range
Example		**3RP20**	**0**	**5**	**–**	**1**	**A**	**P**	**3**	**0**	

Note:

The Article No. scheme shows an overview of product versions for better understanding of the logic behind the article numbers.

For your orders, please use the article numbers quoted in the selection and ordering data.

SIRIUS 3RP20 timing relays, 45 mm

Benefits

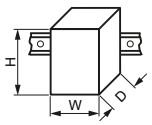
- Suitable for 3RT miniature contactors
- Uniform design
- Ideal for small distance between standard mounting rails and/or for low mounting depth, e.g. in control boxes
- Labels are used on the multifunctional timing relay to document the function that has been set

Application

Timing relays are used in control, starting, and protective circuits for all switching operations involving time delays. They guarantee a high level of functionality and a high repeat accuracy of timer settings.

Technical specifications

More information	
Technical specifications, see https://support.industry.siemens.com/cs/ww/en/ps/16356/td	Internal circuit diagrams, see CAx Download Manager https://support.industry.siemens.com/my/ww/en/CAxOnline#CAxOnline
Operating Instructions, see https://support.industry.siemens.com/cs/ww/en/view/11647144	FAQs, see https://support.industry.siemens.com/cs/ww/en/ps/16356/faq

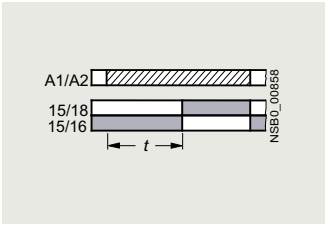
Type		**3RP2005, 3RP2025**
Dimensions (W x H x D) 	mm	45 x 57 x 73
Rated insulation voltage Pollution degree 3 Overvoltage category III	V AC	300
Permissible ambient temperature		
• During operation	°C	-25 ... +60
• During storage	°C	-40 ... +85
Operating range of excitation[1]		0.85 ... 1.1 x U_s at AC; 0.8 ... 1.25 x U_s at DC; 0.95 ... 1.05 times the rated frequency
Mechanical service life	Operating cycles	10 x 10^6
Electrical endurance at I_e	Operating cycles	1 x 10^5
Connection type		**Screw terminals**
• Terminal screw		M3 (for standard screwdriver, size 2 and Pozidriv 2)
• Solid	mm^2	2 x (0.5 ... 1.5)[2], 2 x (0.75 ... 2.5)[2]
• Finely stranded with end sleeve	mm^2	2 x (0.5 ... 1.5)[2], 2 x (0.75 ... 2.5)[2]
• Stranded	AWG	2 x (0.5 ... 1.5)[2], 2 x (0.75 ... 2.5)[2]
• AWG cables	AWG	2 x (18 ... 14)
• Tightening torque	Nm	0.8 ... 1.2
Connection type		**Spring-loaded terminals**
• Solid	mm^2	2 x (0.25 ... 2.5)
• Finely stranded with end sleeve	mm^2	2 x (0.25 ... 1.5)
• Finely stranded without end sleeve	mm^2	2 x (0.25 ... 2.5)
• AWG cables, solid or stranded	AWG	2 x (24 ... 14)
• Max. external diameter of the conductor insulation	mm	3.6

1) If nothing else is stated.

2) If two different conductor cross-sections are connected to one clamping point, both cross-sections must lie in one of the ranges specified.

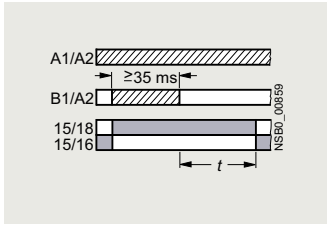
3RP20 function diagrams and 3RP2901 label set

1 CO contact



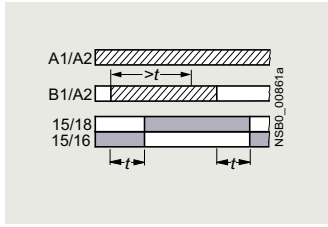
A

3RP2005-.A, 3RP2025
ON-delay



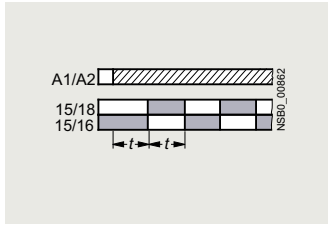
B[1)]

3RP2005-.A
OFF-delay with control signal



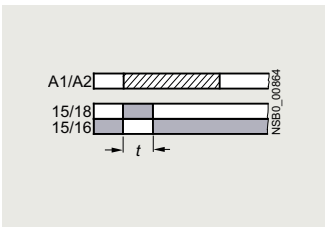
C

3RP2005-.A
ON-delay and OFF-delay
with control signal ($t = t_{on} = t_{off}$)



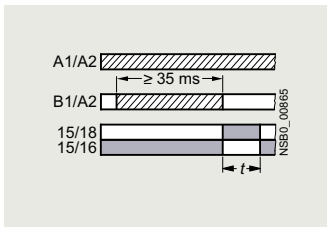
D

3RP2005-.A
Flashing, starting with interval
(pulse/interval 1:1)



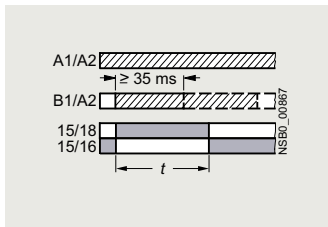
E

3RP2005-.A
Passing make contact



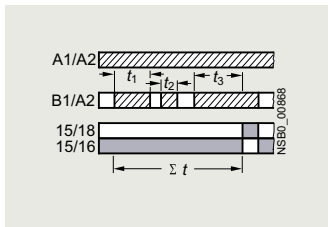
F[1)]

3RP2005-.A
Passing break contact with
control signal



G

3RP2005-.A
Pulse-forming with control signal
(pulse generation at the output does
not depend on duration of energizing)



H

3RP2005-.A
Additive ON-delay with control signal

Legend

A ... H Identification letters for 3RP2005

Timing relay energized

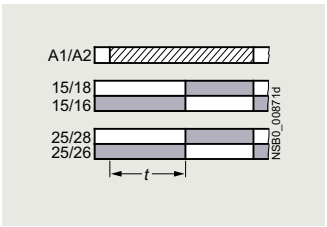
Contact closed

Contact open

1) A new control signal at terminal B, after the operating time has started, resets the operating time to zero (retriggerable).

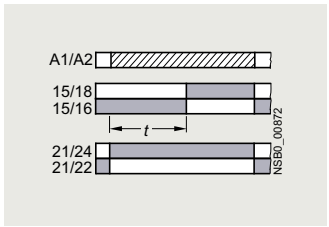
SIRIUS 3RP20 timing relays, 45 mm

2 CO contacts



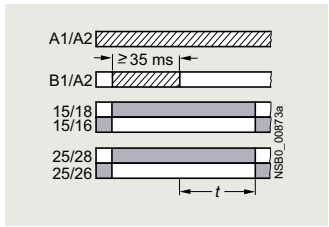
A

3RP2005-.B
ON-delay



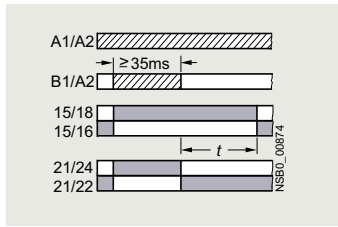
A●

3RP2005-.B
ON-delay and instantaneous contact



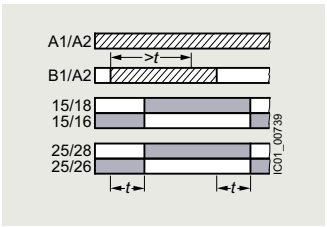
B[1)]

3RP2005-.B
OFF-delay with control signal



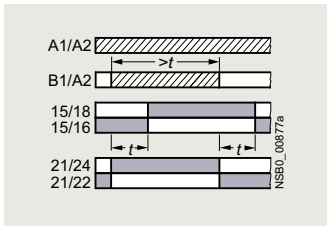
B●[1)]

3RP2005-.B
OFF-delay with control signal and instantaneous contact



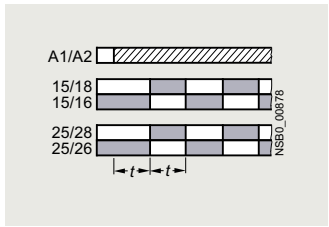
C

3RP2005-.B
ON-delay and OFF-delay
with control signal ($t = t_{on} = t_{off}$)



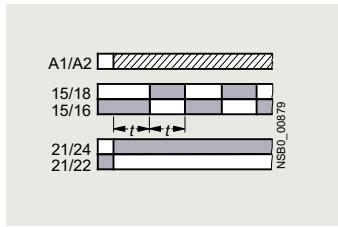
C●

3RP2005-.B
ON-delay and OFF-delay
with control signal and instantaneous contact ($t = t_{on} = t_{off}$)



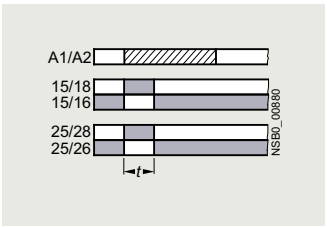
D

3RP2005-.B
Flashing, starting with interval
(pulse/interval 1:1)



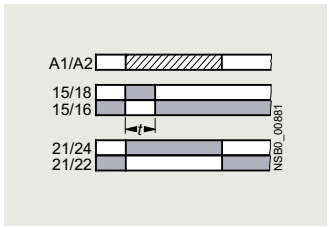
D●

3RP2005-.B
Flashing, starting with interval
(pulse/interval 1:1) and instantaneous contact



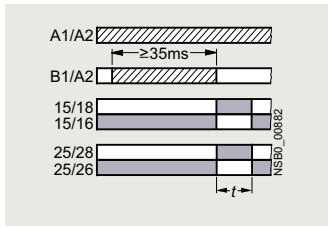
E

3RP2005-.B
Passing make contact



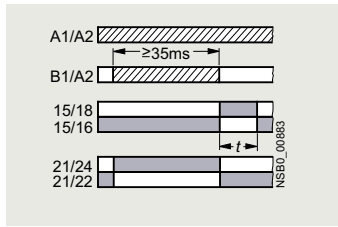
E●

3RP2005-.B
Passing make contact and
instantaneous contact



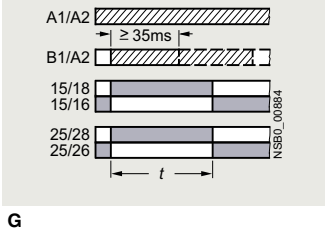
F[1)]

3RP2005-.B
Passing break contact with
control signal



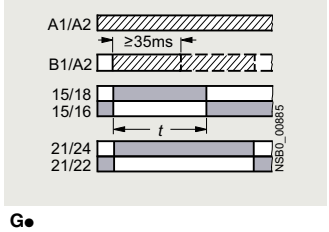
F●[1)]

3RP2005-.B
Passing break contact with control
signal and instantaneous contact



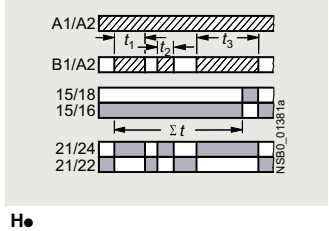
G

3RP2005-.B
Pulse-forming with control signal
(pulse generation at the output does
not depend on duration of energizing)



G●

3RP2005-.B
Pulse-forming with control signal
and instantaneous contact (pulse
generation at the output does not
depend on duration of energizing)



H●

3RP2005-.B
Additive ON-delay with control signal
and instantaneous contact

YΔ

3RP2005-.B
Wye-delta function

Legend

A ... H Identification letters for 3RP2005

Timing relay energized

Contact closed

Contact open

[1)] A new control signal at terminal B, after the operating time has started, resets the operating time to zero (retriggerable).

Selection and ordering data

3RP2005-2AP30

3RP2005-2BW30

Version	Time setting range t	Rated control supply voltage U_s		Spring-loaded terminals	Weight
		50/60 Hz AC	DC	Article No.	
		V	V		kg
3RP2005 timing relays, multifunction, 15 time setting ranges					
The functions can be adjusted by means of rotary switches. Insert labels can be used to adjust different functions of the 3RP2505 timing relay clearly and unmistakably. The corresponding labels can be ordered as an accessory. The same potential must be applied to terminals A. and B. For functions, see 3RP2901 label set, page 2/232.					
With LED and 1 CO contact[1], 8 functions	0.05 ... 1 s 0.15 ... 3 s 0.5 ... 10 s 1.5 ... 30 s 0.05 ... 1 min 5 ... 100 s 0.15 ... 3 min 0.5 ... 10 min 1.5 ... 30 min 0.05 ... 1 h 5 ... 100 min 0.15 ... 3 h 0.5 ... 10 h 1.5 ... 30 h 5 ... 100 h ∞ [2]	24/100 ... 127 24/200 ... 240	24 24	**3RP2005-2AQ30** **3RP2005-2AP30**	0.100 0.100
With LED and 2 CO contacts, 16 functions		24 ... 240[3]	24 ... 240[4]	**3RP2005-2BW30**	0.110
3RP2025 timing relays, ON-delay, 15 time setting ranges					
With LED and 1 CO contact[1]	0.05 ... 1 s 0.15 ... 3 s 0.5 ... 10 s 1.5 ... 30 s 0.05 ... 1 min 5 ... 100 s 0.15 ... 3 min 0.5 ... 10 min 1.5 ... 30 min 0.05 ... 1 h 5 ... 100 min 0.15 ... 3 h 0.5 ... 10 h 1.5 ... 30 h 5 ... 100 h ∞ [2]	24/100 ... 127 24/200 ... 240	24 24	**3RP2025-2AQ30** **3RP2025-2AP30**	0.095 0.095

For accessories, see page 2/232.

[1] Units with protective separation.

[2] With ∞ switch position no timing. For test purposes (ON/OFF function) on site. Relay is constantly on when activated, or relay remains constantly off when activated. Depending on which function is set.

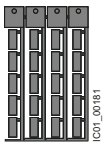
[3] Operating range 0.8 to 1.1 x U_s.

[4] Operating range 0.7 to 1.1 x U_s.

*** You can order this quantity or a multiple thereof.**

SIRIUS 3RP20 timing relays, 45 mm

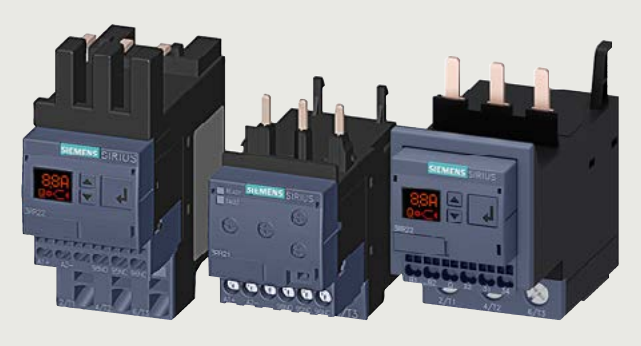
Accessories

Version	Function	Identification letter	Use	Article No.	Weight kg
Label sets for 3RP20					
Accessories for 3RP20 (not included in the scope of supply). The label set can be used to label timing relays with the set function in English and German.					
 3RP2901-0A					
1 label set (1 unit) with 8 functions	• ON-delay	A	For devices with 1 CO	**3RP2901-0A**	0.003
	• OFF-delay with control signal	B			
	• ON-delay and OFF-delay with control signal	C			
	• Flashing, starting with interval	D			
	• Passing make contact	E			
	• Passing break contact with control signal	F			
	• Pulse-forming with control signal	G			
	• Additive ON-delay with control signal	H			
 3RP2901-0B					
1 label set (1 unit) with 16 functions	• ON-delay	A	For devices with 2 CO	**3RP2901-0B**	0.005
	• OFF-delay with control signal	B			
	• ON-delay and OFF-delay with control signal	C			
	• Flashing, starting with interval	D			
	• Passing make contact	E			
	• Passing break contact with control signal	F			
	• Pulse-forming with control signal	G			
	• ON-delay and instantaneous contact	A•			
	• OFF-delay with control signal and instantaneous contact	B•			
	• ON-delay and OFF-delay with control signal and instantaneous contact	C•			
	• Flashing, starting with interval, and instantaneous contact	D•			
	• Passing make contact and instantaneous contact	E•			
	• Passing break contact with control signal and instantaneous contact	F•			
	• Pulse-forming with control signal and instantaneous contact	G•			
	• Additive ON-delay with control signal and instantaneous contact	H•			
	• Wye-delta function	Y Δ			
Blank labels					
 3RT2900-1SB20	**Unit labeling plates**[1] For SIRIUS devices		For 3RP20		
	• 20 mm x 7 mm, titanium gray			**3RT2900-1SB20**	0.062

[1] PC labeling system for individual inscription of unit labeling plates available from: murrplastik Systemtechnik GmbH.

* You can order this quantity or a multiple thereof.

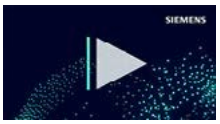
Overview



SIRIUS 3RR2242, 3RR2142, 3RR2243 current monitoring relays

More information

Homepage, see www.siemens.com/sirius-monitoring-relays
Industry Mall, see www.siemens.com/product?3RR21



Video: SIRIUS 3RR2 current monitoring relays

The SIRIUS 3RR2 current monitoring relays are suitable for load monitoring of motors or other loads. In 2 or 3 phases they monitor the rms value of AC currents for overshooting or undershooting of set threshold values.

Whereas apparent current monitoring is used above all in connection with the rated torque or in case of overload, the active current monitoring option can be used to observe and evaluate the load factor over a motor's entire torque range.

The 3RR2 current monitoring relays can be integrated directly in the feeder by mounting on the 3RT2 contactor; separate wiring of the main circuit is therefore superfluous. No separate transformers are required.

For a line-oriented configuration or simultaneous use of an overload relay, terminal supports for stand-alone installation are available for separate standard rail mounting.

Versions

Basic versions

The basic versions with 2-phase apparent current monitoring, a CO contact output and analog adjustability provide a high level of monitoring reliability especially in the rated and overload range.

Standard versions

The standard versions monitor the current in 3 phases with selectable active current monitoring. They have additional diagnostics options such as residual-current monitoring and phase sequence monitoring, and they are also suitable for monitoring motors below the rated torque. These devices have an additional independent semiconductor output, an actual value indicator, and are digitally adjustable.

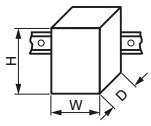
Both versions are available optionally with screw or spring-loaded terminals, in each case for sizes S00 and S0. With variants of size S2 the main conducting paths always have screw terminals; the control current side can have screw or spring-loaded terminals.

Note:

In addition to the features of the standard versions, the 3RR24 monitoring relays for mounting on 3RT2 contactors for IO-Link also offer the possibility of transmitting the measured values and diagnostics data to a controller via an IO-Link. Furthermore, the devices can be parameterized on the devices themselves or via IO-Link.

For more information, see page 2/241 onwards.

3RR21 and 3RR22 overview table

Features		3RR21	3RR22	Benefits
General data				
Sizes Dimensions in mm (W x H x D) • Screw terminals		S00, S0, S2 S00: 45 x 79 x 80, S0: 45 x 87 x 91, S2: 55 x 99 x 112	S00, S0, S2 S00: 45 x 79 x 80, S0: 45 x 87 x 91, S2: 55 x 99 x 112	• Are coordinated with the dimensions, connections and technical characteristics of the other devices in the SIRIUS modular system (contactors, soft starters, etc.) • Permit the mounting of slim-line and compact load feeders in widths of 45 mm (S00 and S0) and 55 mm (S2) • Simplify configuration
• Spring-loaded terminals		S00: 45 x 90 x 80, S0: 45 x 109 x 92, S2: 55 x 99 x 112	S00: 45 x 90 x 80, S0: 45 x 109 x 92, S2: 55 x 99 x 112	
Current range		S00: 1.6 ... 16 A S0: 4 ... 40 A S2: 8 ... 80 A	S00: 1.6 ... 16 A S0: 4 ... 40 A S2: 8 ... 80 A	• Is adapted to the other devices in the SIRIUS modular system • Just a single version per size with a wide setting range enables easy configuration
Permissible ambient temperature				
During operation		-25 ... +60 °C	-25 ... +60 °C	• Suitable for applications in the control cabinet, worldwide

Current and active current monitoring

Features	3RR21	3RR22	Benefits
Monitoring functions			
Current overshoot	✓ (2-phase)	✓ (3-phase)	• Provides optimum inverse-time delayed protection of loads against excessive temperature rises due to overload • Enables detection of filter blockages or pumping against closed gate valves • Enables drawing conclusions about wear, poor lubrication or other maintenance-relevant phenomena
Current undershoot	✓ (2-phase)	✓ (3-phase)	• Enables detection of overload due to a slipping or torn belt • Guarantees protection of pumps against dry running • Facilitates monitoring of the functions of resistive loads such as heaters • Permits energy savings through monitoring of no-load operation
Apparent current monitoring	✓	✓ (Selectable)	• Precision current monitoring especially in a motor's rated and upper torque range
Active current monitoring	--	✓ (Selectable)	• Optimum current monitoring over a motor's entire torque range through the patented combination of power factor and apparent current monitoring
Range monitoring	✓ (2-phase)	✓ (3-phase)	• Simultaneous monitoring of current overshoot and undershoot with a single device
Phase failure, open circuit	✓ (2-phase)	✓ (3-phase)	• Minimizes heating of three-phase motors during phase failure through immediate disconnection • Prevents operation of hoisting equipment with half the load carrying capacity
Phase sequence monitoring	--	✓ (Selectable)	• Prevents starting of motors, pumps or compressors in the wrong direction of rotation
Internal ground-fault detection (residual-current monitoring)	--	✓ (Selectable)	• Provides optimum protection of loads against high-resistance short circuits or ground faults due to moisture, condensed water, damage to the insulation material, etc. • Eliminates the need for additional special equipment and thus space in the control cabinet • Reduces wiring overhead and costs
Blocking current monitoring	--	✓ (Selectable)	• Minimizes heating of three-phase motors when blocked during operation through immediate disconnection • Minimizes mechanical loading of the system by acting as an electronic shear pin
Features			
RESET function	✓	✓	• Allows manual or automatic resetting of the relay • Resetting directly on the device or by switching the control supply voltage off and on (Remote RESET)
ON-delay time	0 ... 60 s	0 ... 99 s	• Enables motor starting without evaluation of the starting current • Can be used for monitoring motors with lengthy startup
Tripping delay time	0 ... 30 s	0 ... 30 s	• Permits brief threshold value violations during operation • Prevents frequent warnings and disconnections with currents near the threshold values
Operating and indicating elements	LEDs and rotary potentiometers	Displays and buttons	• For setting the threshold values and delay times and for fast and targeted diagnostics • For selectable functions • Displays for permanent display of measured values
Integrated contacts	1 CO contact	1 CO contact, 1 semiconductor output	• Enable disconnection of the system or process when there is an irregularity • Can be used to output signals

✓ Available
-- Not available

Features	3RR21	3RR22	Benefits
Design of load feeders			
Short-circuit strength up to 100 kA at 690 V (in conjunction with the corresponding fuses or the corresponding motor starter protector)	✓	✓	• Provides optimum protection of the loads and operating personnel in the event of short circuits due to insulation faults or faulty switching operations
Electrical and mechanical matching to 3RT2 contactors	✓	✓	• Simplifies configuration • Reduces wiring overhead and costs • Enables stand-alone installation as well as space-saving direct mounting
Spring-loaded terminals for main circuit (with S00, S0) and auxiliary circuits	✓ (optional)	✓ (optional)	• Enables fast connections • Permits vibration-resistant connections • Enables maintenance-free connections
Other features			
Suitable for 1-phase and 3-phase loads	✓	✓	• Enables the monitoring of 1-phase systems through parallel infeed at the contactor or looping the current through the three phase connections
Wide setting ranges	✓	✓	• Reduce the number of versions • Minimize the configuration overhead and costs • Minimize storage overhead, storage costs, tied-up capital
Wide-voltage supply range	✓ (optional)	✓ (optional)	• Reduces the number of versions • Minimizes the configuring overhead and costs • Minimizes storage overhead, storage costs, tied-up capital

✓ Available

Possible combinations of 3RR21/3RR22 monitoring relays with 3RT2 contactors

Monitoring relays	Current range	**Contactors** (type, size, operating power)		
		3RT201	**3RT202**	**3RT203**
		S00	S0	S2
Type	A	3/4/5.5/7.5 kW	5.5/7.5/11/15/18.5 kW	18.5/22/30/37 kW
3RR2.41				
3RR2141	1.6 ... 16	✓	With stand-alone installation support	With stand-alone installation support
3RR2241	1.6 ... 16	✓	With stand-alone installation support	With stand-alone installation support
3RR2.42				
3RR2142	4 ... 40	With stand-alone installation support	✓	With stand-alone installation support
3RR2242	4 ... 40	With stand-alone installation support	✓	With stand-alone installation support
3RR2.43				
3RR2143	8 ... 80	With stand-alone installation support	With stand-alone installation support	✓
3RR2243	8 ... 80	With stand-alone installation support	With stand-alone installation support	✓

✓ Available

Current and active current monitoring

Article No. scheme

Product versions		Article number									
Monitoring relays		**3RR2**	□	**4**	□	**–**	□	□	□	**3**	**0**
Type of setting	Analogically adjustable, 2-phase		**1**								
	Digitally adjustable, 3-phase		**2**								
Size	S00				**1**						
	S0				**2**						
	S2				**3**						
Connection type	Screw terminals						**1**				
	Spring-loaded terminals Size S00, S0						**2**				
	Size S2						**3**				
Number and type of outputs	1 CO contact							**A**			
	1 CO contact + 1 semiconductor							**F**			
Rated control supply voltage	24 V AC/DC								**A**		
	24 ... 240 V AC/DC								**W**		
Example		**3RR2**	**1**	**4**	**1**	**–**	**1**	**A**	**A**	**3**	**0**

Note:

The Article No. scheme shows an overview of product versions for better understanding of the logic behind the article numbers.

For your orders, please use the article numbers quoted in the selection and ordering data.

Benefits

- Can be mounted directly on 3RT2 contactors and 3RA23 reversing contactor assemblies, in other words, there is no need for additional wiring in the main circuit
- Optimally coordinated with the technical characteristics of the 3RT2 contactors
- No separate current transformer required
- Versions with wide voltage supply range
- Variably adjustable to overshoot, undershoot or range monitoring
- Freely configurable delay times and RESET response
- Display of actual value and status messages
- All versions with removable control current terminals
- All versions with screw terminals or spring-loaded terminals
- Simple determination of the threshold values through direct reference to actually measured values for setpoint loading
- Range monitoring and selectable active current measurement mean that only one device for monitoring a motor is required along the entire torque curve
- In addition to current monitoring it is also possible to monitor for broken cables, phase failure, phase sequence, residual current and motor blocking

Application

- Monitoring for current overshoot and undershoot
- Monitoring of broken conductors
- Monitoring of no-load operation and load shedding, e.g. in the event of a torn V-belt or no-load operation of a pump
- Monitoring of overload, e.g. on conveyor belts or cranes due to an excessive load
- Monitoring the functionality of electrical loads such as heaters
- Monitoring of wrong phase sequence on mobile equipment such as compressors or cranes
- Monitoring of high-resistance ground faults, e.g. caused by damaged insulation or moisture

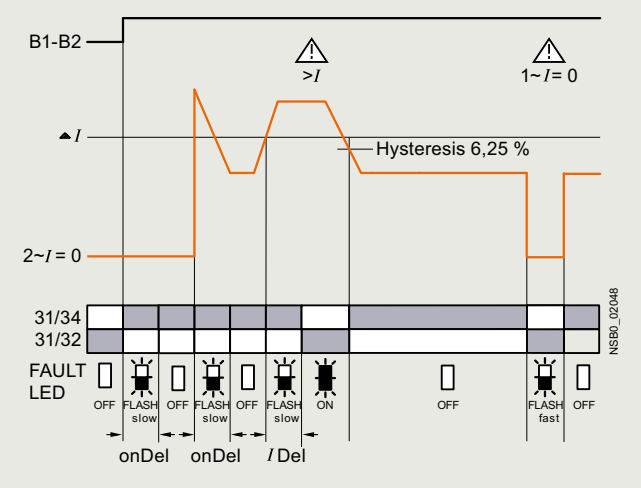
Technical specifications

More information	
Technical specifications, see https://support.industry.siemens.com/cs/ww/en/ps/16205/td	System Manual for modular system, see https://support.industry.siemens.com/cs/ww/en/view/60311318
Configuration Manual for load feeders, see https://support.industry.siemens.com/cs/ww/en/view/39714188	Equipment Manual, see https://support.industry.siemens.com/cs/ww/en/view/54397927
	FAQs, see https://support.industry.siemens.com/cs/ww/en/ps/16205/faq

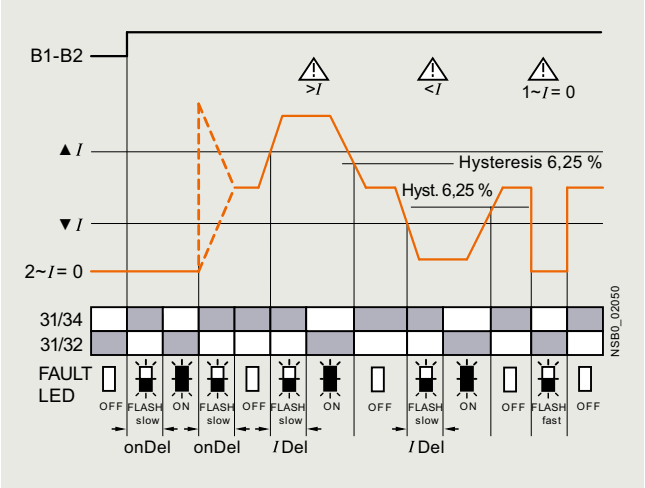
Function diagrams of 3RR214.-.A.30 basic versions, analogically adjustable

Closed-circuit principle upon application of the control supply voltage

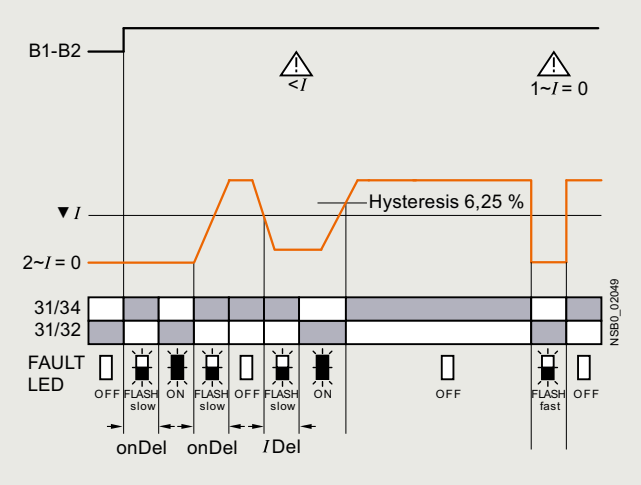
Current overshoot



Range monitoring



Current undershoot



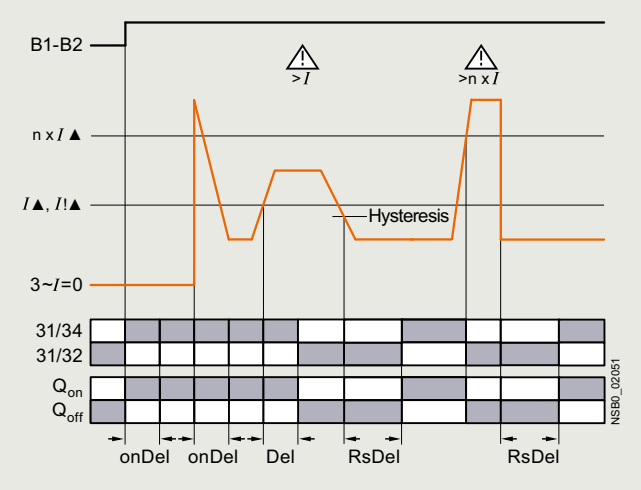
Current and active current monitoring

Function diagrams of 3RR224.-.F.30 standard versions, digitally adjustable

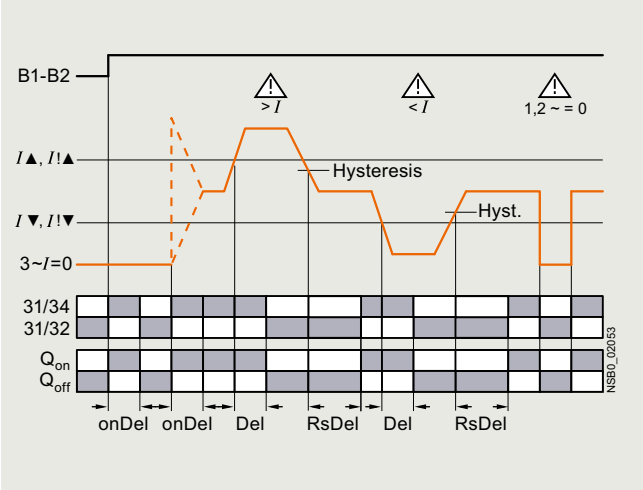
With the closed-circuit principle selected upon application of the control supply voltage

2

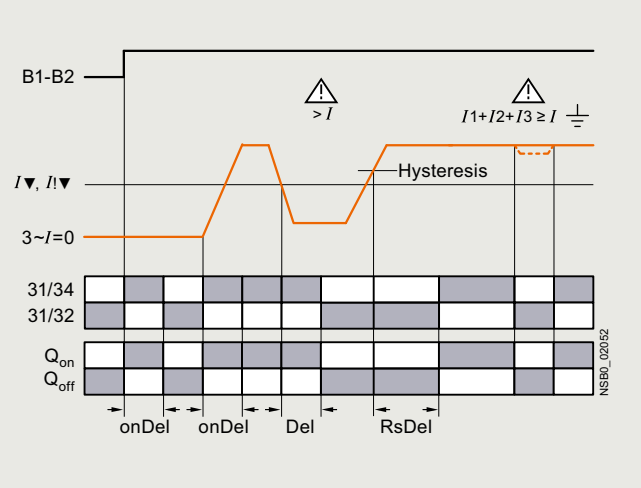
Current overshoot



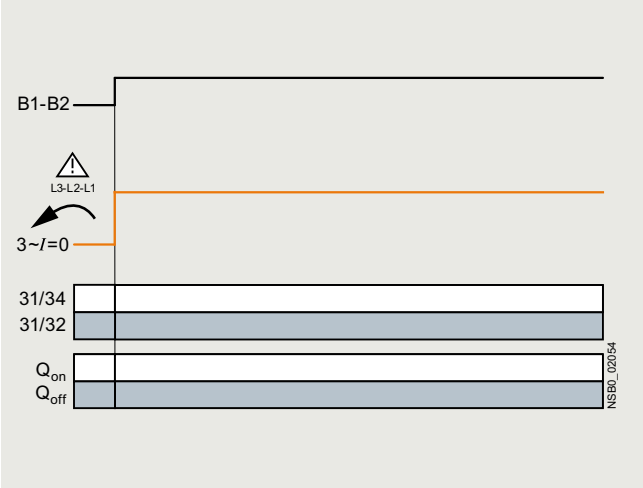
Range monitoring



Current undershoot with residual-current monitoring



Phase sequence monitoring



Selection and ordering data


3RR2141-1AW30


3RR2142-1AW30


3RR2241-1FW30


3RR2242-2FW30


3RR2141-2AA30


3RR2243-3FW30

Size	Measuring range	Hysteresis	Supply voltage U_s	Article No.	Weight
	A	A	V		kg
Basic versions					
• Analogically adjustable • Closed-circuit principle • 1 CO contact • 2-phase current monitoring • Apparent current monitoring • ON-delay 0 ... 60 s • Tripping delay 0 ... 30 s					
S00	1.6 ... 16	6.25% of threshold value	24 AC/DC	**3RR2141-□AA30**	0.180
			24 ... 240 AC/DC	**3RR2141-□AW30**	0.180
S0	4 ... 40	6.25% of threshold value	24 AC/DC	**3RR2142-□AA30**	0.263
			24 ... 240 AC/DC	**3RR2142-□AW30**	0.260
S2	8 ... 80	6.25% of threshold value	24 AC/DC	**3RR2143-□AA30**	0.200
			24 ... 240 AC/DC	**3RR2143-□AW30**	0.200
Standard versions					
• Digitally adjustable • LC display • Open-circuit or closed-circuit principle • 1 CO, 1 semiconductor output • 3-phase current monitoring • Active current or apparent current monitoring • Phase sequence monitoring • Residual-current monitoring • Blocking current monitoring • Reclosing delay time 0 ... 300 min • ON-delay 0 ... 99 s • Separate settings for warning and alarm thresholds • Tripping delay 0 ... 30 s					
S00	1.6 ... 16	0.1 ... 3	24 AC/DC	**3RR2241-□FA30**	0.200
			24 ... 240 AC/DC	**3RR2241-□FW30**	0.200
S0	4 ... 40	0.1 ... 8	24 AC/DC	**3RR2242-□FA30**	0.280
			24 ... 240 AC/DC	**3RR2242-□FW30**	0.280
S2	8 ... 80	0.2 ... 16	24 AC/DC	**3RR2243-□FA30**	0.200
			24 ... 240 AC/DC	**3RR2243-□FW30**	0.440

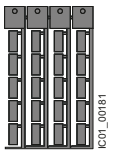
Type of electrical connection

• Screw terminals	1
• Spring-loaded terminals size S00, S0	2
• Spring-loaded terminals size S2	3

*** You can order this quantity or a multiple thereof.**

Current and active current monitoring

Accessories

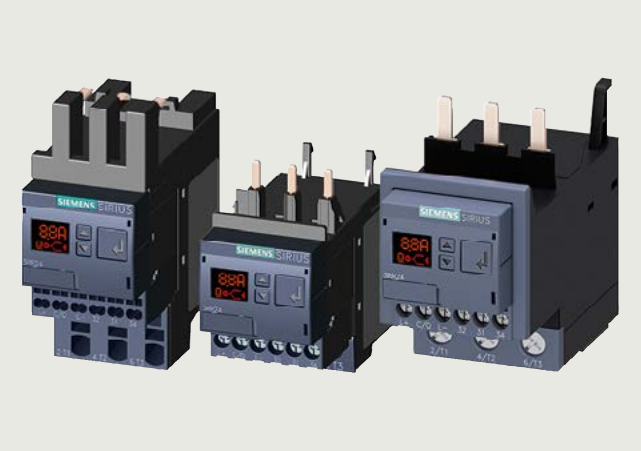
	Use	Version	Size	Article No.	Weight kg
Terminal supports for stand-alone installation[1]					
 3RU2916-3AA01	For 3RR21, 3RR22	For separate mounting of the overload relays or monitoring relays; screw fixing and snap-on mounting on TH 35 standard mounting rail according to IEC 60715		**Screw terminals**	
		• Screw terminals	S00	**3RU2916-3AA01**	0.060
			S0	**3RU2926-3AA01**	0.078
			S2	**3RU2936-3AA01**	0.181
 3RU2936-3AA01					
				Spring-loaded terminals	
 3RU2926-3AC01		• Spring-loaded terminals	S00	**3RU2916-3AC01**	0.064
			S0	**3RU2926-3AC01**	0.086
Sealable covers					
 3RR2940	For 3RR21, 3RR22	**Sealable covers** For securing against unintentional or unauthorized adjustment of settings		**3RR2940**	0.002
Blank labels					
 3RT2900-1SB20	For 3RR21, 3RR22	**Unit labeling plates[2]** For SIRIUS devices			
		• 20 mm x 7 mm, titanium gray		**3RT2900-1SB20**	0.062
Tools for opening spring-loaded terminals					
 3RA2908-1A	For auxiliary circuit connections	**Screwdrivers** For all SIRIUS devices with spring-loaded terminals		**Spring-loaded terminals**	
		Length approx. 200 mm, 3.0 mm x 0.5 mm, titanium gray/black, partially insulated		**3RA2908-1A**	0.050

1) The accessories are exactly the same as the accessories for the 3RU21 thermal overload relay and the 3RB3 electronic overload relay.

2) PC labeling system for individual inscription of unit labeling plates available from: murrplastik Systemtechnik GmbH.

* You can order this quantity or a multiple thereof.

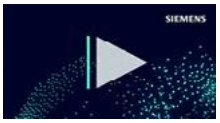
Overview



SIRIUS 3RR2441, 3RR2442 and 3RR2443 current monitoring relays

More information

Homepage, see www.siemens.com/sirius-monitoring-relays
Industry Mall, see www.siemens.com/product?3RR24



Video: SIRIUS 3RR2 current monitoring relays

The SIRIUS 3RR24 current monitoring relays for IO-Link are suitable for the load monitoring of motors or other loads. In 3 phases they monitor the rms value of AC currents for overshooting or undershooting of set threshold values.

Whereas apparent current monitoring is used above all in connection with the rated torque or in case of overload, the active current monitoring option, which is also selectable, can be used to observe and evaluate the load factor over a motor's entire torque range.

The 3RR24 current monitoring relays for IO-Link can be integrated directly in the feeder by mounting on the 3RT2 contactor; separate wiring of the main circuit is therefore superfluous. No separate transformers are required.

For a line-oriented configuration or simultaneous use of an overload relay, terminal supports for stand-alone installation are available for separate standard rail mounting.

The SIRIUS 3RR24 current monitoring relays for IO-Link also offer many other options based upon the monitoring functions of the conventional SIRIUS 3RR2 monitoring relays:

- Measured value transmission to a controller, including resolution and unit, may be parameterizable as to which value is cyclically transmitted
- Transmission of alarm flags to a controller
- Full diagnostics capability by inquiry as to the cause of the fault in the diagnostics data record
- Remote parameterization is also possible, in addition to or instead of local parameterization
- Rapid parameterization of the same devices by duplication of the parameterization in the controller
- Parameter transmission through upload to a controller by IO-Link call or by parameter server (if IO-Link master from IO-Link specification V1.1 and higher is used)
- Consistent central data storage in the event of parameter change locally or via a controller
- Automatic reparameterizing when devices are exchanged
- Blocking of local parameterization via IO-Link possible
- Faults are saved in parameterizable and non-volatile fashion to prevent an automatic startup after voltage failure and to make sure diagnostics data are not lost
- Integration into the automation level provides the option of parameterizing the monitoring relays at any time via a display unit, or displaying the measured values in a control room or locally at the machine/control cabinet.
- The MindSphere app SIRIUS Asset Monitor enables access to the SIRIUS 3RR24 current monitoring relay anytime and anywhere. It provides the user with detailed information on the device status as well as fault messages and warnings in a clearly arranged form.

Even without communication via IO-Link the devices continue to function fully autonomously:

- Parameterization can take place locally at the device, independently of a controller.
- In the event of failure or before the controller becomes available the monitoring relays work as long as the control supply voltage (24 V DC) is present.
- If the monitoring relays are operated without the controller, the 3RR24 monitoring relays for IO-Link have, thanks to the integrated SIO mode, an additional semiconductor output, which switches when the adjustable warning threshold is exceeded.

Thanks to the combination of autonomous monitoring relay function and integrated IO-Link communication, redundant sensors and/or analog signal converters – which previously took over the transmission of measured values to a controller, leading to considerable extra cost and wiring overhead – are no longer needed.

Because the output relays are still present, the monitoring relays increase the functional reliability of the system, since only the controller can fulfill the control tasks if the current measured values are available, whereas the output relays can also be used for the disconnection of the system if limit values that cannot be reached during operation are exceeded.

For more information on the IO-Link communication system.

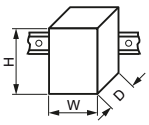
Notes on security

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens products and solutions represent only one component of such a concept.

For more information about the subject of Industrial Security, see www.siemens.com/industrialsecurity.

Current and active current monitoring

3RR24 overview table

Features		3RR24	Benefits
General data			
Sizes Dimensions in mm (W x H x D) • Screw terminals		S00, S0, S2 S00: 45 x 79 x 80, S0: 45 x 87 x 91, S2: 55 x 99 x 112	• Are coordinated with the dimensions, connections and technical characteristics of the other devices in the SIRIUS modular system (contactors, soft starters, etc.) • Permit the mounting of slim-line and compact load feeders in widths of 45 mm (S00 and S0) and 55 mm (S2) • Simplify configuration
• Spring-loaded terminals		S00: 45 x 90 x 80, S0: 45 x 109 x 92, S2: 55 x 99 x 112	
Current range		S00: 1.6 ... 16 A S0: 4 ... 40 A S2: 8 ... 80 A	• Is adapted to the other devices in the SIRIUS modular system • Just a single version per size with a wide setting range enables easy configuration
Permissible ambient temperature			
During operation		-25 ... +60 °C	• Suitable for applications in the control cabinet, worldwide
Monitoring functions			
Current overshoot		✓ (3-phase)	• Provides optimum inverse-time delayed protection of loads against excessive temperature rises due to overload • Enables detection of filter blockages or pumping against closed gate valves • Enables drawing conclusions about wear, poor lubrication or other maintenance-relevant phenomena
Current undershoot		✓ (3-phase)	• Enables detection of overload due to a slipping or torn belt • Guarantees protection of pumps against dry running • Facilitates monitoring of the functions of resistive loads such as heaters • Permits energy savings through monitoring of no-load operation
Apparent current monitoring		✓ (Selectable)	• Precision current monitoring especially in a motor's rated and upper torque range
Active current monitoring		✓ (Selectable)	• Optimum current monitoring over a motor's entire torque range through the patented combination of power factor and apparent current monitoring
Range monitoring		✓ (3-phase)	• Simultaneous monitoring of current overshoot and undershoot with a single device
Phase failure, open circuit		✓ (3-phase)	• Minimizes heating of three-phase motors during phase failure through immediate disconnection • Prevents operation of hoisting equipment with half the load carrying capacity
Phase sequence monitoring		✓ (Selectable)	• Prevents starting of motors, pumps or compressors in the wrong direction of rotation
Internal ground-fault detection (residual-current monitoring)		✓ (Selectable)	• Provides optimum protection of loads against high-resistance short circuits or ground faults due to moisture, condensed water, damage to the insulation material, etc. • Eliminates the need for additional special equipment • Saves space in the control cabinet • Reduces wiring overhead and costs
Blocking current monitoring		✓ (Selectable)	• Minimizes heating of three-phase motors when blocked during operation through immediate disconnection • Minimizes mechanical loading of the system by acting as an electronic shear pin
Operating hours counter		✓	• Gives the time during which there was a measurable current in at least 2 conducting paths • As an indicator for upcoming maintenance or replacement of machine and system components
Operating cycles counter		✓	• Is incremented by 1 each time a breaking operation is detected, in other words a transition from 3-phase current flow to no measurable current flow • As an indicator for upcoming maintenance or replacement of contact blocks

✓ Available

Features	3RR24	Benefits
Features		
RESET function	✓	• Allows manual or automatic resetting of the relay • Resetting directly on the device, by switching the control supply voltage off and on or via IO-Link (Remote RESET)
ON-delay time	0 ... 999.9 s	• Enables motor starting without evaluation of the starting current • Can be used for monitoring motors with lengthy startup
Tripping delay time	0 ... 999.9 s	• Permits brief threshold value violations during operation • Prevents frequent warnings and disconnections with currents near the threshold values
Operating and indicating elements	Displays and buttons	• For setting the threshold values and delay times • For selectable functions • For quick and selective diagnostics • Displays for permanent display of measured values
Integrated contacts	1 CO contact, 1 semiconductor output (in SIO mode)	• Enable disconnection of the system or process when there is an irregularity • Can be used to output signals
Design of load feeders		
Short-circuit strength up to 100 kA at 690 V (in conjunction with the corresponding fuses or the corresponding motor starter protector)	✓	• Provides optimum protection of the loads and operating personnel in the event of short circuits due to insulation faults or faulty switching operations
Electrical and mechanical matching to 3RT2 contactors	✓	• Simplifies configuration • Reduces wiring overhead and costs • Enables stand-alone installation as well as space-saving direct mounting
Spring-loaded terminals for main circuit (with S00, S0) and auxiliary circuits	✓ (optional)	• Enables fast connections • Permits vibration-resistant connections • Enables maintenance-free connections
Other features		
Suitable for 1-phase and 3-phase loads	✓	• Enables the monitoring of 1-phase systems through parallel infeed at the contactor or looping the current through the three phase connections
Wide setting ranges	✓	• Reduce the number of variants • Minimize the configuration overhead and costs • Minimize storage overhead, storage costs, tied-up capital
Power supply	24 V DC	• Direct via IO-Link master or via an external auxiliary voltage independent of the IO-Link • Minimizes the configuring overhead and costs

✓ Available

Possible ways of combining the 3RR24 monitoring relay with the 3RT2 contactor for IO-Link

Monitoring relays	Current range	**Contactors** (type, size, operating power)		
		3RT201	**3RT202**	**3RT203**
		S00	S0	S2
Type	A	3/4/5.5/7.5 kW	5.5/7.5/11/15/18.5 kW	18.5/22/30/37 kW
3RR2441	1.6 ... 16	✓	With stand-alone installation support	With stand-alone installation support
3RR2442	4 ... 40	With stand-alone installation support	✓	With stand-alone installation support
3RR2443	8 ... 80	With stand-alone installation support	With stand-alone installation support	✓

✓ Available

Notes:

Devices required for communication via IO-Link:
- Any controller that supports IO-Link (e.g. ET 200SP with CPU or S7-1200), see Catalog ST 70.
- IO-Link master (e.g. CM 4xIO-Link for SIMATIC ET 200SP or SM 1278 for S7-1200.

Each monitoring relay requires an IO-Link channel.

Current and active current monitoring

Article No. scheme

Product versions		Article number
3RR24 monitoring relay, digitally adjustable with IO-Link		**3RR2 4 4 □ – □ A A 4 0**
Size	S00	**1**
	S0	**2**
	S2	**3**
Connection type	Screw terminals	**1**
	Spring-loaded terminals Size S00, S0	**2**
	Size S2	**3**
Example		**3RR2 4 4 1 – 1 A A 4 0**

Note:

The Article No. scheme shows an overview of product versions for better understanding of the logic behind the article numbers.

For your orders, please use the article numbers quoted in the selection and ordering data.

Benefits

- Can be mounted directly on 3RT2 contactors and 3RA23 reversing contactor assemblies, in other words, there is no need for additional wiring in the main circuit
- Optimally coordinated with the technical characteristics of the 3RT2 contactors
- No separate current transformer required
- Variably adjustable to overshoot, undershoot or range monitoring
- Freely configurable delay times and RESET response
- Display of actual value and status messages
- All versions with removable control current terminals
- All versions with screw or spring-loaded terminals
- Simple determination of the threshold values through direct reference to actually measured values for setpoint loading
- Range monitoring and selectable active current measurement mean that only one device for monitoring a motor is required along the entire torque curve
- In addition to current monitoring it is also possible to monitor for current asymmetry, broken cables, phase failure, phase sequence, residual current and motor blocking
- Integrated counter for operating cycles and operating hours to support requirements-based maintenance of the monitored machine or application
- Simple cyclical transmission of the current measured values, relay switching states and events to a controller
- Remote parameterization
- Automatic reparameterizing when devices are exchanged
- Simple duplication of identical or similar parameterizations
- Reduction of control current wiring
- Elimination of testing costs and wiring errors
- Reduction of configuration work
- Integration in TIA means clear diagnostics if a fault occurs
- Cost saving and space saving in control cabinet due to the elimination of AI and IO modules as well as analog signal converters and duplicated sensors

Application

- Monitoring for current overshoot and undershoot
- Monitoring of broken conductors
- Monitoring of no-load operation and load shedding, e.g. in the event of a torn V-belt or no-load operation of a pump
- Monitoring of overload, e.g. on pumps due to a dirty filter system
- Monitoring the functionality of electrical loads such as heaters
- Monitoring of wrong phase sequence on mobile equipment such as compressors or cranes
- Monitoring of high-resistance short circuits or ground faults, e.g. caused by damaged insulation or moisture

The use of SIRIUS monitoring relays for IO-Link is particularly recommended for machines and plants in which these relays, in addition to their monitoring function, are to be connected to the automation level for the rapid, simple and fault-free provision of the current measured values and/or for remote parameterization.

The monitoring relays can either relieve the controller of monitoring tasks or, as a second monitoring entity in parallel to and independent of the controller, increase the reliability in the process or in the system. In addition, the elimination of AI and IO modules allows the width of the controller to be reduced despite significantly expanded functionality.

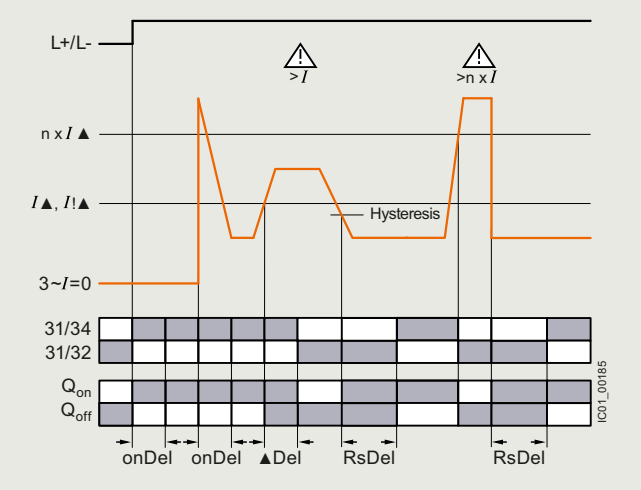
Technical specifications

More information	
Technical specifications, see https://support.industry.siemens.com/cs/ww/en/ps/16206/td	System Manual for modular system, see https://support.industry.siemens.com/cs/ww/en/view/60311318
Configuration Manual for load feeders, see https://support.industry.siemens.com/cs/ww/en/view/39714188	Equipment Manual, see https://support.industry.siemens.com/cs/ww/en/view/54375430
	FAQs, see https://support.industry.siemens.com/cs/ww/en/ps/16206/faq

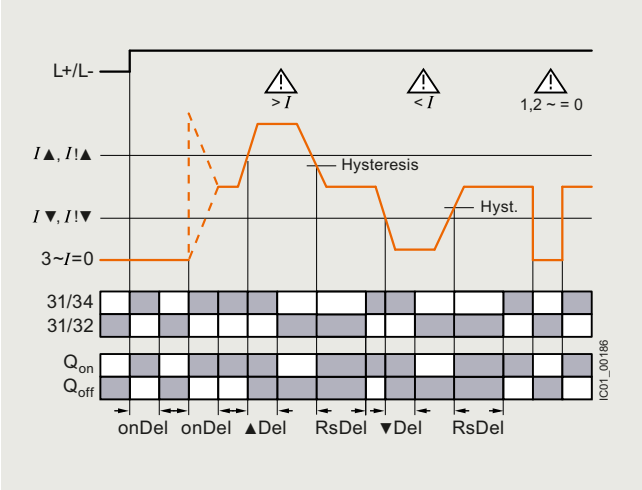
Function diagrams of 3RR24 for IO-Link, digitally adjustable

With the closed-circuit principle selected upon application of the control supply voltage

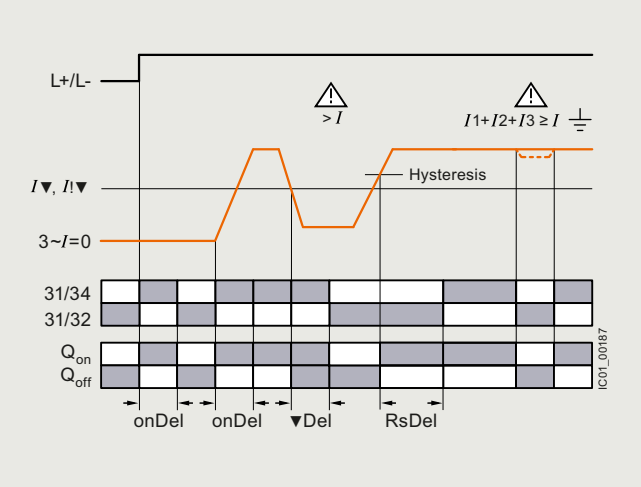
Current overshoot



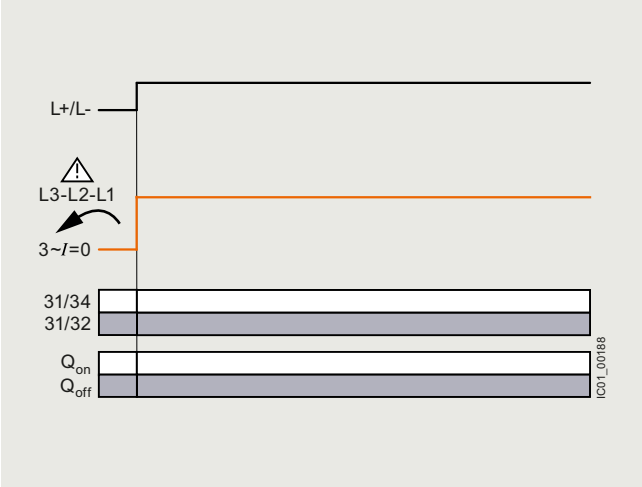
Range monitoring



Current undershoot with residual-current monitoring



Phase sequence monitoring



Current and active current monitoring

Selection and ordering data

SIRIUS 3RR24 current monitoring relays for IO-Link


3RR2441-1AA40


3RR2442-1AA40


3RR2441-2AA40


3RR2442-2AA40


3RR2443-1AA40


3RR2443-2AA40

Size	Measuring range	Hysteresis	Supply voltage U_s	Article No.	Weight
	A	A	V		kg
• Digitally adjustable • LC display • Open-circuit or closed-circuit principle • 1 CO contact • 1 semiconductor output (in SIO mode) • 3-phase current monitoring • Active current or apparent current monitoring • Current asymmetry monitoring • Phase sequence monitoring • Residual-current monitoring • Blocking current monitoring • Operating hours counter • Operating cycles counter • Reclosing delay time 0 ... 300 min • ON-delay 0 ... 999.9 s • Tripping delay 0 ... 999.9 s • Separate settings for warning and alarm thresholds • Auto or Manual RESET					
S00	1.6 ... 16	0.1 ... 3	24 DC	**3RR2441-☐AA40**	0.200
S0	4 ... 40	0.1 ... 8	24 DC	**3RR2442-☐AA40**	0.280
S2	8 ... 80	0.2 ... 16	24 DC	**3RR2443-☐AA40**	0.200

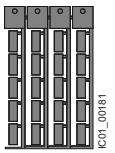
Type of electrical connection

- Screw terminals
- Spring-loaded terminals size S00, S0
- Spring-loaded terminals size S2

1
2
3

* You can order this quantity or a multiple thereof.

Accessories

	Use	Version	Size	Article No.	Weight kg
Terminal supports for stand-alone installation[1]					
 3RU2916-3AA01	For 3RR24	For separate mounting of the overload relays or monitoring relays; screw fixing and snap-on mounting on TH 35 standard mounting rail according to IEC 60715		**Screw terminals**	
		• Screw terminals	S00	**3RU2916-3AA01**	0.060
			S0	**3RU2926-3AA01**	0.078
 3RU2936-3AA01			S2	**3RU2936-3AA01**	0.181
				Spring-loaded terminals	
 3RU2926-3AC01		• Spring-loaded terminals	S00	**3RU2916-3AC01**	0.064
			S0	**3RU2926-3AC01**	0.086
Sealable covers					
 3RR2940	For 3RR24	**Sealable covers** For securing against unintentional or unauthorized adjustment of settings		**3RR2940**	0.002
Blank labels					
 3RT2900-1SB20	For 3RR24	**Unit labeling plates**[2] For SIRIUS devices			
		• 20 mm x 7 mm, titanium gray		**3RT2900-1SB20**	0.062
Tools for opening spring-loaded terminals					
 3RA2908-1A	For auxiliary circuit connections	**Screwdrivers** For all SIRIUS devices with spring-loaded terminals		**Spring-loaded terminals**	
		Length approx. 200 mm, 3.0 mm x 0.5 mm, titanium gray/black, partially insulated		**3RA2908-1A**	0.050
Software					
	For 3RR24	**SIRIUS Asset Monitor** The MindSphere app enables access to the SIRIUS 3RR24 monitoring relays anytime and anywhere and provides detailed information about the device status and fault messages and warnings.			

1) The accessories are exactly the same as the accessories for the 3RU21 thermal overload relay and the 3RB3 electronic overload relay.

2) PC labeling system for individual inscription of unit labeling plates available from: murrplastik Systemtechnik GmbH.

*** You can order this quantity or a multiple thereof.**

DC load monitoring

Overview

SIRIUS 3UG546 DC load monitoring relays

More information

Homepage, see www.siemens.com/sirius-monitoring-relays
Industry Mall, see www.siemens.com/product?3UG5

The SIRIUS 3UG546 DC load monitoring relays are suitable for monitoring motors, batteries, and other DC equipment. They are also suitable for applications where batteries are used. The devices monitor the DC current, voltage, and actual power for overshooting or undershooting of the set limit values in 1 or 2 channels. The relays have a CO contact output for alarms and operate on the closed-circuit principle (NC).

The devices are parameterized via PROFINET, and transfer the measured values and diagnostic messages to a controller. Besides providing detailed fault diagnostics, the integrated energy counters, operating hours counters, and operating cycle counters can also be read out and reset.

When metering energy consumption, the SIRIUS 3UG546 DC load monitoring relays distinguish the direction of current flow and can thus, for example, separately sense the quantities of energy stored in or drawn from a battery.

Features	3UG5461-1AA4., 3UG5462-1AA4.
DC monitoring	
Monitoring the DC current for undershoot	✓
Monitoring the DC current for overshoot	✓
Range monitoring	✓
Voltage monitoring	
Monitoring the voltage for undershoot	✓
Monitoring the voltage for overshoot	✓
Range monitoring	✓
Power monitoring	
Monitoring the power for undershoot	✓
Monitoring the power for overshoot	✓
Range monitoring	✓
Delay times	
ON-delay	✓
Tripping delay	✓
Operating hours counter	
Monitoring for overshoot	✓
Operating cycles counter	
Monitoring for overshoot	✓
Energy recovery counter	
Monitoring for overshoot	✓
Energy consumption counter	
Monitoring for overshoot	✓
PROFINET IO functions	
Ethernet services	✓
Port diagnostics	✓
Min. update time	2 ms
Resetting of communication parameters to factory settings	✓
PROFINET RT (real-time communication)	✓
Firmware update via PROFINET IO	✓
I&M identification data 0 to 3	✓

✓ Available

Article No. scheme

Product versions		Article number									
Monitoring relays		**3UG546**	☐	**–**	**1**	**A**	**A**	**4**	☐
Current measuring range	2 x 8 A/1 x 16 A		**1**						
	1 x 63 A		**2**						
Voltage range	0 ... 800 V								**0**
	0 ... 60 V								**1**
Example		**3UG546**	**1**	**–**	**1**	**A**	**A**	**4**	**0**

Note:

The Article No. scheme shows an overview of product versions for better understanding of the logic behind the article numbers.

For your orders, please use the article numbers quoted in the selection and ordering data.

Benefits

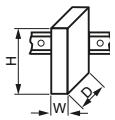
- Wide voltage measuring range of up to 800 V
- 60 V versions especially for applications where batteries are used
- Detection and monitoring of current, voltage and power in a single device
- Detailed fault diagnostics
- Energy metering with distinction of direction of current flow
- Communication and visualization via PROFINET and thus quick and easy integration for visualizing plant energy values
- Integration in the TIA Portal
- Customary screw terminals for quick and reliable wiring
- Device replacement without renewed wiring thanks to removable terminals

Application

- Exhaustive discharge protection on battery-operated vehicles
- Acquisition of energy flows, incl. energy recovery, e.g. for robots
- DC line monitoring
- DC heaters
- Lighting systems
- Energy management
- Condition monitoring

Technical specifications

More information	
Technical specifications, see https://support.industry.siemens.com/cs/ww/en/ps/25412/td	Equipment Manual, see https://support.industry.siemens.com/cs/ww/en/ps/25412/man FAQs, see https://support.industry.siemens.com/cs/ww/en/ps/25412/faq

Article number		3UG5461-1AA40	3UG5461-1AA41	3UG5462-1AA40	3UG5462-1AA41
General technical specifications:					
Dimensions (W x H x D)	mm	22.5 × 100 × 141.6		45 × 100 × 141.6	
					
Type of electrical separation		Protective separation			
Electrical endurance (operating cycles) for relay outputs, maximum		100 000, 0.5 A, 125 V AC, for resistive load up to 40 °C			
Mechanical service life (operating cycles), typical		10 000 000			
Power loss [W], maximum	W	3			
Adjustable response value current 1	A	-8 ... +8		-63 ... +63	
Adjustable response value current 2	A	-8 ... +8		--	
Adjustable ON-delay time					
• On starting	s	0 ... 999			
• On upper or lower limit violation	s	0 ... 999			
Adjustable voltage range	V	0 ... 800	0 ... 60	0 ... 800	0 ... 60
Minimum supply voltage failure buffering time	ms	10			
Reaction time, maximum	ms	100			
Degree of protection IP on the front according to IEC 60529		IP20			
Touch protection on the front according to IEC 60529		Finger-safe		Finger-safe for vertical touching from the front	
Type of mounting		Screw fixing and snap-on mounting on 35 mm standard mounting rail			
• Mounting position		Any			
Installation altitude at height above sea level, maximum	m	2 000			
Ambient temperature					
• During operation	°C	-25 ... +60			
• During storage	°C	-40 ... +80			
Relative temperature-related measurement deviation	%	0.5			
Number of ports at the interface 1		1			
Product function					
• Operating cycles counter		Yes			
• Operating hours counter		Yes			
• Auto RESET		Yes			
• Manual RESET		Yes			
• Overvoltage detection DC		Yes			
• Overcurrent detection DC		Yes			
• Undervoltage detection DC		Yes			
• Undercurrent detection DC		Yes			
Product component					
• Removable terminal for main circuit		Yes		No	
• Removable terminal for auxiliary and control circuit		Yes			

DC load monitoring

Article number		3UG5461-1AA40	3UG5461-1AA41	3UG5462-1AA40	3UG5462-1AA41
Measuring circuit:					
Relative measuring accuracy with reference to the full-scale value	%	2			
Number of CO contacts for auxiliary contacts		1			
Control circuit:					
Current-carrying capacity of the output relay at DC-13 at 24 V	A	1			
Thermal current of the non-solid-state contact blocks, maximum	A	1			
Type of voltage for monitoring		DC			
Type of current for monitoring		DC			
Supply voltage type		DC			
Supply voltage 1 at DC, rated value	V	24			
Supply voltage:					
Operating range factor of the supply voltage, rated value **At DC**		0.85 ... 1.15			

Article number		3UG5461-1AA40	3UG5461-1AA41	3UG5462-1AA40	3UG5462-1AA41
Type of electrical connection		**Screw terminals**			
Connectable conductor cross-section for auxiliary contacts					
• Solid	mm^2	1 x (0.5 ... 4), 2 x (0.5 ... 2.5)			
• Finely stranded with end sleeve	mm^2	1 x (0.5 ... 4), 2 x (0.5 ... 1.5)			
• For AWG cables		1 x (20 ... 12), 2 x (20 ... 14)			
Connectable conductor cross-section for main contacts					
• Solid	mm^2	1 x (0.5 ... 4), 2 x (0.5 ... 2.5)		2 x (1 ... 16), 1 x (1 ... 16)	
• Finely stranded with end sleeve	mm^2	1 x (0.5 ... 4), 2 x (0.5 ... 2.5)		2 x (1 ... 25), 1 x (1 ... 35)	
• Stranded	mm^2	1 x (0.5 ... 4), 2 x (0.5 ... 2.5)		2 x (1 ... 16), 1 x (1 ... 16)	
• For AWG cables		1 x (20 ... 12), 2 x (20 ... 14)		1 x (18 ... 1), 2 x (18 ... 2)	

The SIRIUS 3UG546 DC load monitoring relays monitor a DC load current circuit for undershooting or overshooting of set limit values in 1 or 2 channels. Current, voltage, and power can be monitored separately. When the relays measure the current, they also detect the direction of current and have separate counters for measuring energy consumption and energy recovery.

The devices count the operating cycles and the operating hours of the connected loads as well as the operating cycles of the internal relay. All counters can be monitored for settable limit values and the counter statuses can be reset (with the exception of the operating cycle counter of the internal relay).

The SIRIUS 3UG546 DC load monitoring relays are parameterized exclusively via a PROFINET interface. All measured values and counter values as well as other diagnostics data are transmitted to a controller via PROFINET. The relays can also be operated without PROFINET. If communication fails, the monitoring function continues to be reliably executed. The internal relay, which is switched as a signaling output that responds when a set limit value is undershot or overshot, responds to detected system faults.

All monitored counter values and measured values can be additionally assigned a warning limit, which generates an alarm via PROFINET when the set value is undershot or overshot. Violations of the set limit values are also signaled as an alarm via PROFINET.

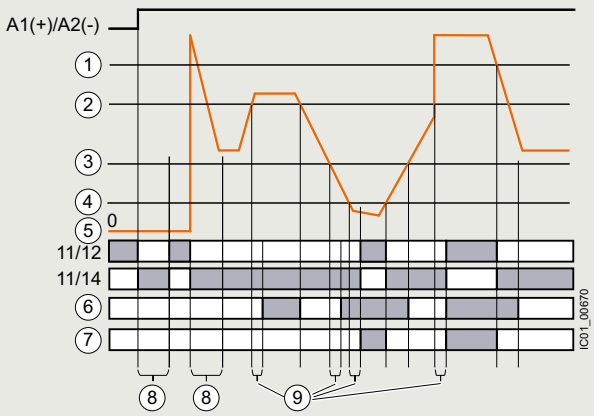
The devices are supplied via an external 24 V DC voltage source.

The integral counters for operating hours and operating cycles support operators in requirement-oriented plant maintenance. The operating hours counter outputs the time during which a measurable current flows. The properties of the insulation material of the motor windings, for example, deteriorate during operation due to the thermal load. The operating hours serve as an indicator of upcoming maintenance or replacement of machine parts and system components.

The operating cycles counter is incremented by one each time a breaking operation of the monitored load is detected (transition from current flow to no measurable current flow). The number of operating cycles serves as an indicator of upcoming maintenance or replacement of contact blocks. Arcs in breaking operations cause high loads and wear in particular in DC current circuits.

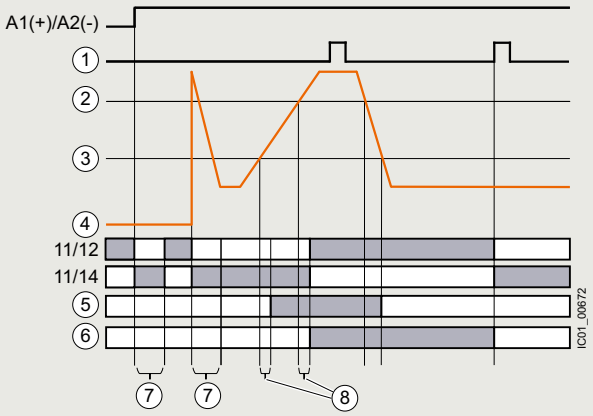
With the closed-circuit principle selected upon application of the control supply voltage

Monitoring for overshooting and undershooting of a measured value including parameterized warning limit/current flow in one direction only/automatic RESET



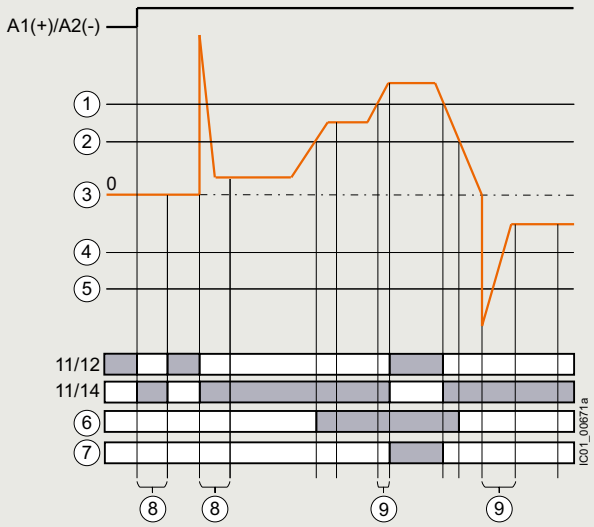
1 Threshold for overshoot
2 Warning threshold for overshoot
3 Warning threshold for undershoot
4 Threshold for undershoot
5 Measured value
6 PROFINET diagnostic interrupt (warning)
7 PROFINET diagnostic interrupt (fault)
8 ON-delay time
9 Tripping delay time

Monitoring for overshooting of a measured value including parameterized warning limit/manual RESET



1 RESET
2 Threshold for overshoot
3 Warning threshold for overshoot
4 Measured value
5 PROFINET diagnostic interrupt (warning)
6 PROFINET diagnostic interrupt (fault)
7 ON-delay time
8 Tripping delay time

Monitoring for overshooting and undershooting of a measured value including parameterized warning limit/current flow in both directions (energy consumption and energy recovery)/ automatic RESET



1 Threshold for overshoot
2 Warning threshold for overshoot
3 Measured value
4 Warning threshold for undershoot
5 Threshold for undershoot
6 PROFINET diagnostic interrupt (warning)
7 PROFINET diagnostic interrupt (fault)
8 ON-delay time
9 Tripping delay time

DC load monitoring

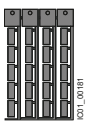
Selection and ordering data

3UG5461-1AA40

3UG5462-1AA40

Measurable voltage	Measurable current	Width	Screw terminals Article No.	Weight kg
V	A	mm		
DC load monitoring relay				
0 ... 800	2 x 8/1 x 16	22.5	**3UG5461-1AA40**	0.255
	1 x 63	45	**3UG5462-1AA40**	0.385
0 ... 60	2 x 8/1 x 16	22.5	**3UG5461-1AA41**	0.252
	1 x 63	45	**3UG5462-1AA41**	0.381

Accessories

	Version	Article No.	Weight kg
Terminals for SIRIUS devices in the industrial standard mounting rail enclosure			
 3ZY1122-1BA00	**Removable terminals** • 2-pole, up to 1 x 4 mm² or 2 x 2.5 mm²	**Screw terminals** **3ZY1122-1BA00**	0.010
Accessories for enclosures			
 3ZY1311-0AA00	**Push-in lugs** For wall mounting	**3ZY1311-0AA00**	0.001
 3ZY1440-1AA00	**Coding pins** For removable terminals of SIRIUS devices in the industrial standard mounting rail enclosure; enable the mechanical coding of terminals	**3ZY1440-1AA00**	
  3ZY1450-1AB00	**Hinged cover** Replacement cover, without terminal labeling, titanium gray • 22.5 mm wide	**3ZY1450-1AB00**	0.004
Blank labels			
 3RT2900-1SB20	**Unit labeling plates**[1)] For SIRIUS devices • 20 mm x 7 mm, titanium gray	**3RT2900-1SB20**	0.062
Tools for opening spring-loaded terminals			
 3RA2908-1A	**Screwdrivers** For all SIRIUS devices with spring-loaded terminals Length approx. 200 mm, 3.0 mm x 0.5 mm, titanium gray/black, partially insulated	**Spring-loaded terminals (push-in)** **3RA2908-1A**	0.050

1) PC labeling system for individual inscription of unit labeling plates available from: murrplastik Systemtechnik GmbH.

* You can order this quantity or a multiple thereof.

Overview

SIRIUS 3UG4 monitoring relay

More information
Homepage, see www.siemens.com/sirius-monitoring-relays
Industry Mall, see www.siemens.com/product?3UG45
Conversion tool, see www.siemens.com/conversion-tool

The field-proven SIRIUS monitoring relays for electrical and mechanical variables enable constant monitoring of all important characteristic quantities that provide information about the functional capability of a plant. Both sudden disturbances and gradual changes, which may indicate the need for maintenance, are detected. Thanks to their relay outputs, the monitoring relays permit direct disconnection of the affected system components as well as alerting (e.g. by switching a warning lamp).

Thanks to adjustable delay times the monitoring relays can respond very flexibly to brief faults such as voltage dips or load changes. This avoids unnecessary alarms and disconnections while enhancing plant availability.

The individual 3UG4 monitoring relays offer the following functions in various combinations:

- Undershooting and/or overshooting of liquid levels
- Phase sequence
- Phase failure, neutral conductor failure
- Phase asymmetry
- Undershooting and/or overshooting of limit values for voltage
- Undershooting and/or overshooting of limit values for current
- Undershooting and/or overshooting of limit values for power factor
- Monitoring of the active current or the apparent current
- Monitoring of the residual current
- Monitoring of the insulation resistance
- Undershooting and/or overshooting of limit values for speed

Article No. scheme

Product versions		Article number									
Monitoring relays		**3UG4**	□	□	□	–	□	□	□	□	**0**
Type of setting	e.g. 5 = analogically adjustable		□								
Functions	e.g. 11 = line monitoring			□	□						
Connection type	Screw terminals						**1**				
	Spring-loaded terminals						**2**				
Contacts	e.g. A = 1 CO contact							□			
Supply voltage	e.g. N2 = 160 ... 260 V AC									□	□
Example		**3UG4**	**5**	**1**	**1**	**–**	**1**	**A**	**N**	**2**	**0**

Note:

The Article No. scheme shows an overview of product versions for better understanding of the logic behind the article numbers.

For your orders, please use the article numbers quoted in the selection and ordering data.

General data

Benefits

- Customary screw and spring-loaded terminals for quick and reliable wiring
- Fast commissioning thanks to menu-guided parameterization and actual value display for limit value determination
- Reduced space requirement in the control cabinet thanks to a consistent width of 22.5 mm
- Parameterizable monitoring functions, delay times, RESET response, etc.
- Reduced stockkeeping thanks to minimized variance and large measuring ranges
- Wide-voltage power supply units for global applicability
- Device replacement without renewed wiring thanks to removable terminals
- Reliable system diagnostics thanks to actual value display and connectable fault storage
- Rapid diagnostics thanks to unambiguous fault messages on the display

Application

The SIRIUS 3UG4 monitoring relays monitor the most diverse electrical and mechanical quantities in the feeder, and provide reliable protection against damage in the plant. For this purpose, they offer freely parameterizable limit values and diverse options for adapting to the respective task, and in the event of a fault, they provide clear diagnostics information.

The digitally adjustable products also display the current measured values direct on the device. This not only facilitates the display of valuable plant status information during operation, it also enables adjustment of the monitored limit values in accordance with the actual conditions.

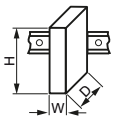
The positive result: More selective avoidance of production faults – sustained increases in availability and productivity.

The 3UG4 monitoring relays are available for the following applications:

- Line and 1-phase voltage monitoring
- 1-phase current monitoring or power factor and active current monitoring
- Residual-current monitoring
- Insulation monitoring
- Level monitoring
- Speed monitoring

Technical specifications

More information	
Technical specifications, see https://support.industry.siemens.com/cs/ww/en/ps/16367/td Equipment Manual and internal circuit diagrams, see https://support.industry.siemens.com/cs/ww/en/view/54397927	FAQs, see https://support.industry.siemens.com/cs/ww/en/ps/16367/faq

Type			3UG
General data			
Dimensions (W x H x D)			
• For 2 terminal blocks			
- Screw terminals		mm	22.5 x 83 x 91
- Spring-loaded terminals		mm	22.5 x 84 x 91
• For 3 terminal blocks			
- Screw terminals		mm	22.5 x 92 x 91
- Spring-loaded terminals		mm	22.5 x 94 x 91
• For 4 terminal blocks			
- Screw terminals		mm	22.5 x 103 x 91
- Spring-loaded terminals		mm	22.5 x 103 x 91
Permissible ambient temperature			
• During operation		°C	-25 ... +60
Connection type			**Screw terminals**
• Terminal screw			M3 (for standard screwdriver, size 2 and Pozidriv 2)
• Solid		mm^2	1 x (0.5 ... 4)/2 x (0.5 ... 2.5)
• Finely stranded with end sleeve		mm^2	1 x (0.5 ... 2.5)/2 x (0.5 ... 1.5)
• AWG cables, solid or stranded		AWG	2 x (20 ... 14)
Connection type			**Spring-loaded terminals**
• Solid		mm^2	2 x (0.25 ... 1.5)
• Finely stranded, with end sleeve acc. to DIN 46228		mm^2	2 x (0.25 ... 1.5)
• Finely stranded		mm^2	2 x (0.25 ... 1.5)
• AWG cables, solid or stranded		AWG	2 x (24 ... 16)

Overview

SIRIUS 3UG4616 monitoring relay

Electronic line monitoring relays provide maximum protection for mobile machines and plants or for unstable networks. Network and voltage faults can thus be detected early and rectified before far greater damage ensues.

Depending on the version, the relays monitor phase sequence, phase failure with and without N conductor monitoring, phase asymmetry, undervoltage or overvoltage.

Phase asymmetry is evaluated as the difference between the greatest and the smallest phase voltage relative to the greatest phase voltage. Undervoltage or overvoltage exists when at least one phase voltage deviates by 20% from the set rated system voltage or the directly set limit values are overshot or undershot. The rms value of the voltage is measured.

With the 3UG4617 or 3UG4618 relay, a wrong direction of rotation can also be corrected automatically.

Benefits

- Can be used without auxiliary voltage in any network from 160 to 630 V AC worldwide thanks to wide voltage range
- Variably adjustable to overshoot, undershoot or range monitoring
- Freely configurable delay times and RESET response
- Width 22.5 mm
- Permanent display of actual value and line fault type on the digital versions
- Automatic correction of the direction of rotation by distinguishing between power system faults and wrong phase sequence
- All versions with removable terminals
- All versions with screw or spring-loaded terminals

Application

The relays are used above all for mobile equipment, e.g. air conditioning compressors, refrigerating containers, building site compressors and cranes.

Function	Application
Phase sequence	• Direction of rotation of the drive
Phase failure	• A fuse has tripped • Failure of the control supply voltage • Broken cable
Phase asymmetry	• Overheating of the motor due to asymmetrical voltage • Detection of asymmetrically loaded networks
Undervoltage	• Increased current on a motor with corresponding overheating • Unintentional resetting of a device • Network collapse, particularly with battery power
Overvoltage	• Protection of a plant against destruction due to overvoltage

Technical specifications

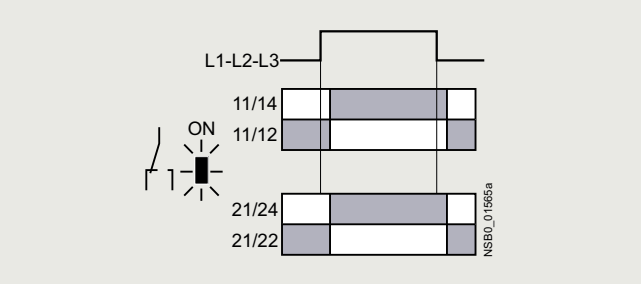
3UG4511 monitoring relays

The 3UG4511 phase sequenced relay monitors the phase sequence in a 3-phase network. No adjustments are required for operation. The device has an internal power supply and works using the closed-circuit principle. If the phase sequence at the terminals L1-L2-L3 is correct, the output relay picks up after the delay time has elapsed and the green LED is lit. If the phase sequence is wrong, the output relay remains in its rest position.

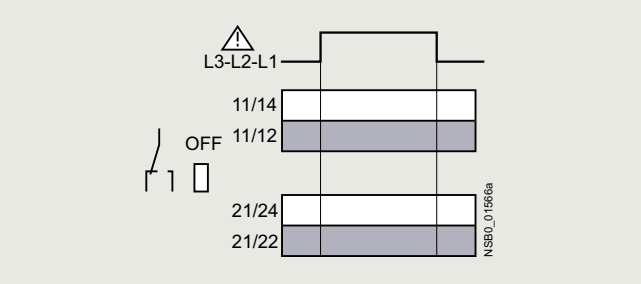
Note:

When one phase fails, connected loads (motor windings, lamps, transformers, coils, etc.) create a feedback voltage at the terminal of the failed phase due to the network coupling. Because the 3UG4511 relays are not resistant to voltage feedback, such a phase failure is not detected. Should this be required, then the 3UG4512 monitoring relay must be used.

Correct phase sequence



Wrong phase sequence



Line monitoring

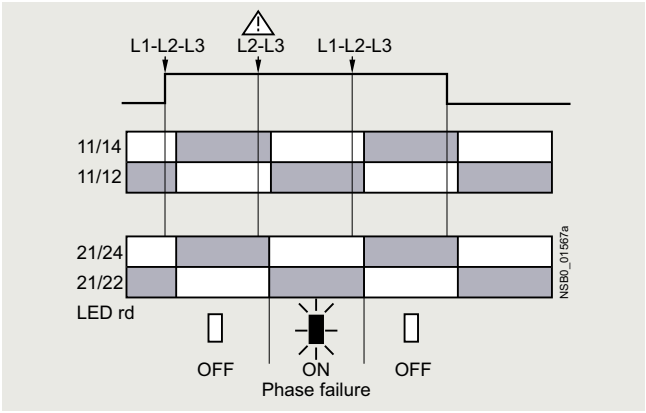
3UG4512 monitoring relays

The 3UG4512 line monitoring relay monitors 3-phase networks with regard to phase sequence, phase failure and phase asymmetry of 10%. Thanks to a special measuring method, a phase failure is reliably detected in spite of the wide voltage range from 160 to 690 V AC and feedback through the load of up to 90%. The device has an internal power supply and works using the closed-circuit principle. No adjustments are required. If the line voltage is switched on, the green LED will light up. If the phase sequence at the terminals L1-L2-L3 is correct, the output relay picks up. If the phase sequence is wrong, the red LED flashes and the output relay remains in its rest position. If a phase fails, the red LED is permanently lit and the output relay drops.

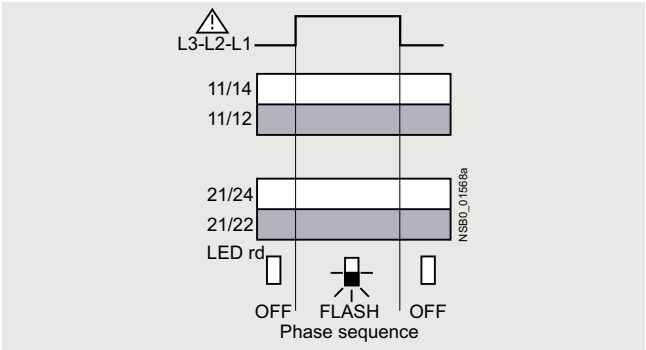
Note:

The red LED is a fault diagnostic indicator and does not show the current relay status. The 3UG4512 monitoring relay is suitable for line frequencies of 50/60 Hz.

Phase failure



Wrong phase sequence



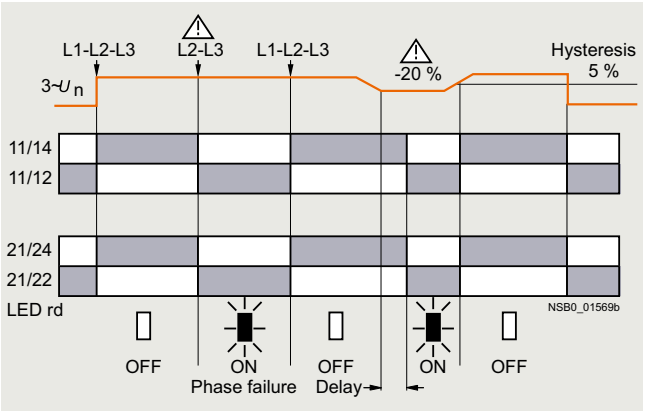
3UG4513 monitoring relays

The 3UG4513 line monitoring relay monitors 3-phase networks with regard to phase sequence, phase failure, phase asymmetry and undervoltage of 20%. The device has an internal power supply and works using the closed-circuit principle.
The hysteresis is 5%. The integrated response delay time T is adjustable from 0 to 20 s and responds to undervoltage. If the direction is incorrect, the device switches off immediately. Thanks to a special measuring method, a phase failure is reliably detected in spite of the wide voltage range from 160 to 690 V AC and feedback through the load of up to 80%. If the line voltage is switched on, the green LED will light up. If the phase sequence at the terminals L1-L2-L3 is correct, the output relay picks up. If the phase sequence is wrong, the red LED flashes and the output relay remains in its rest position. If a phase fails, the red LED is permanently lit and the output relay drops.

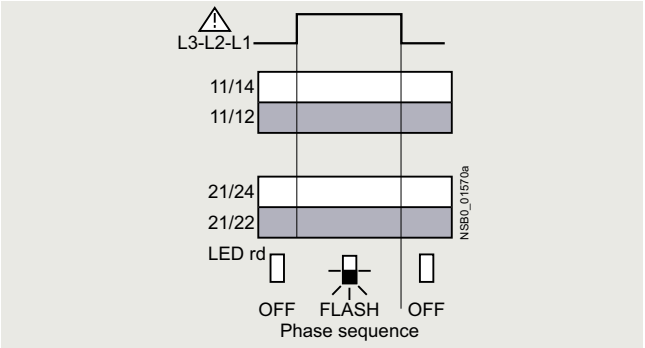
Note:

The red LED is a fault diagnostic indicator and does not show the current relay status. The 3UG4513 monitoring relay is suitable for line frequencies of 50/60 Hz.

Phase failure and undervoltage



Wrong phase sequence



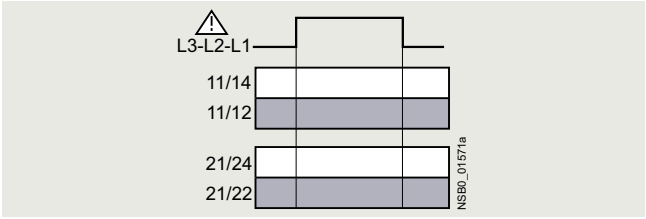
3UG4614 monitoring relays

The 3UG4614 line monitoring relay has a wide voltage range input and an internal power supply. The device is equipped with a display and is parameterized using three buttons. The unit monitors 3-phase networks with regard to phase asymmetry from 5 to 20%, phase failure, undervoltage and phase sequence. The hysteresis is adjustable from 1 to 20 V. In addition the device has a response delay and ON-delay from 0 to 20 s in each case. The response delay time responds to phase asymmetry and undervoltage. If the direction is incorrect, the device switches off immediately. Thanks to a special measuring method, a phase failure is reliably detected in spite of the wide voltage range from 160 to 690 V AC and feedback through the load of up to 80%.

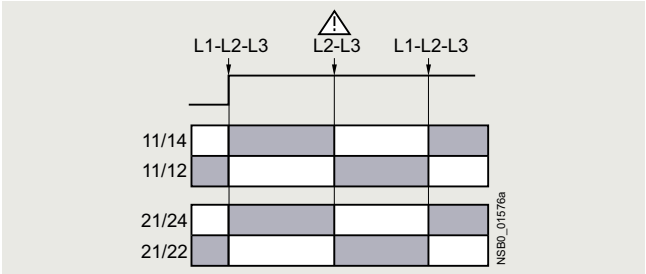
The 3UG4614 monitoring relay can be operated on the basis of either the open-circuit or closed-circuit principle and with Manual or Auto RESET.

With the closed-circuit principle selected

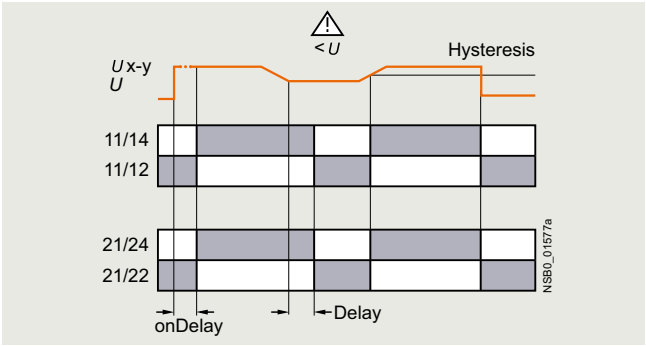
Wrong phase sequence



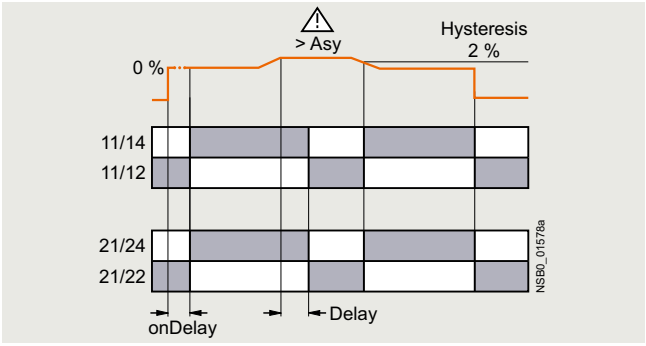
Phase failure



Undervoltage



Asymmetry



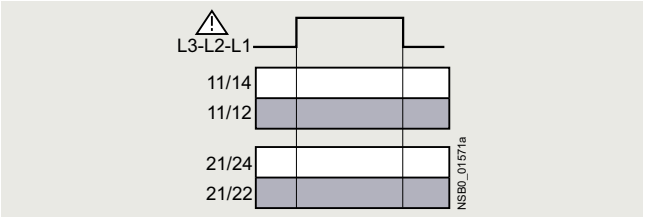
3UG4615/3UG4616 monitoring relays

The 3UG4615/3UG4616 line monitoring relay has a wide voltage range input and an internal power supply. The device is equipped with a display and is parameterized using three buttons. The 3UG4615 device monitors 3-phase networks with regard to phase failure, undervoltage, overvoltage and phase sequence. The 3UG4616 monitoring relay monitors the neutral conductor as well. The hysteresis is adjustable from 1 to 20 V. In addition the device has two separately adjustable delay times for overvoltage and undervoltage from 0 to 20 s in each case. If the direction of rotation is incorrect, the device switches off immediately. Thanks to a special measuring method, a phase failure is reliably detected in spite of the wide voltage range from 160 to 690 V AC and feedback through the load of up to 80%.

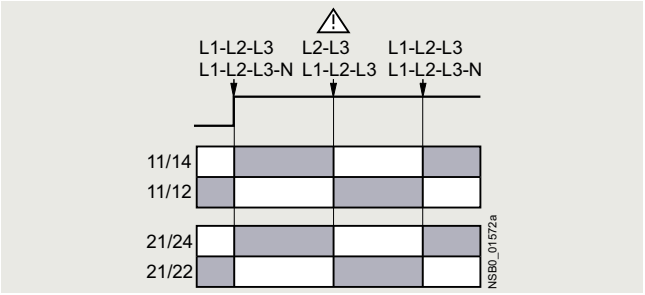
The 3UG4615/3UG4616 monitoring relay can be operated on the basis of either the open-circuit or closed-circuit principle and with Manual or Auto RESET.

With the closed-circuit principle selected

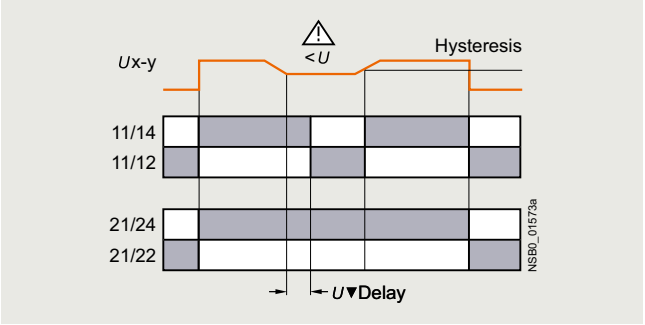
Wrong phase sequence



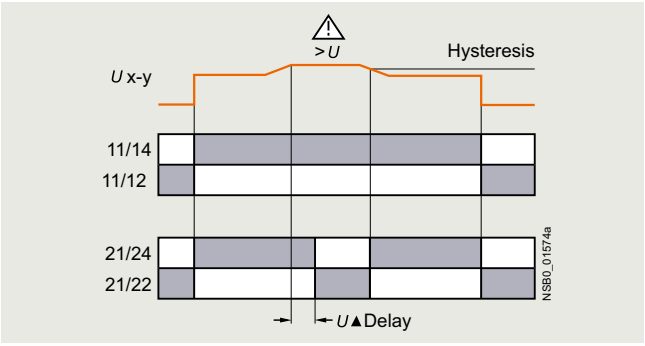
Phase failure



Undervoltage



Overvoltage



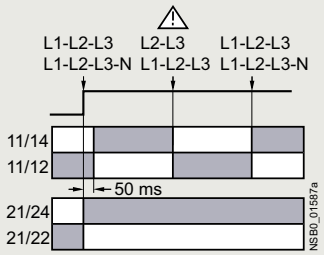
Line monitoring

3UG4617/3UG4618 monitoring relays

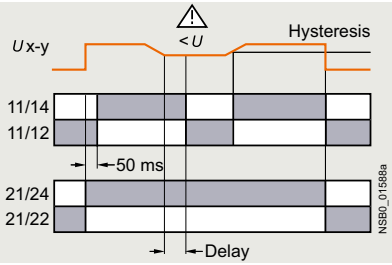
The 3UG4617/3UG4618 line monitoring relay has an internal power supply and can automatically correct a wrong direction of rotation. Thanks to a special measuring method, a phase failure is reliably detected in spite of the wide voltage range from 160 to 690 V AC and feedback through the load of up to 80%. The device is equipped with a display and is parameterized using three buttons. The 3UG4617 line monitoring relay unit monitors 3-phase networks with regard to phase sequence, phase failure, phase asymmetry, undervoltage and overvoltage. The 3UG4618 monitoring relay monitors the neutral conductor as well. The hysteresis is adjustable from 1 to 20 V. In addition the device has delay times from 0 to 20 s in each case for overvoltage, undervoltage, phase failure and phase asymmetry. The 3UG4617/3UG4618 monitoring relay can be operated on the basis of either the open-circuit or closed-circuit principle and with Manual or Auto RESET. The one changeover contact is used for warning or disconnection in the event of power system faults (voltage, asymmetry), the other responds only to a wrong phase sequence. In conjunction with a contactor reversing assembly it is thus possible to change the direction automatically.

With the closed-circuit principle selected

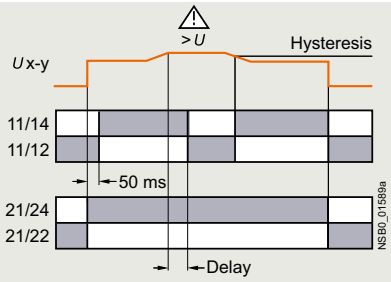
Phase failure



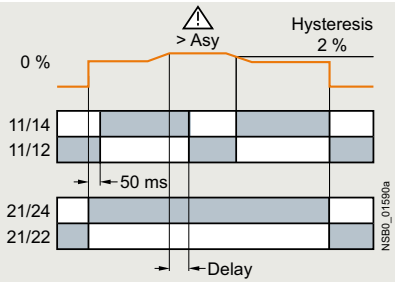
Undervoltage



Overvoltage



Asymmetry



Type		3UG4511 ... 3UG4513, 3UG4614 ... 3UG4618
General data		
Rated insulation voltage U_i Pollution degree 3 Overvoltage category III acc. to VDE 0110	V	690
Rated impulse withstand voltage U_{imp}	kV	6
Control circuit		
Load capacity of the output relay • Thermal current I_{th}	A	5
Rated operational current I_e at • AC-15/24 ... 400 V • DC-13/24 V • DC-13/125 V • DC-13/250 V	 A A A A	 3 1 0.2 0.1
Minimum contact load at 17 V DC	mA	5
Electrical endurance AC-15	million operating cycles	0.1
Mechanical service life	million operating cycles	10

Selection and ordering data


3UG4511-2BP20


3UG4512-2BR20

Adjustable hysteresis	Under-voltage detection	Overvolt-age detection	Stabilization time adjust-able stDEL	Tripping delay time adjustable Del	Version of auxiliary con-tacts	Measurable line voltage[1]	**Spring-loaded terminals**	Weight
			s	s	CO contact	V	Article No.	kg
Monitoring of phase sequence								
Auto RESET								
--	--	--	--	--	1 2	160 … 260 AC	**3UG4511-2AN20** **3UG4511-2BN20**	0.114 0.120
					1 2	320 … 500 AC	**3UG4511-2AP20** **3UG4511-2BP20**	0.115 0.130
					1 2	420 … 690 AC	**3UG4511-2AQ20** **3UG4511-2BQ20**	0.119 0.133
Monitoring of phase sequence, phase failure and phase asymmetry								
Auto RESET, closed-circuit principle, asymmetry threshold permanently 10%								
--	--	--	--	--	1 2	160 … 690 AC	**3UG4512-2AR20** **3UG4512-2BR20**	0.120 0.140
Monitoring of phase sequence, phase failure, asymmetry and undervoltage								
Analogically adjustable, Auto RESET, closed-circuit principle, asymmetry and undervoltage threshold permanently 20%								
5% of set value	✓	--	--	0.1 … 20	2	160 … 690 AC	**3UG4513-2BR20**	0.140
Digitally adjustable, Auto RESET or Manual RESET, open-circuit or closed-circuit principle, asymmetry threshold 0 or 5 ... 20%								
Adjustable 1 ... 20 V	✓	--	0.1 ... 20	0.1 … 20	2	160 … 690 AC	**3UG4614-2BR20**	0.144
Monitoring of phase sequence, phase failure, overvoltage and undervoltage								
Digitally adjustable, Auto RESET or Manual RESET, open-circuit or closed-circuit principle								
Adjustable 1 ... 20 V	✓	✓	--	0.1 … 20[2]	2[2]	160 … 690 AC	**3UG4615-2CR20**	0.141
Monitoring of phase sequence, phase and N conductor failure, overvoltage and undervoltage								
Digitally adjustable, Auto RESET or Manual RESET, open-circuit or closed-circuit principle								
Adjustable 1 ... 20 V	✓	✓	--	0.1 … 20[2]	2[2]	90… 400 AC against N	**3UG4616-2CR20**	0.151
Automatic correction of the direction of rotation in case of wrong phase sequence, phase failure, asymmetry, overvoltage and undervoltage								
Digitally adjustable, Auto RESET or Manual RESET, open-circuit or closed-circuit principle, asymmetry threshold 0 or 5 ... 20%								
Adjustable 1 ... 20 V	✓	✓	--	0.1 … 20	2[3]	160 … 690 AC	**3UG4617-2CR20**	0.139
Automatic correction of the direction of rotation in case of wrong phase sequence, phase and N conductor failure, phase asymmetry, overvoltage and undervoltage								
Digitally adjustable, Auto RESET or Manual RESET, open-circuit or closed-circuit principle, asymmetry threshold 0 or 5 ... 20%								
Adjustable 1 ... 20 V	✓	✓	--	0.1 … 20	2[3]	90 … 400 AC against N	**3UG4618-2CR20**	0.149

✓ Function available
-- Function not available

For accessories, see page 2/281.

[1] Absolute limit values.
[2] 1 CO contact each and one tripping delay time each for U_{min} and U_{max}.
[3] 1 CO contact each for power system fault and phase sequence correction.

*** You can order this quantity or a multiple thereof.**

Voltage monitoring

Overview

SIRIUS 3UG4631 monitoring relay

The relays monitor 1-phase AC voltages (rms value) and DC voltages against the set threshold value for overshoot and undershoot. The devices differ with regard to their power supply (internal or external).

Benefits

- Versions with wide voltage supply range
- Variably adjustable to overshoot, undershoot or range monitoring
- Freely configurable delay times and RESET response
- Width 22.5 mm
- Display of actual value and status messages
- All versions with removable terminals
- All versions with screw or spring-loaded terminals

Application

- Protection of a plant against destruction due to overvoltage
- Switch-on of a plant at a defined voltage and higher
- Protection from undervoltage due to overloaded supply voltages, particularly with battery power
- Threshold switch for analog signals from 0.1 to 10 V

Technical specifications

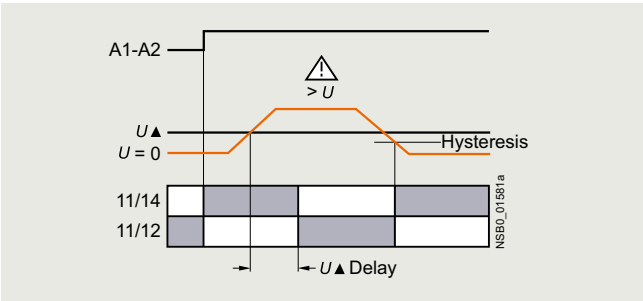
3UG4631/3UG4632 monitoring relays

The 3UG4631/3UG4632 voltage monitoring relay is supplied with an auxiliary voltage of 24 V AC/DC or 24 to 240 V AC/DC and performs overshoot, undershoot or range monitoring of the voltage depending on parameterization. The device is equipped with a display and is parameterized using three buttons.

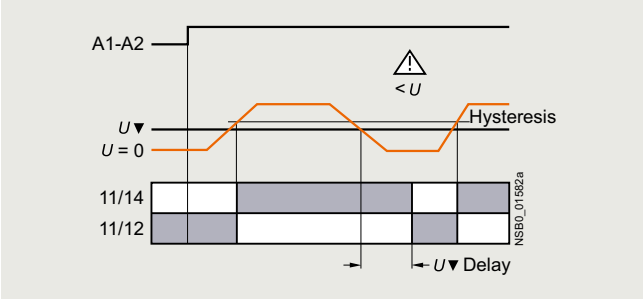
The measuring range extends from 0.1 to 60 V or 10 to 600 V AC/DC. The threshold values for overshoot or undershoot can be freely configured within this range. If one of these threshold values is reached, the output relay responds according to the set principle of operation as soon as the delay time has elapsed. This delay time U_{Del} can be set from 0.1 to 20 s. The hysteresis can be set from 0.1 to 30 V or 0.1 to 300 V. The device can be operated on the basis of either the open-circuit or closed-circuit principle and with Manual or Auto RESET. One output changeover contact is available as signaling contact.

With the closed-circuit principle selected

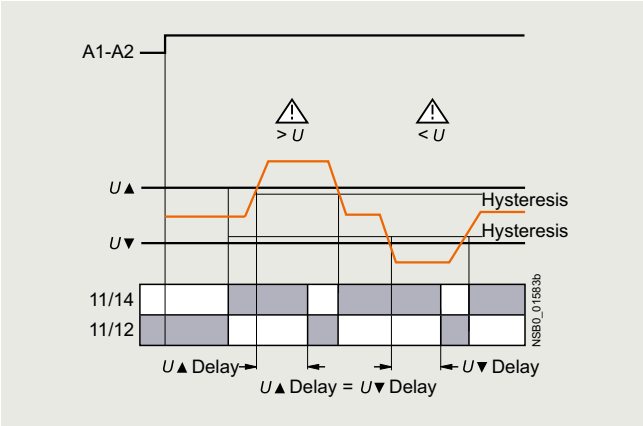
Overvoltage



Undervoltage



Range monitoring



3UG4633 monitoring relay

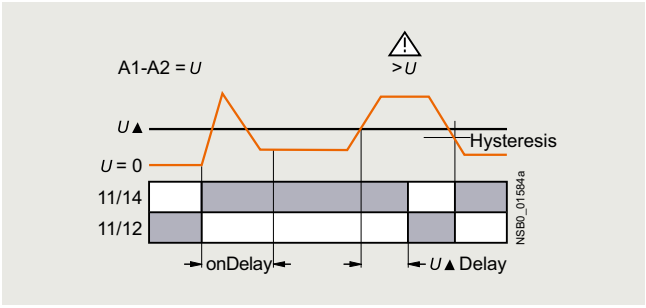
The 3UG4633 voltage monitoring relay has an internal power supply and performs overshoot, undershoot or range monitoring of the voltage depending on parameterization. The device is equipped with a display and is parameterized using three buttons.

The operating and measuring range extends from 17 to 275 V AC/DC. The threshold values for overshoot or undershoot can be freely configured within this range. If one of these threshold values is reached, the output relay responds according to the set principle of operation as soon as the tripping delay time has elapsed. This delay time U_{Del} can also be adjusted, just like the ON-delay time onDel from 0.1 to 20 s.

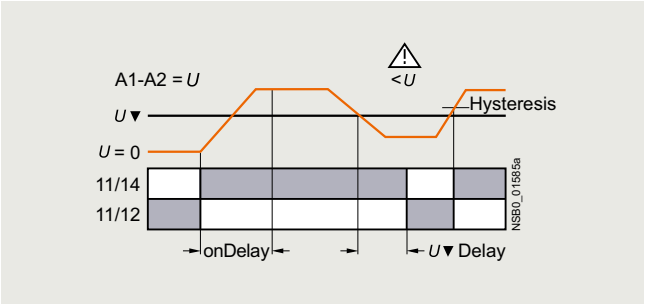
The hysteresis is adjustable from 0.1 to 150 V. The device can be operated on the basis of either the open-circuit or closed-circuit principle and with Manual or Auto RESET. One output changeover contact is available as signaling contact.

With the closed-circuit principle selected

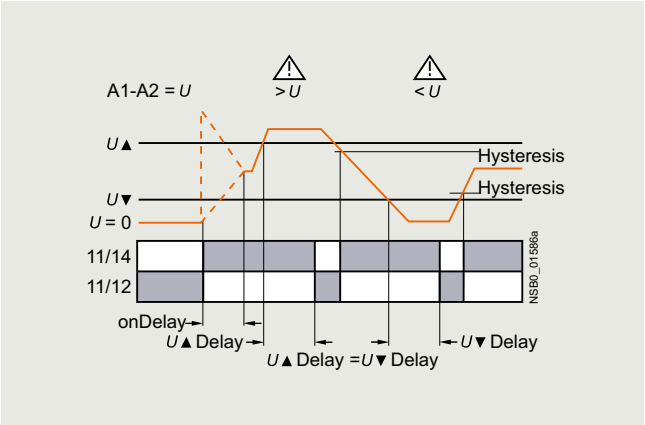
Overvoltage



Undervoltage



Range monitoring



Type		3UG4631	3UG4632	3UG4633
General data				
Rated insulation voltage U_i Pollution degree 3 Overvoltage category III acc. to VDE 0110	V	690		
Rated impulse withstand voltage U_{imp}	kV	6		
Measuring circuit				
Permissible measuring range 1-phase AC/DC voltage	V	0.1 ... 60	10 … 650	17 … 275
Measuring frequency	Hz	40 ... 500		
Setting range 1-phase voltage	V	0.1 ... 60	10 ... 600	17 ... 275
Control circuit				
Load capacity of the output relay • Thermal current I_{th}	A	5		
Rated operational current I_e at • AC-15/24 ... 400 V • DC-13/24 V • DC-13/125 V • DC-13/250 V	 A A A A	 3 1 0.2 0.1		
Minimum contact load at 17 V DC	mA	5		

Voltage monitoring

2

Selection and ordering data

- Digitally adjustable, with illuminated LCD
- Auto or Manual RESET
- Open-circuit or closed-circuit principle
- 1 CO contact

3UG4633-2AL30

Measuring range	Adjustable hysteresis	Rated control supply voltage U_s	Spring-loaded terminals	Weight
V	V	V	Article No.	kg
Internal power supply without auxiliary voltage, separately adjustable ON-delay and tripping delay time 0.1 ... 20 s				
17 ... 275 AC/DC	0.1 ... 150	17 ... 275 AC/DC[1]	**3UG4633-2AL30**	0.131
Externally supplied with auxiliary voltage, tripping delay time adjustable 0.1 ... 20 s				
0.1 … 60 AC/DC	0.1 ... 30	24 AC/DC	**3UG4631-2AA30**	0.128
10 ... 600 AC/DC	0.1 ... 300		**3UG4632-2AA30**	0.122
0.1 … 60 AC/DC	0.1 ... 30	24 ... 240 AC/DC	**3UG4631-2AW30**	0.139
10 ... 600 AC/DC	0.1 ... 300		**3UG4632-2AW30**	0.131

[1] Absolute limit values.

For accessories, see page 2/281.

* You can order this quantity or a multiple thereof.

Overview

SIRIUS 3UG4622 monitoring relay

The relays monitor 1-phase AC currents (rms value) and DC currents against the set threshold value for overshoot and undershoot. They differ with regard to their measuring ranges and control supply voltage types.

Benefits

- Versions with wide voltage supply range
- Variably adjustable to overshoot, undershoot or range monitoring
- Freely configurable delay times and RESET response
- Width 22.5 mm
- Display of actual value and status messages
- All versions with removable terminals
- All versions with screw or spring-loaded terminals

Application

- Overcurrent and undercurrent monitoring
- Monitoring the functionality of electrical loads
- Open-circuit monitoring
- Threshold switch for analog signals from 4 to 20 mA

Technical specifications

3UG4621/3UG4622 monitoring relays

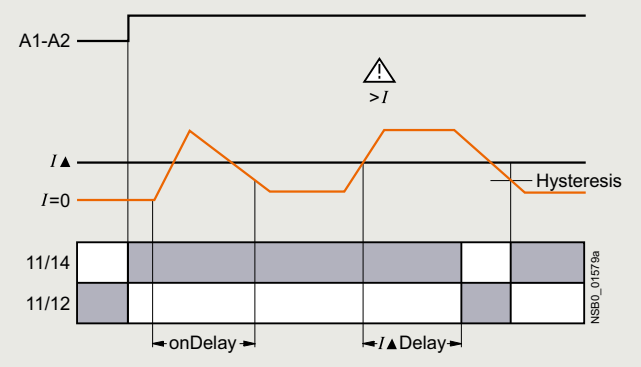
The 3UG4621 or 3UG4622 current monitoring relay is supplied with an auxiliary voltage of 24 V AC/DC or 24 to 240 V AC/DC and performs overshoot, undershoot or range monitoring of the current depending on parameterization. The device is equipped with a display and is parameterized using three buttons.

The measuring range extends from 3 to 500 mA or 0.05 to 10 A. The rms value of the current is measured. The threshold values for overshoot or undershoot can be freely configured within this range. If one of these threshold values is reached, the output relay responds according to the set principle of operation as soon as the tripping delay time I_{Del} has elapsed. This time and the ON-delay time onDel are adjustable from 0.1 to 20 s.

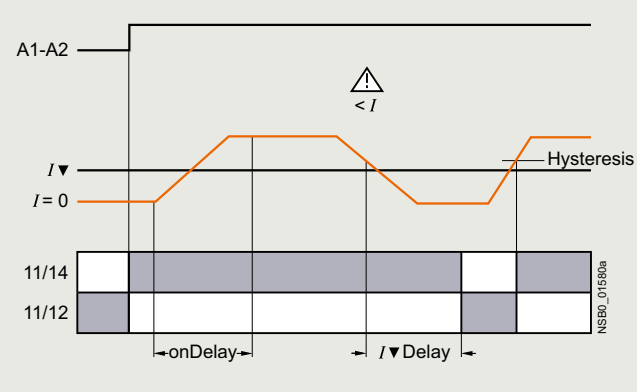
The hysteresis is adjustable from 0.1 to 250 mA or 0.01 to 5 A. The device can be operated with Manual or Auto RESET and on the basis of either the open-circuit or closed-circuit principle. You can decide here whether the output relay is to respond when the supply voltage U_S = ON is applied, or not until the lower measuring range limit of the measuring current (I > 3 mA/50 mA) is reached. One output changeover contact is available as signaling contact.

With the closed-circuit principle selected
upon application of the control supply voltage

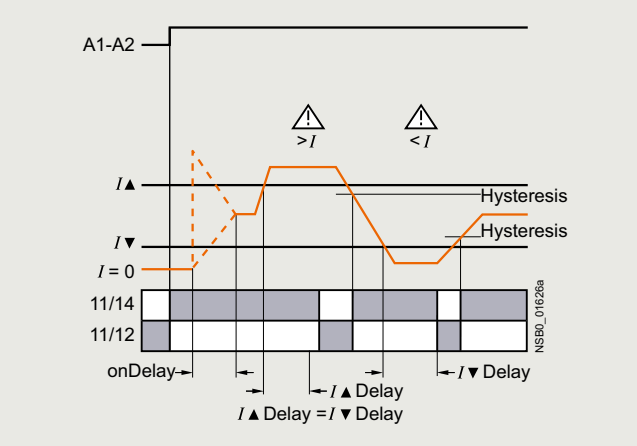
Current overshoot



Current undershoot



Range monitoring



Current monitoring

Type		3UG4621-.AA	3UG4621-.AW	3UG4622-.AA	3UG4622-.AW
General data					
Rated insulation voltage U_i Pollution degree 3; overvoltage category III according to VDE 0110	V	690			
Rated impulse withstand voltage U_{imp}	kV	6			
Measuring circuit					
Measuring range for 1-phase AC/DC current	A	0.003 … 0.6		0.05 … 15	
Measuring frequency	Hz	40 ... 500			
Setting range for 1-phase current	A	0.003 ... 0.5		0.05 ... 10	
Load supply voltage	V	24	Max. 300[1] Max. 500[2]	24	Max. 300[1] Max. 500[2]
Control circuit					
Load capacity of the output relay • Thermal current I_{th}	A	5			
Rated operational current I_e at • AC-15/24 ... 400 V • DC-13/24 V • DC-13/125 V • DC-13/250 V	 A A A A	 3 1 0.2 0.1			
Minimum contact load at 17 V DC	mA	5			

1) With protective separation.

2) With simple separation.

Selection and ordering data

- Digitally adjustable, with illuminated LCD
- Auto or Manual RESET
- Open-circuit or closed-circuit principle
- 1 CO contact

3UG4622-2AW30

Measuring range	Adjustable hysteresis	Rated control supply voltage U_s	Spring-loaded terminals	Weight
		V	Article No.	kg
Monitoring of undercurrent and overcurrent, startup delay and tripping delay times can be adjusted separately 0.1 ... 20 s				
3 … 500 mA AC/DC 0.05 … 10 A AC/DC	0.1 ... 250 mA 0.01 ... 5 A	24 AC/DC[1]	**3UG4621-2AA30** **3UG4622-2AA30**	0.132 0.130
3 … 500 mA AC/DC 0.05 … 10 A AC/DC	0.1 ... 250 mA 0.01 ... 5 A	24 ... 240 AC/DC[2]	**3UG4621-2AW30** **3UG4622-2AW30**	0.145 0.145

1) No electrical separation. Load supply voltage 24 V.

2) Electrical separation between control circuit and measuring circuit. Load supply voltage for protective separation max. 300 V, for simple separation max. 500 V.

For accessories, see page 2/281.

For AC currents I > 10 A it is possible to use 4NC current transformers as an accessory, see Catalog LV 10.

* You can order this quantity or a multiple thereof.

Overview

SIRIUS 3UG4641 monitoring relay

The 3UG4641 power factor and active current monitoring device enables load monitoring of motors.

Whereas power factor (p.f.) monitoring is used above all for monitoring no-load operation, the active current monitoring option can be used to observe and evaluate the load factor over the entire torque range.

Benefits

- Can be used worldwide thanks to wide voltage range from 90 to 690 V (absolute limit values)
- Monitoring of even small 1-phase motors with a no-load supply current below 0.5 A
- Simple determination of threshold values by directly referencing measured variables to motor loading
- Range monitoring and active current measurement enable detection of cable breaks between control cabinets and motors, as well as phase failures
- Power factor (p.f.) or I_{res} (active current) can be selected as the measurement principle
- Width 22.5 mm
- All versions with removable terminals
- All versions with screw or spring-loaded terminals

Application

- No-load monitoring and load shedding, such as in the event of a V-belt tear
- Underload monitoring in the low-end performance range, e.g. in the event of pump no-load operation
- Monitoring of overload, e.g. due to a dirty filter system
- Simple power factor monitoring in power systems for control of compensation equipment
- Broken cable between control cabinet and motor

Technical specifications

3UG4641 monitoring relays

The 3UG4641 monitoring relay is self-powered and serves the 1-phase monitoring of the power factor or performs overshoot, undershoot or range monitoring of the active current depending on how it is parameterized. The load to be monitored is connected upstream of the IN terminal. The load current flows through the terminals IN and Ly/N. The setting range for the power factor is 0.1 to 0.99 and for the active current I_{res} it is 0.2 to 10 A. If the control supply voltage is switched on and no load current flows, the display will show $I < 0.2$ and a symbol for overshoot, undershoot or range monitoring. If the motor is now switched on and the current exceeds 0.2 A, the set ON-delay time begins. During this time, if the set limit values are undershot or exceeded, this does not lead to a relay reaction of the changeover contact. If the operational flowing active current and/or the power factor value falls below or exceeds the respective set threshold value, the spike delay begins. When this time has expired, the relay changes its switch position. The relevant measured variables for overshooting and undershooting in the display flash. If monitoring for active current undershoot is switched off (I_{res}▼= OFF), and if the load current undershoots the lower measuring range threshold (0.2 A), the CO contacts remain unchanged. If a threshold value is set for the monitoring of active current undershooting, then undershooting of the measuring range threshold (0.2 A) will result in a response of the CO contacts.

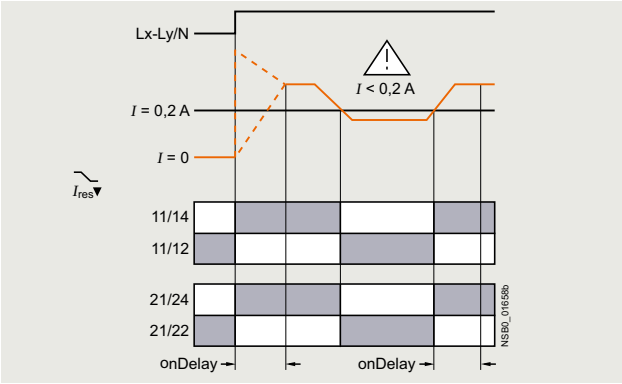
The relay operates either according to the open-circuit or closed-circuit principle. If the device is set to Auto RESET (Memory = No), depending on the set principle of operation, the switching relay returns to its initial state and the flashing ends when the hysteresis threshold is reached.

If Manual RESET is selected in the menu (Memory = Yes), the switching relay remains in its current switching state and the current measured value and the symbol for undershooting and overshooting continue to flash, even when the measured variable reaches a permissible value again. This stored fault status can be reset by simultaneously pressing the UP▲ and DOWN▼ keys for 2 seconds, or by switching the supply voltage off and back on again.

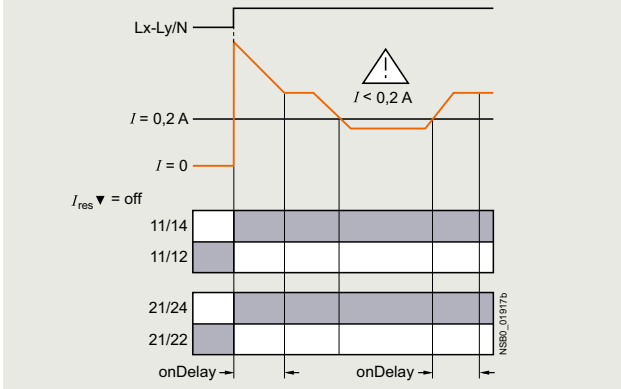
With the closed-circuit principle selected

Response in the event of undershooting the measuring range limit

- With activated monitoring of I_{res}▼

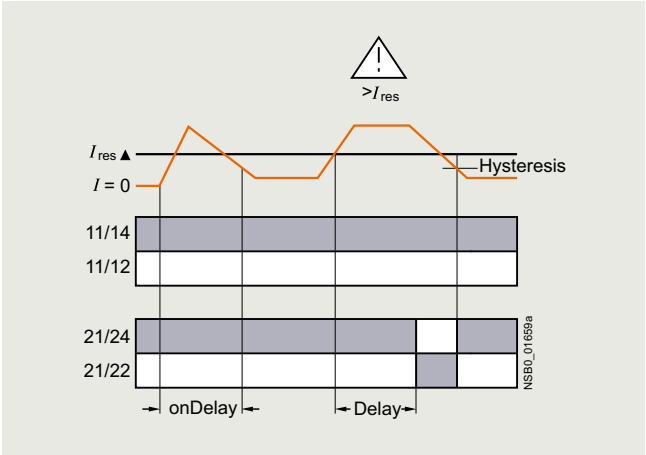


- With deactivated monitoring of active current undershooting

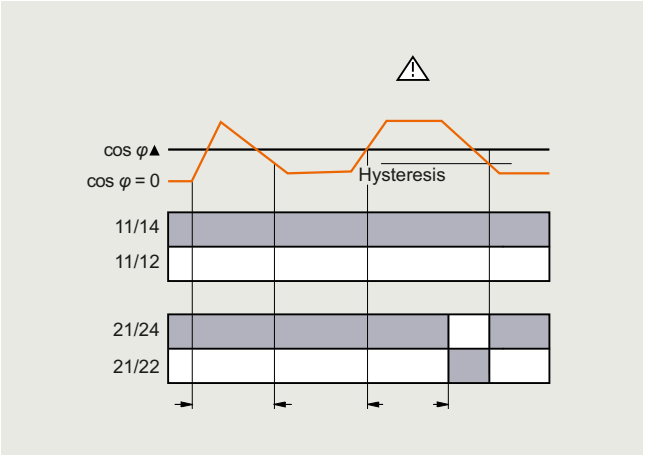


Power factor and active current monitoring

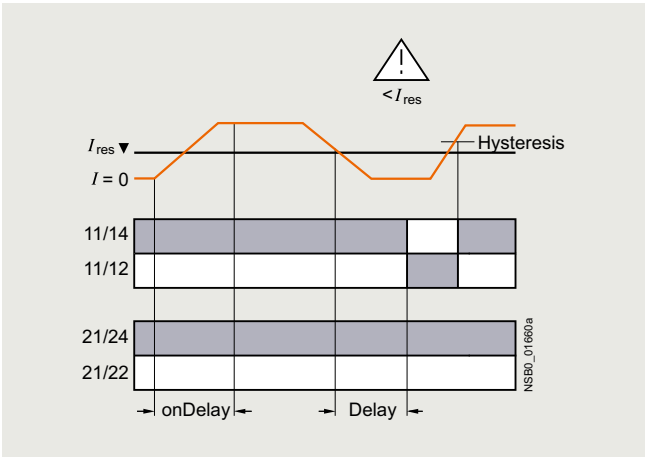
Overshooting of active current



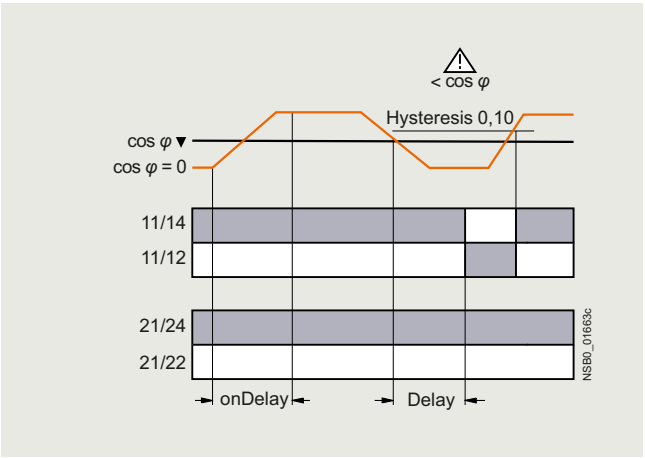
Overshooting of power factor



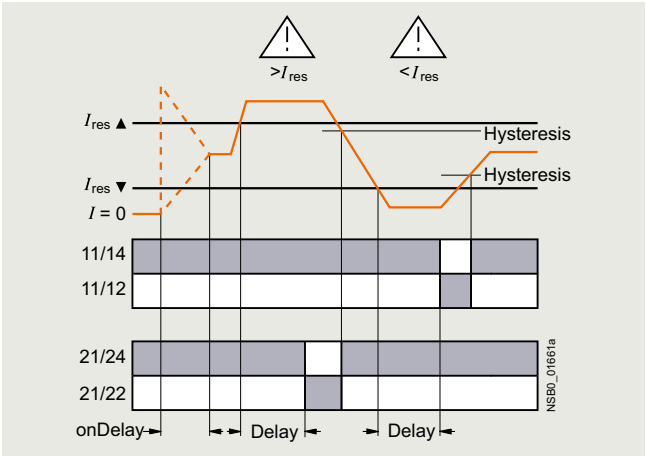
Undershooting of active current



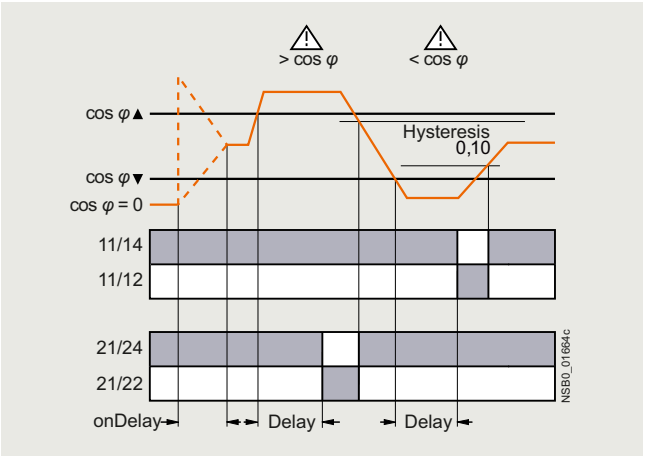
Undershooting of power factor



Range monitoring of active current



Range monitoring of power factor



Type		3UG4641
General data		
Rated insulation voltage U_i Pollution degree 3 Overvoltage category III acc. to VDE 0110	V	690
Rated impulse withstand voltage U_{imp}	kV	6
Control circuit		
Number of CO contacts for auxiliary contacts		2
Load capacity of the output relay • Thermal current I_{th}	A	5
Rated operational current I_e at • AC-15/24 ... 400 V • DC-13/24 V • DC-13/125 V • DC-13/250 V	A A A A	3 1 0.2 0.1
Minimum contact load at 17 V DC	mA	5

Selection and ordering data

- For monitoring the power factor and the active current I_{res} (p.f. x I)
- Suitable for 1-phase and 3-phase currents
- Digitally adjustable, with illuminated LCD
- Overshoot, undershoot or range monitoring adjustable
- Upper and lower threshold value can be adjusted separately
- Permanent display of actual value and tripping state
- 1 changeover contact each for undershoot/overshoot

Measuring range		Adjustable hysteresis		ON-delay time adjustable onDel	Tripping delay time adjustable I▲Del/ I▼Del, φ▲Del/ φ▼Del	Rated control supply voltage U_s [1] 50/60 Hz AC	**Spring-loaded terminals**	Weight
For power factor	For active current I_{res}	For power factor	For active current I_{res}					
P.f.	A	P.f.	A	s	s	V	Article No.	kg
0.10 ... 0.99	0.2 ... 10.0	0.1	0.1 ... 2.0	0 ... 99	0.1 ... 20.0	90 ... 690	**3UG4641-2CS20**	0.153

[1] Absolute limit values.

For accessories, see page 2/281.

For AC active currents I_{res} > 10 A it is possible to use 4NC current transformers as an accessory, see Catalog LV 10.

*** You can order this quantity or a multiple thereof.**

2

Overview

SIRIUS 3UG4625 monitoring relay

The 3UG4625 residual-current monitoring relays are used in conjunction with the 3UL23 residual-current transformers for monitoring plants in which higher residual currents are increasingly expected due to ambient conditions. Monitoring encompasses pure AC residual currents or AC residual currents with a pulsating DC fault current component (transformer type A in accordance with DIN VDE 0100-530/IEC TR 60755).

Benefits

- Worldwide use thanks to wide voltage range from 24 to 240 V AC/DC
- High measuring accuracy of ± 7.5%
- Permanent self-monitoring
- Variable threshold values for warning and disconnection
- Freely configurable delay times and RESET response
- Permanent display of the actual value and fault diagnostics via the display
- High level of flexibility and space saving through installation of the transformer inside or outside the control cabinet
- Width 22.5 mm
- All versions with removable terminals
- All versions with screw or spring-loaded terminals

Application

Monitoring of plants in which residual currents can occur, e.g. due to dust deposits or moisture, porous cables and leads, or capacitive residual currents.

Technical specifications

3UG4625 monitoring relays

The main conductor, and any neutral conductor to which a load is connected, are routed through the opening of the toroidal core of a residual-current transformer. A secondary winding is placed around this toroidal core to which the monitoring relay is connected.

If operation of a plant is fault-free, the sum of the inflowing and outward currents equals zero. No current is then induced in the secondary winding of the residual-current transformer.

However, if an insulation fault occurs, the sum of the inflowing currents is greater than that of the outward currents. The differential current – i.e. the residual current – induces a secondary current in the secondary winding of the transformer. This current is evaluated in the monitoring relay and is used on the one hand to display the actual residual current and on the other, to switch the relay if the set warning or tripping threshold is overshot.

If the measured residual current exceeds the set warning value, the associated changeover contact instantly changes the switching state and an indication appears on the display.

If the measured residual current exceeds the set tripping value, the set delay time begins and the associated relay symbol flashes. On expiry of this time, the associated changeover contact changes the switching state.

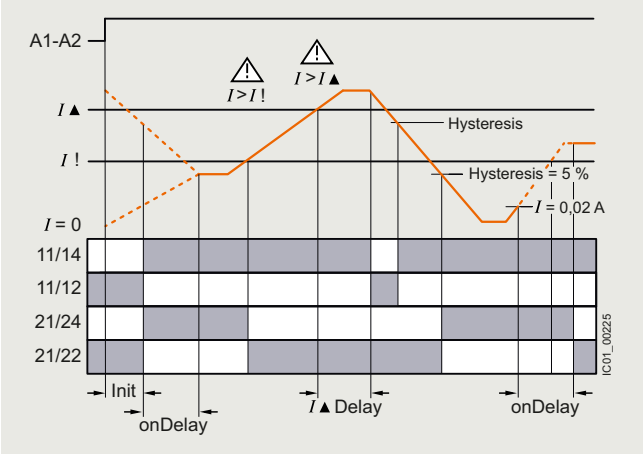
ON-delay time for motor start

To be able to start a drive when a residual current is detected, the output relays switch to the OK state for an adjustable ON-delay time depending on the selected open-circuit or closed-circuit principle.

The changeover contacts do not react if the set threshold values are overshot during this period.

With the closed-circuit principle selected

Residual-current monitoring with Auto RESET (Memory = no)

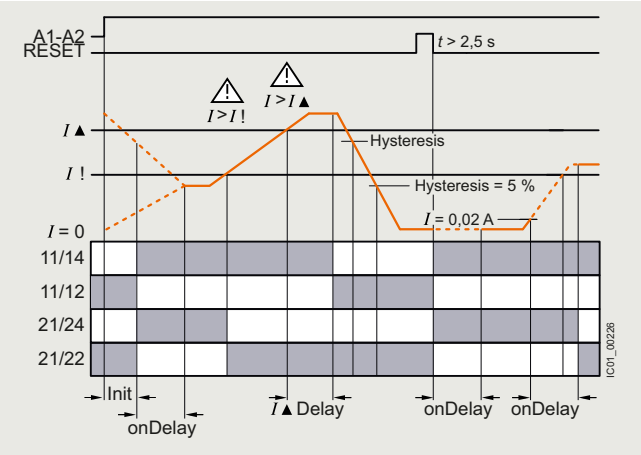


If the device is set to Auto RESET, the relay switches back to the OK state for the tripping value after tripping once the value falls below the set hysteresis threshold and the display stops flashing.

The associated relay changes its switching state if the value falls below the fixed hysteresis value of 5% of the set warning value.

Any overshoots are therefore not stored.

Residual-current monitoring with Manual RESET (Memory = yes)



If Manual RESET is selected in the menu, the output relays remain in their current switching state and the current measured value and the symbol for overshooting continue to flash, even when the measured residual current returns to a permissible value. This stored fault status can be reset by simultaneously pressing the UP▲ and DOWN▼ keys for > 2 seconds, or by switching the supply voltage off and back on again.

Note:

Do not ground the neutral conductor downstream of the residual-current transformer as otherwise residual current monitoring functions can no longer be ensured.

Type		**3UG4625-1CW30, 3UG4625-2CW30**
General data		
Insulation voltage for overvoltage category III acc. to IEC 60664 for pollution degree 3, rated value	V	300
Impulse withstand voltage, rated value U_{imp}	kV	4
Control circuit		
Number of CO contacts for auxiliary contacts		2
Thermal current of the non-solid-state contact blocks, maximum	A	5
Current-carrying capacity of the output relay		
• At AC-15 at 250 V at 50/60 Hz	A	3
• At DC-13		
- At 24 V	A	1
- At 125 V	A	0.2
- At 250 V	A	0.1
Operational current at 17 V, minimum	mA	5

Selection and ordering data

- For monitoring residual currents from 0.03 to 40 A, from 16 to 400 Hz
- For 3UL23 residual-current transformers with feed-through opening from 35 to 210 mm
- Permanent self-monitoring
- Certified in accordance with IEC 60947, functionality corresponds to IEC 62020
- Digitally adjustable, with illuminated LCD
- Permanent display of actual value and tripping state
- Separately adjustable limit value and warning threshold
- 1 changeover contact each for warning threshold and tripping threshold

3UG4625-2CW30

Measurable current	Adjustable response value current	Switching hysteresis	Adjustable ON-delay time	Control supply voltage			**Spring-loaded terminals**	Weight
				At AC at 50 Hz, rated value	At AC at 60 Hz, rated value	At DC, rated value	Article No.	
A	A	%	s	V	V	V		kg
0.01 ... 43	0.03 ... 40	0 ... 50	0 ... 20	24 ... 240	24 ... 240	24 ... 240	**3UG4625-2CW30**	0.155

For accessories, see page 2/281.

For the 3UL23 residual-current transformers, see page 2/270.

*** You can order this quantity or a multiple thereof.**

2

Overview

SIRIUS 3UL23 residual-current transformer

The 3UL23 residual-current transformers detect residual currents in machines and plants. They are suitable for pure AC residual currents or AC residual currents with a pulsating DC fault current component (transformer type A in accordance with DIN VDE 0100-530/IEC TR 60755).

Together with the 3UG4625, 3UG4825 residual-current monitoring relays for IO-Link or the SIMOCODE 3UF motor management and control device they enable residual-current and ground-fault monitoring.

The 3UL2302-1A and 3UL2303-1A residual-current transformers with a feed-through opening from 35 to 55 mm can be mounted in conjunction with the 3UL2900 accessories on a TH 35 standard mounting rail according to IEC 60715.

Selection and ordering data

Diameter of the bushing opening	Connectable cross-section of the connecting terminal	**Screw terminals** ⊕	Weight
mm	mm^2	Article No.	kg
Residual-current transformers (essential accessories for 3UG4625, 3UG4825)			
35	2.5	**3UL2302-1A**	0.130
55	2.5	**3UL2303-1A**	0.207
80	2.5	**3UL2304-1A**	0.343
110	2.5	**3UL2305-1A**	0.446
140	2.5	**3UL2306-1A**	0.800
210	4	**3UL2307-1A**	1.817

Accessories

	Version	Article No.	Weight
			kg
Adapters			
 3UL2900	**Adapters** For mounting on standard rail for 3UL23 to diameter 55 mm	**3UL2900**	0.005

*** You can order this quantity or a multiple thereof.**

Overview

SIRIUS 3UG458 insulation monitor

Insulation monitoring relays are used for monitoring the insulation resistance between ungrounded 1-phase or 3-phase AC supplies and a protective conductor.

Ungrounded, i.e. isolated networks (IT networks) are always used where high demands are placed on the reliability of the power supply, e.g. emergency lighting systems. IT systems are supplied via an isolating transformer or by power supply sources such as batteries or a generator. While an initial insulation fault between a phase conductor and the ground effectively grounds the conductor, as a result no circuit has been closed, so it is possible to continue work in safety (single-fault safety). However, the fault must be rectified as quickly as possible before a second insulation fault occurs (e.g. according to DIN VDE 0100-410). For this purpose insulation monitoring relays are used, which constantly measure the resistance to ground of the phase conductor and the neutral conductor, reporting a fault immediately if insulation resistance falls below the set value so that either a controlled shutdown can be performed or the fault can be rectified without interrupting the power supply.

Two device series

- 3UG4581 insulation monitoring relays for ungrounded AC networks
- 3UG4582 and 3UG4583 insulation monitoring relays for ungrounded DC and AC networks

Insulation monitoring for ungrounded AC networks

The 3UG4581 insulation monitoring relays are used to monitor insulation resistance according to IEC 61557-8 in ungrounded AC networks with rated voltages of up to 400 V.

These devices can monitor control circuits (1-phase) and main circuits (3-phase).

They measure insulation resistances between system cables and system ground. If the value falls below the threshold value, the output relays are switched to fault status.

In the case of 3UG4581 a higher-level DC measuring signal is used. The higher-level DC measuring signal and the resulting current are used to determine the value of the insulation resistance of the network which is to be measured.

Insulation monitoring relay for ungrounded DC and AC networks

The 3UG4582 and 3UG4583 insulation monitoring relays are used to monitor insulation resistance in ungrounded IT AC or DC networks according to IEC 61557-8.

They measure insulation resistances between system cables and system ground. If the value falls below the threshold value, the output relays are switched to fault status. With these devices, which are suitable for both AC and DC networks, a pulsed test signal is fed into the network to be monitored and the insulation resistance is determined.

The pulsed test signal changes its form according to insulation resistance and network loss capacitance. The changed form is used to predict the changed insulation resistance.

If the predicted insulation resistance matches the insulation resistance calculated in the next measurement cycle, and is lower than the threshold value, the output relays are activated or deactivated, depending on the device configuration.
This measurement principle is also suitable for identifying symmetrical insulation faults.

3UG4983 voltage reducer module

3UG4983 voltage reducer module

The 3UG4983-.AA01 voltage reducer module is available for the 3UG4583 insulation monitoring relay to extend the network voltage range to 690 V AC and 1000 V DC.

Connection methods

With the updated enclosure, future-proof push-in technology is available alongside the tried-and-trusted screw terminals.

Push-in is a form of spring-loaded connection system allowing wiring of terminals without tools. These terminals are self-adjusting, i.e. the regular tightening needed with screw terminals is not necessary.

Insulation monitoring

Benefits

- Devices for AC and DC systems
- All devices have a wide control supply voltage range
- Direct connection to networks with mains voltages of up to 690 V AC and 1 000 V DC by means of a voltage reducer module
- For AC supply systems: Frequency range 15 to 400 Hz
- Monitoring of broken conductors
- Monitoring of setting errors
- Safety in use thanks to integrated system test after startup
- Option of resetting and testing (by means of button on front or using control contact)
- New predictive measurement principle allows very fast response times
- All versions with screw or spring-loaded terminals with push-in functionality

Application

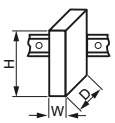
IT networks are used, for example:

- In emergency power supplies
- In safety lighting systems
- In industrial production facilities with high availability requirements (chemical industry, automobile manufacturing, printing plants)
- In shipping and railways
- For mobile generators (aircraft)
- For renewable energies, such as wind energy and photovoltaic power plants
- In the mining industry

Technical specifications

More information

For equipment manuals, see
- https://support.industry.siemens.com/cs/ww/en/view/54382552
- https://support.industry.siemens.com/cs/ww/en/view/54382528

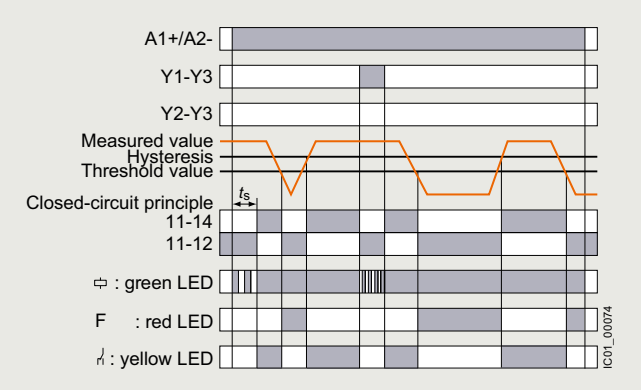
Type		3UG4581-.AW31	3UG4582-.AW31	3UG4583-.CW31	3UG4983-.AA01
General data					
Dimensions (W x H x D) 	mm	22.5 x 78 x 100		45 × 78 × 100	
Degree of protection IP on the front according to IEC 60529		IP20			
Mounting position		Any			
Type of mounting		Snap-on mounting on 35 mm standard mounting rail			
Ambient temperature during operation	°C	-25 ... +60			
Fault storage		✓	✓	✓	--
Measuring circuit					
Measurable voltage					
• At DC	V	--	0 ... 345	0 ... 600	0 ... 1000
• At AC	V	0 ... 460	0 ... 287.5	0 ... 400	0 ... 690
Measurable line frequency	Hz	50 ... 60		15 ... 400	
Adjustable response value impedance					
• 1	kΩ	1 ... 100			--
• 2	kΩ	--		2 ... 200	--
System leakage capacitance	µF	10		20	
Control circuit					
Control supply voltage					
• At AC					
- At 50 Hz	V	24 ... 240			--
- At 60 Hz	V	24 ... 240			--
• At DC	V	24 ... 240			--
Operating frequency	Hz	15 ... 400			
Impulse withstand voltage	V	6000		4000	8000
Number of CO contacts with delayed switching		1		2	0
Thermal current of the non-solid-state contact blocks, maximum	A	4			

✓ Available
-- Not available

Type	3UG4581-1AW31 3UG4582-1AW31 3UG4583-1CW31 3UG4983-1AA01	3UG4581-2AW31 3UG4582-2AW31 3UG4583-2CW31 3UG4983-2AA01
Type of electrical connection	**Screw terminals**	**Spring-loaded terminals (push-in)**
Tightening torque	0.6 … 0.8 Nm	--
Type of connectable conductor cross-sections		
• Finely stranded	1x (0.5 ... 4.0 mm²), 2x (0.5 ... 2.5 mm²)	2 x (0.5 ... 1.5 mm²)
• Finely stranded		
- Without end sleeves	1x (0.5 ... 2.5 mm²), 2x (0.5 ... 1.5 mm²)	2 x (0.5 ... 1.5 mm²)
- With end sleeves	1x (0.5 ... 2.5 mm²), 2x (0.5 ... 1.5 mm²)	2 x (0.5 ... 1.5 mm²)
• For AWG cables		
- Solid	1 x (20 ... 12), 2x (20 ... 14)	2 x (20 ... 16)
- Stranded	1 x (18 ... 14), 2x (18 ... 16)	2 x (18 ... 16)

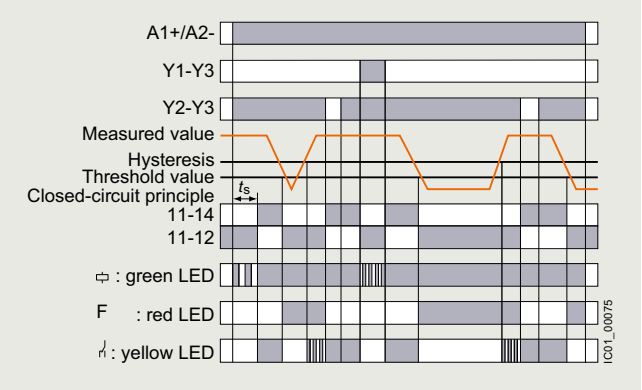
With the closed-circuit principle selected

- Insulation resistance monitoring without fault storage, with Auto RESET

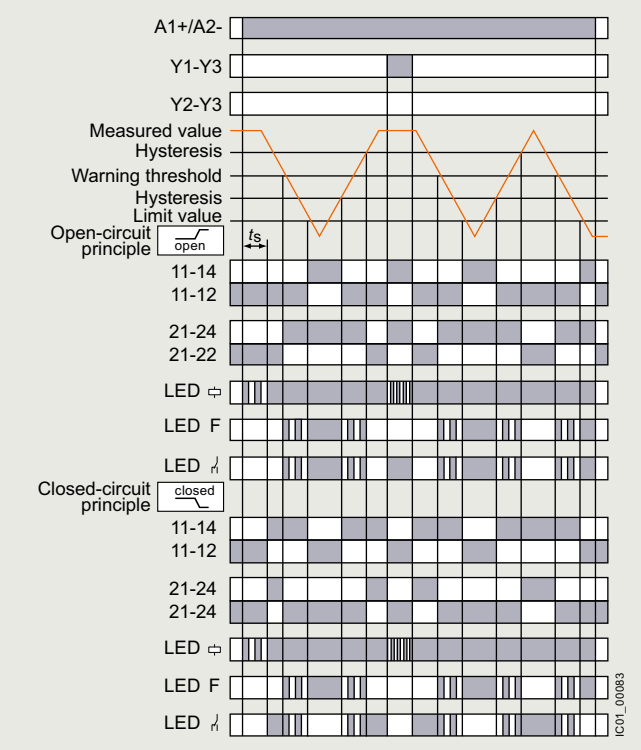


3UG4581, 3UG4582 monitoring relays

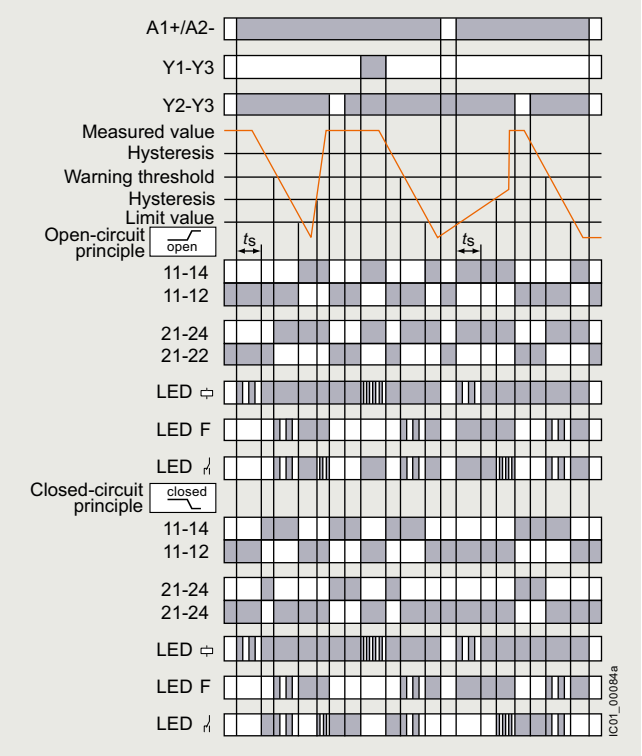
- Insulation resistance monitoring with fault storage and Manual RESET



3UG4581, 3UG4582 monitoring relays



3UG4583 monitoring relays



3UG4583 monitoring relays

Insulation monitoring

Selection and ordering data


3UG4581-1AW31


3UG4582-1AW31


3UG4583-1CW31


3UG4583-1AA01

Measurable voltage		Type of voltage of the control supply voltage, value range	System leakage capacitance	Number of CO contacts with delayed switching	Adjustable response value impedance		Spring-loaded terminals (push-in)	Weight
At AC	At DC				1	2		
V	V	AC/DC	µF		kΩ	kΩ	Article No.	kg
Insulation monitors								
0 ... 460	--	24 ... 240	10	1	1 ... 100	--	**3UG4581-2AW31**	0.155
0 ... 287.5	0 ... 345	24 ... 240	10	1	1 ... 100	--	**3UG4582-2AW31**	0.160
0 ... 460	0 ... 690	24 ... 240	20	2	1 ... 100	2 ... 200	**3UG4583-2CW31**	0.265
Voltage reducer modules								
For the 3UG4583 insulation monitoring relay for extending the network voltage range to 690 V AC and 1 000 V DC								
0 ... 460	0 ... 690	--	20	0	--	--	**3UG4983-2AA01**	0.200

* You can order this quantity or a multiple thereof.

Overview

SIRIUS 3UG4501 monitoring relay

The 3UG4501 level monitoring relay is used in combination with 2- or 3-pole sensors to monitor the levels of conductive liquids.

Benefits

- Can be used worldwide thanks to wide voltage range from 24 to 240 V (absolute limit values)
- Individually shortenable 2- and 3-pole wire electrodes for easy mounting from above/below
- Bow electrodes for installation from the side, for larger filling levels and minimum space requirements
- Can be flexibly adapted to different conductive liquids through analog setting of the sensitivity from 2 to 200 kΩ
- Compensation for wave movements through tripping delay times from 0.1 to 10 s
- Upstream or downstream function selectable
- All versions with removable terminals
- All versions with screw or spring-loaded terminals

Application

- Single-point and two-point level monitoring
- Overflow protection
- Dry-running protection
- Leak monitoring

Technical specifications

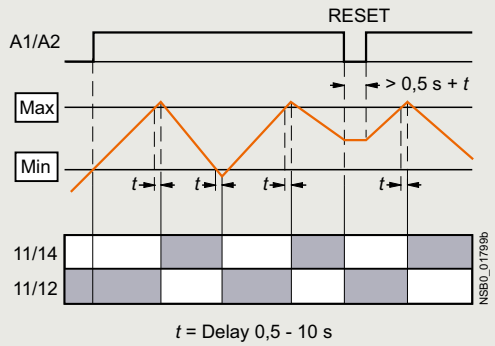
3UG4501 monitoring relays

The principle of operation of the 3UG4501 level monitoring relay is based on measuring the electrical resistance of the liquid between two immersion sensors and a reference terminal.
If the measured value is lower than the sensitivity set at the front, the output relay changes its switching state. In order to preclude active current undershooting of the liquid, the sensors are supplied with alternating current.

Two-point control

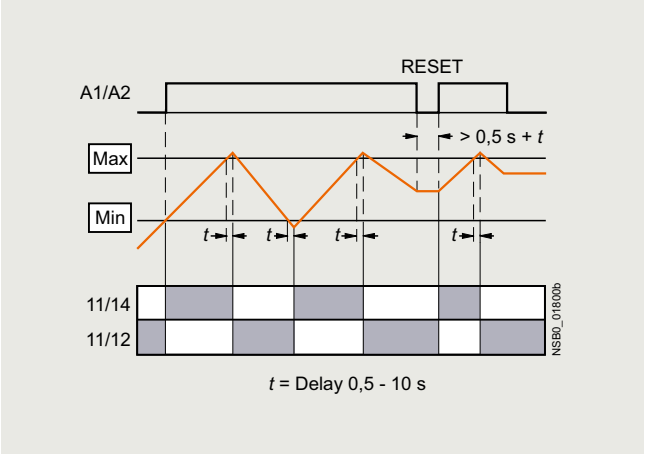
The output relay changes its switching state as soon as the liquid level reaches the maximum sensor, while the minimum sensor is submerged. The relay returns to its original switching state as soon as the minimum sensor no longer has contact with the liquid.

OVER, two-point control



t = Delay 0,5 - 10 s

UNDER, two-point control



t = Delay 0,5 - 10 s

Note:

It is also possible to connect other resistance sensors to the Min and Max terminals in the range 2 to 200 kΩ, e.g. photoresistors, temperature sensors, encoders based on resistance, etc. The monitoring relay can therefore also be used for other applications as well as for monitoring the levels of liquids.

Level monitoring

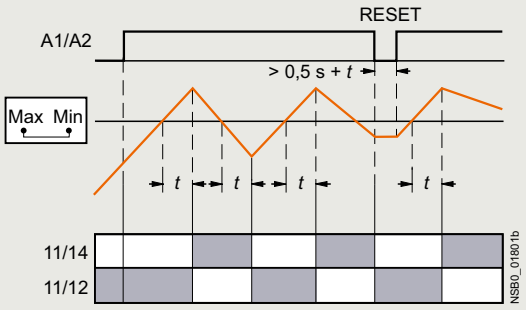
Single-point control

If only one level is being controlled, the terminals for Min and Max on the monitoring relay are bridged. The output relay changes its switching state as soon as the liquid level is reached and returns to its original switching state once the sensor no longer has contact with the liquid.

In order to prevent premature tripping of the switching function caused by wave motion or frothing, even though the set level has not been reached, it is possible to delay this function by 0.5 to 10 s.

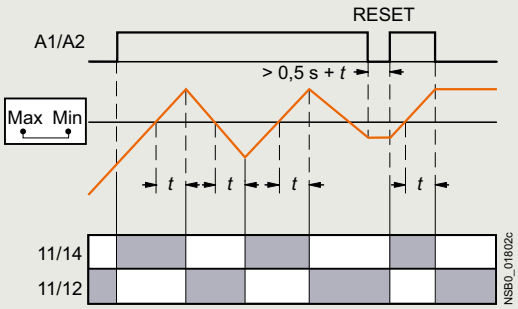
For safe resetting, the control supply voltage must be interrupted for at least the set delay time of +0.5 s.

OVER, single-point control



t = Delay 0,5 - 10 s

UNDER, single-point control



t = Delay 0,5 - 10 s

Type		3UG4501
General data		
Rated insulation voltage U_i Pollution degree 3 Overvoltage category III acc. to VDE 0110	V	300
Rated impulse withstand voltage U_{imp}	kV	4
Measuring circuit		
Electrode current, max. (typ. 70 Hz)	mA	1
Electrode voltage, max. (typ. 70 Hz)	V	15
Sensor feeder cable	m	Max. 100
Conductor capacitance of sensor cable[1)]	nF	Max. 10
Control circuit		
Load capacity of the output relay Thermal current I_{th}	A	5
Rated operational current I_e at • AC-15/24 ... 400 V • DC-13/24 V • DC-13/125 V • DC-13/250 V	 A A A A	 3 1 0.2 0.1
Minimum contact load at 17 V DC	mA	5

1) The sensor cable does not necessarily have to be shielded, but we do not recommend installing this cable parallel to the power supply lines. It is also possible to use a shielded cable, whereby the shield has to be connected to the M terminal.

Selection and ordering data

- For level monitoring of electrically conductive liquids
- Control principle: inlet or sequence control adjustable per rotary switch
- Single-point and two-point control possible
- Analogically adjustable sensitivity (specific resistance of the liquid)
- Analogically adjustable tripping delay time
- 1 yellow LED for displaying the relay state
- 1 green LED for displaying the applied control supply voltage
- 1 CO contact

Sensitivity	Tripping delay time	Rated control supply voltage U_s	Spring-loaded terminals	Weight
kΩ	s	V AC/DC	Article No.	kg
2 ... 200	0.5 ... 10	24[1)]	**3UG4501-2AA30**	0.123
		24 ... 240	**3UG4501-2AW30**	0.123

[1)] The rated control supply voltage and the measuring circuit are not electrically separated.

For accessories, see page 2/281.

Note:

Level monitoring sensors are available from various providers. We recommend sensors made by Jacob GmbH (see "External partners". The previous 3UG3 level sensors are also available from here.

Speed monitoring

Overview

SIRIUS 3UG4651 monitoring relay

The 3UG4651 monitoring relay is used in combination with a sensor to monitor motor drives for overspeed and/or underspeed.

Furthermore, the monitoring relay is ideal for all functions where a continuous pulse signal needs to be monitored (e.g. belt travel monitoring, completeness monitoring, passing monitoring, clock-time monitoring).

Benefits

- Can be used worldwide thanks to wide voltage range from 24 to 240 V (absolute limit values)
- Variably adjustable to overshoot, undershoot or range monitoring
- Freely configurable delay times and RESET response
- Permanent display of actual value and fault type
- Use of up to 10 sensors per rotation for extremely slowly rotating motors
- Two- or three-wire sensors and sensors with a mechanical switching output or solid-state output can be connected
- Auxiliary voltage for sensor integrated
- All versions with removable terminals
- All versions with screw or spring-loaded terminals

Application

- Slip or tear of a belt drive
- Overload monitoring
- Transport monitoring for completeness

Technical specifications

3UG4651 monitoring relays

The speed monitoring relay operates according to the principle of period duration measurement.

In the monitoring relay, the time between two successive rising edges of the pulse encoder is measured and compared to the minimum and/or maximum permissible period duration calculated from the set limit values for the speed.

Thus, the period duration measurement recognizes any deviation in speed after just two pulses, even at very low speeds or in the case of extended pulse gaps.

By using up to ten pulse encoders evenly distributed around the circumference, it is possible to shorten the period duration, and in turn the response time. By taking into account the number of sensors in the monitoring relay, the speed continues to be indicated in rpm.

ON-delay time for motor start

To be able to start a motor drive, and depending on whether the open-circuit or closed-circuit principle is selected, the output relay switches to the OK state during the ON-delay time, even if the speed is still below the set value.

The ON-delay time is started by either switching on the auxiliary voltage or, if the auxiliary voltage is already applied, by actuating the respective NC contact (e.g. auxiliary contact).

Speed monitoring with Auto RESET (Memory = no)

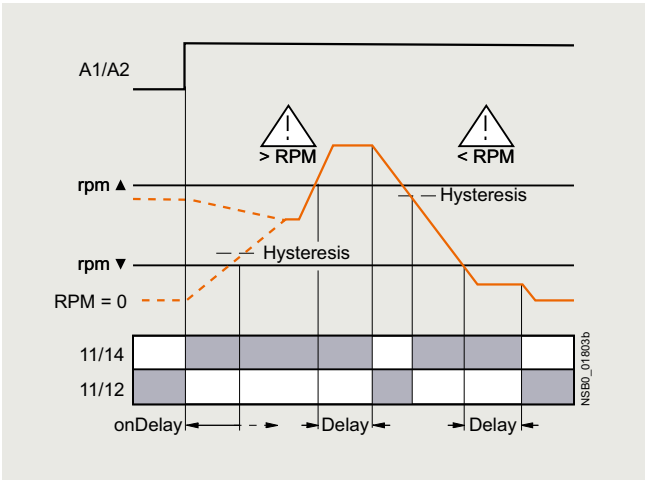
If the device is set to Auto RESET, the output relay switches to the OK state, once the adjustable hysteresis threshold is reached in the range of 0.1 to 99.9 rpm and the flashing stops. Any overshoots or undershoots are therefore not stored.

Speed monitoring with Manual RESET (Memory = yes)

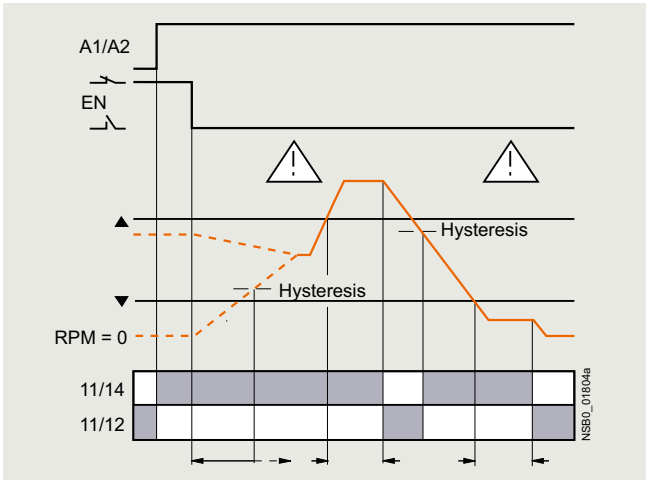
If Manual RESET is selected in the menu, the output relay remains in its current switching state and the current measured value and the symbol for overshooting/undershooting continue to flash, even when the speed returns to a permissible value. This stored fault status can be reset by simultaneously pressing the UP▲ and DOWN▼ buttons for > 2 s, by connecting the RESET device terminal to 24 V DC or by switching the control supply voltage off and back on again.

With the closed-circuit principle selected

Range monitoring without enable input



Range monitoring with enable input



Type		3UG4651
General data		
Rated insulation voltage U_i Pollution degree 3 Overvoltage category III acc. to VDE 0110	V	300
Rated impulse withstand voltage U_{imp}	kV	4
Measuring circuit		
Sensor supply		
• For three-wire sensor (24 V/0 V)	mA	Max. 50
• For two-wire NAMUR sensor (8V2)	mA	Max. 8.2
Signal input		
• IN1	kΩ	16, three-wire sensor, pnp operation
• IN2	kΩ	1, floating contact, two-wire NAMUR sensor
Voltage level		
• For level 1 at IN1	V	4.5 ... 30
• For level 0 at IN1	V	0 ... 1
Current level		
• For level 1 at IN2	mA	> 2.1
• For level 0 at IN2	mA	< 1.2
Minimum pulse duration of signal	ms	5
Minimum interval between 2 pulses	ms	5
Control circuit		
Number of CO contacts for auxiliary contacts		1
Load capacity of the output relay Thermal current I_{th}	A	5
Rated operational current I_e at		
• AC-15/24 ... 400 V	A	3
• DC-13/24 V	A	1
• DC-13/125 V	A	0.2
• DC-13/250 V	A	0.1
Minimum contact load at 17 V DC	mA	5

Speed monitoring

Selection and ordering data

- For speed monitoring in revolutions per minute (rpm)
- Two- or three-wire sensor with mechanical or electronic switching output can be connected
- Two-wire NAMUR sensor can be connected
- Sensor supply 24 V DC/50 mA integrated
- Input frequency 0.1 to 2 200 pulses per minute (0.0017 to 36.7 Hz)
- With or without enable signal for the drive to be monitored
- Digitally adjustable, with illuminated LCD
- Overshoot, undershoot or range monitoring adjustable
- Number of pulses per revolution can be adjusted
- Upper and lower threshold value can be adjusted separately
- Auto, Manual or Remote RESET options after tripping
- Permanent display of actual value and tripping state
- 1 CO contact

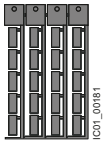
Measuring range	Hysteresis	ON-delay time	Tripping delay time	Pulses per revolution	Rated control supply voltage U_s	**Spring-loaded terminals**	Weight
rpm	rpm	s	s		V AC/DC	Article No.	kg
0.1 ... 2 200	OFF 0.1 ... 99.9	0 ... 900	0.1 ... 99.9	1 ... 10	24[1)]	**3UG4651-2AA30**	0.145
					24 ... 240	**3UG4651-2AW30**	0.200

[1)] The rated control supply voltage and the measuring circuit are not electrically separated.

For accessories, see page 2/281.

* You can order this quantity or a multiple thereof.

Selection and ordering data

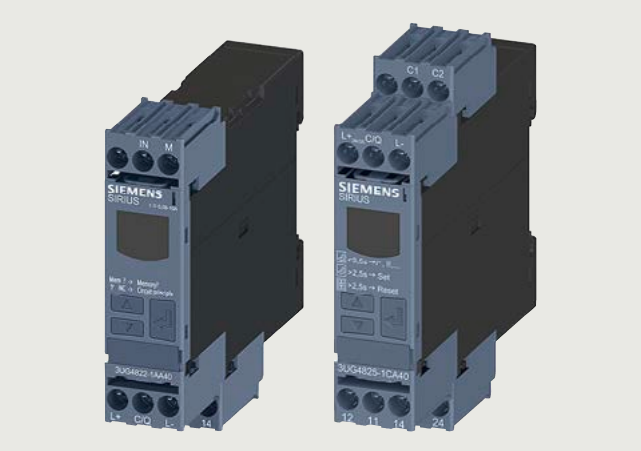
	Use	Version	Article No.	Weight kg
Accessories for enclosures				
 3RP1902	For 3UG4	**Sealable covers** For securing against unauthorized adjustment of setting knobs	**3RP1902**	0.003
 3RP1903	For 3UG4	**Push-in lugs** For screw fixing, 2 units are required for each device	**3RP1903**	0.002
Blank labels				
 3RT2900-1SB20	For 3UG4	**Unit labeling plates**[1] For SIRIUS devices • 20 mm x 7 mm, titanium gray[1]	**3RT2900-1SB20**	0.062
Tools for opening spring-loaded terminals				
 3RA2908-1A	For auxiliary circuit connections	**Screwdrivers** For all SIRIUS devices with spring-loaded terminals Length approx. 200 mm, 3.0 mm x 0.5 mm, titanium gray/black, partially insulated	**Spring-loaded terminals** **3RA2908-1A**	0.050

[1] PC labeling system for individual inscription of unit labeling plates available from: murrplastik Systemtechnik GmbH.

Note:

For products for mechanical bearing monitoring, e.g. condition monitoring systems, see www.siemens.com/siplus-cms.

Overview



SIRIUS 3UG48 monitoring relays

More information

Homepage, see www.siemens.com/sirius-monitoring-relays
Industry Mall, see www.siemens.com/product?3UG48
Conversion tool, see www.siemens.com/conversion-tool

The SIRIUS 3UG4 monitoring relays for electronic and mechanical variables monitor all important characteristics that allow conclusions to be drawn about the functionality of a plant. Both sudden disturbances and gradual changes, which may indicate the need for maintenance, are detected.

Thanks to their relay outputs, the monitoring relays permit direct disconnection of the affected system components and alerting, e.g. by the triggering of a warning light. Thanks to adjustable delay times the 3UG4 monitoring relays can respond very flexibly to brief faults such as voltage dips or load changes and can thus avoid unnecessary alarms and disconnections and increase system availability.

3UG48 monitoring relays for IO-Link

The SIRIUS 3UG48 monitoring relays for IO-Link also offer many other options based upon the monitoring functions of the tried-and-tested SIRIUS 3UG4 monitoring relays:

- Measured value transmission to a controller, including resolution and unit, may be parameterizable as to which value is cyclically transmitted
- Transmission of alarm flags to a controller
- Full diagnostics capability by inquiry as to the cause of the fault in the diagnostics data record
- Remote parameterization is also possible, in addition to or instead of local parameterization
- Rapid parameterization of the same devices by duplication of the parameterization in the controller
- Parameter transmission through uploading to a controller by IO-Link call or by parameter server (if IO-Link master from IO-Link specification V1.1 and higher is used)
- Consistent central data storage in the event of parameter change locally or via a controller
- Automatic reparameterizing when devices are exchanged
- Blocking of local parameterization via IO-Link possible
- Faults are saved in parameterizable and non-volatile fashion to prevent an automatic startup after voltage failure and to make sure diagnostics data are not lost
- Integration into the automation level provides the option of parameterizing the monitoring relays at any time via a display unit, or displaying the measured values in a control room or locally at the machine/control cabinet.
- The MindSphere app SIRIUS Asset Monitor enables access to the SIRIUS 3UG48 monitoring relay for IO-Link anytime and anywhere. It provides the user with detailed information on the device status as well as fault messages and warnings in a clearly arranged form.

Even without communication via IO-Link the devices continue to function fully autonomously:

- Parameterization can take place locally at the device, independently of a controller.
- In the event of failure or before the controller becomes available the monitoring relays work as long as the control supply voltage (24 V DC) is present.
- If the monitoring relays are operated without the controller, the 3UG48 monitoring relays have, thanks to the integrated SIO mode, an additional semiconductor output, which switches when the adjustable warning threshold is exceeded.

Thanks to the combination of autonomous monitoring relay function and integrated IO-Link communication, redundant sensors and/or analog signal converters – which previously took over the transmission of measured values to a controller, leading to considerable extra cost and wiring overhead – are no longer needed.

Because the output relays are still present, the monitoring relays increase the functional reliability of the system, since only the controller can fulfill the control tasks if the current measured values are available, whereas the output relays can also be used for the disconnection of the system if limit values that cannot be reached during operation are exceeded.

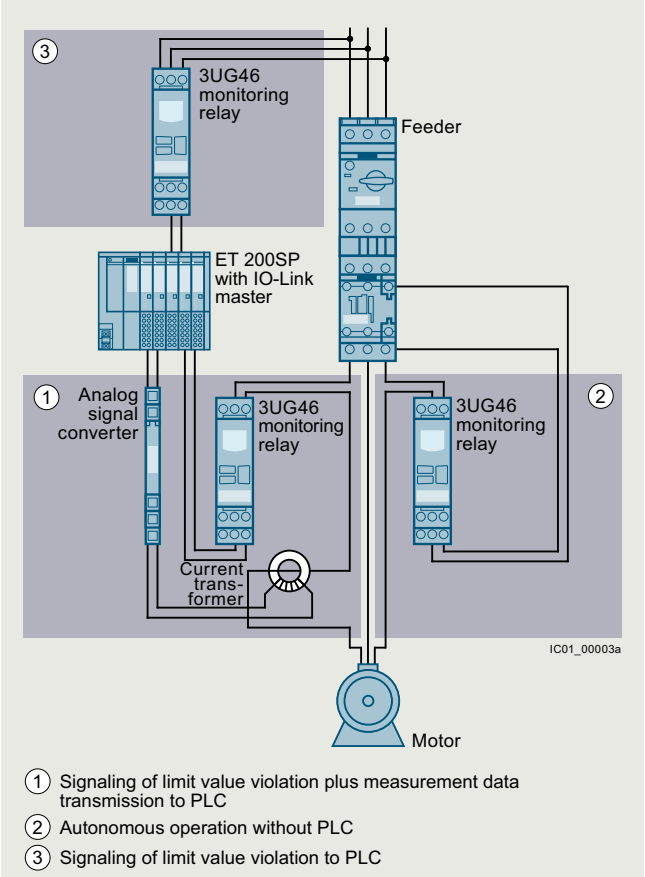
The individual 3UG48 monitoring relays for IO-Link offer the following functions in different combinations:

- Phase sequence
- Phase failure, neutral conductor failure
- Phase asymmetry
- Undershooting and/or overshooting of limit values for voltage
- Undershooting and/or overshooting of limit values for current
- Undershooting and/or overshooting of power factor limit values
- Monitoring of the active current or the apparent current
- Monitoring of the residual current
- Undershooting and/or overshooting of limit values for speed

Notes on security

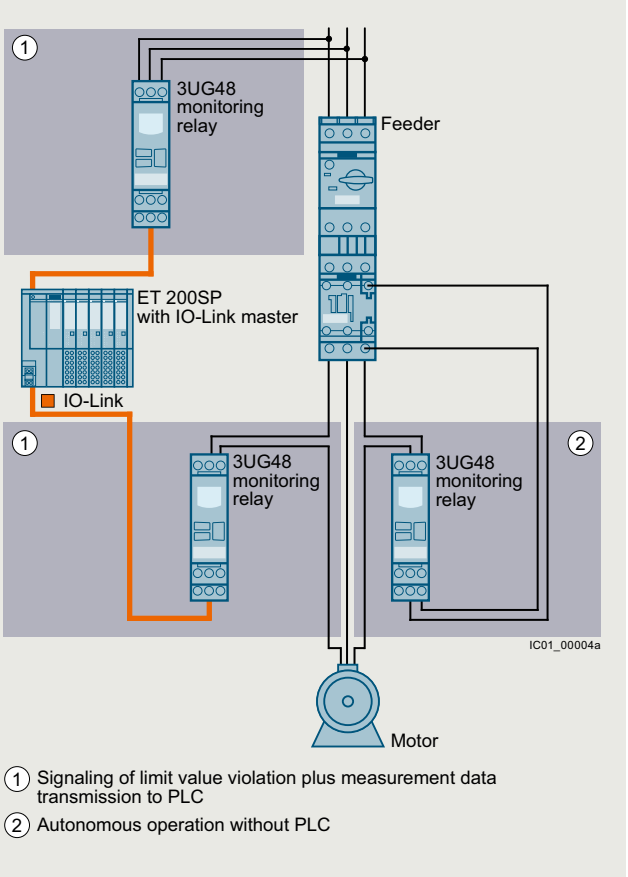
In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens products and solutions represent only one component of such a concept.

For more information about the subject of Industrial Security, see www.siemens.com/industrialsecurity.



① Signaling of limit value violation plus measurement data transmission to PLC
② Autonomous operation without PLC
③ Signaling of limit value violation to PLC

Use of conventional monitoring relays



① Signaling of limit value violation plus measurement data transmission to PLC
② Autonomous operation without PLC

Monitoring relays for IO-Link

Notes:

Devices required for communication via IO-Link:
- Any controller that supports IO-Link (e.g. ET 200SP with CPU or S7-1200), see Catalog ST 70.
- IO-Link master (e.g. CM 4xIO-Link for SIMATIC ET 200SP or SM 1278 for S7-1200.

Each monitoring relay requires an IO-Link channel.

Article No. scheme

Product versions		Article number
3UG4 monitoring relay with IO-Link		**3UG4** □ □ □ – □ □ □ □ **0**
Type of setting	e.g. 8 = analogically adjustable	□
Functions	e.g. 15 = line monitoring	□ □
Connection type	Screw terminals	**1**
	Spring-loaded terminals	**2**
Contacts	e.g. A = 1 CO contact	□
Supply voltage	e.g. A4 = 160 ... 690 V AC	□ □
Example		**3UG4 8 1 5 – 1 A A 4 0**

Note:

The Article No. scheme shows an overview of product versions for better understanding of the logic behind the article numbers.

For your orders, please use the article numbers quoted in the selection and ordering data.

Benefits

- Simple cyclical transmission of the current measured values, relay switching states and events to a controller
- Remote parameterization
- Automatic reparameterizing when devices are exchanged
- Simple duplication of identical or similar parameterizations
- Reduction of control current wiring
- Elimination of testing costs and wiring errors
- Reduction of configuration work
- Integration in TIA means clear diagnostics if a fault occurs
- Cost saving and space saving in control cabinet due to the elimination of AI and IO modules as well as analog signal converters and duplicated sensors

General data

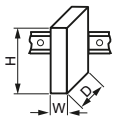
Application

The use of SIRIUS monitoring relays for IO-Link is particularly recommended for machines and plants in which these relays, in addition to their monitoring function, are to be connected to the automation level for the rapid, simple and fault-free provision of the current measured values and/or for remote parameterization.

The monitoring relays can either relieve the controller of monitoring tasks or, as a second monitoring entity in parallel to and independent of the controller, increase the reliability in the process or in the system. In addition, the elimination of AI and IO modules allows the width of the controller to be reduced despite significantly expanded functionality.

Technical specifications

More information	
Technical specifications, see https://support.industry.siemens.com/cs/ww/en/ps/16368/td Equipment Manual and internal circuit diagrams, see https://support.industry.siemens.com/cs/ww/en/view/54375430	FAQs, see https://support.industry.siemens.com/cs/ww/en/ps/16368/faq

Type			3UG48
General technical specifications			
Dimensions (W x H x D)			
• For 3 terminal blocks			
- Screw terminals		mm	22.5 x 92 x 91
- Spring-loaded terminals		mm	22.5 x 94 x 91
• For 4 terminal blocks			
- Screw terminals		mm	22.5 x 103 x 91
- Spring-loaded terminals		mm	22.5 x 103 x 91
Permissible ambient temperature			
• During operation		°C	-25 ... +60
Connection type			**Screw terminals**
• Terminal screw			M3 (for standard screwdriver, size 2 and Pozidriv 2)
• Solid		mm^2	1 x (0.5 ... 4), 2 x (0.5 ... 2.5)
• Finely stranded with end sleeve		mm^2	1 x (0.5 ... 2.5), 2 x (0.5 ... 1.5)
• AWG cables, solid or stranded		AWG	2 x (20 ... 14)
• Tightening torque		Nm	0.8 … 1.2
Connection type			**Spring-loaded terminals**
• Solid		mm^2	2 x (0.25 ... 1.5)
• Finely stranded, with end sleeve acc. to DIN 46228		mm^2	2 x (0.25 ... 1.5)
• Finely stranded		mm^2	2 x (0.25 ... 1.5)
• AWG cables, solid or stranded		AWG	2 x (24 ... 16)

Overview

SIRIUS 3UG4815 monitoring relay

Solid-state line monitoring relays provide maximum protection for mobile machines, plants and hoisting equipment or for unstable networks. Network and voltage faults can thus be detected early and rectified before far greater damage ensues.

The line monitoring relays with IO-Link monitor phase sequence, phase failure (with or without N conductor monitoring), phase asymmetry and undervoltage and/or overvoltage.

Phase asymmetry is evaluated as the difference between the greatest and the smallest phase voltage relative to the greatest phase voltage. Undervoltage or overvoltage exist if the set limit values for at least one phase voltage are overshot or undershot. The rms value of the voltage is measured.

Benefits

- Can be used in any network from 160 to 630 V AC worldwide thanks to wide voltage range
- Variably adjustable to overshoot, undershoot or range monitoring
- Freely configurable delay times and RESET response
- Width 22.5 mm
- Display and transmission of actual value and network fault type to controller
- All versions with removable terminals
- All versions with screw or spring-loaded terminals

Application

The relays are used above all for mobile equipment, e.g. air conditioning compressors, refrigerating containers, building site compressors and cranes.

Function	Application
Phase sequence	• Direction of rotation of the drive
Phase failure	• A fuse has tripped • Failure of the control supply voltage • Broken cable
Phase asymmetry	• Overheating of the motor due to asymmetrical voltage • Detection of asymmetrically loaded networks
Undervoltage	• Increased current on a motor with corresponding overheating • Unintentional resetting of a device • Network collapse, particularly with battery power
Overvoltage	• Protection of a plant against destruction due to overvoltage

Line monitoring

Technical specifications

3UG4815/3UG4816 monitoring relays

The 3UG4815 and 3UG4816 line monitoring relays have a wide voltage range input and are supplied with power through IO-Link or from an external 24 V DC source.

The device is equipped with a display and is parameterized using three buttons. The 3UG4815 monitoring relay monitors 3-phase networks with regard to phase sequence, phase failure, phase asymmetry, undervoltage and overvoltage. The 3UG4816 monitoring relay monitors the neutral conductor as well. The hysteresis is adjustable from 1 to 20 V.

The device has two separately adjustable delay times for overvoltage and undervoltage and for line stabilization. If the direction of rotation is incorrect or a phase fails, the device switches off immediately. Thanks to a special measuring method, a phase failure is reliably detected in spite of the wide voltage range from and potentially high feedback through the load.

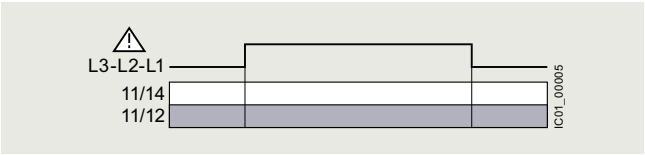
The 3UG4815 and 3UG4816 monitoring relays can be operated on the basis of either the open-circuit or closed-circuit principle and with Manual or Auto RESET.

If Manual RESET is selected in the menu (Memory = Yes), the switching relay remains in its current switching state and the current measured value and the symbol for undershooting and overshooting continue to flash, even when the measured variable reaches a permissible value again. This stored fault status can be reset by simultaneously pressing the UP▲ and DOWN▼ keys for 2.5 s.

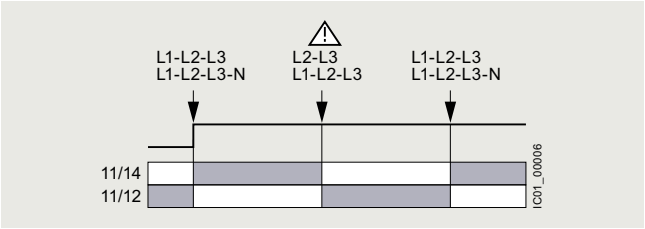
With Manual RESET through IO-Link it is possible in addition to set whether fault messages are to be deleted when the control supply voltage is switched off and on (as Remote RESET) or whether the signals are to be permanently saved even in a voltage failure, with confirmation possible only through local RESET or via IO-Link.

With the closed-circuit principle selected

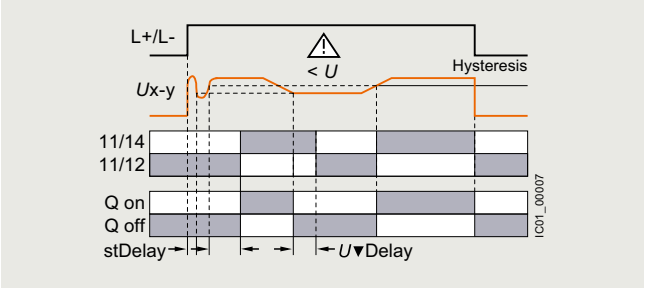
Wrong phase sequence



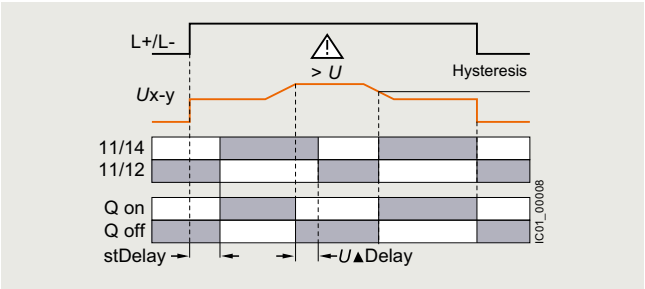
Phase failure



Undervoltage



Overvoltage



Type		3UG4815, 3UG4816
General technical specifications		
Rated insulation voltage U_i Pollution degree 2 Overvoltage category III acc. to VDE 0110	V	690
Rated impulse withstand voltage U_{imp}	kV	6
Control circuit		
Load capacity of the output relay • Thermal current I_{th}	A	5
Rated operational current I_e at • AC-15/24 ... 400 V • DC-13 at - 24 V - 125 V - 250 V	A A A A	3 1 0.2 0.1
Minimum contact load at 17 V DC	mA	5
Electrical endurance AC-15	million operating cycles	0.1
Mechanical service life	million operating cycles	10

Selection and ordering data

- Adjustable via IO-Link and locally, with illuminated LCD
- Power supply with 24 V DC via IO-Link or external auxiliary voltage
- Auto or Manual RESET
- Open-circuit or closed-circuit principle
- 1 CO contact, 1 semiconductor output (in SIO mode)

3UG4815-2AA40

3UG4816-2AA40

Adjustable hysteresis	Undervoltage detection	Overvoltage detection	Stabilization time adjustable stDEL	Tripping delay time adjustable Del	Version of auxiliary contacts	Measurable line voltage[1]	Spring-loaded terminals	Weight
V			s	s		V AC	Article No.	kg
Monitoring of phase sequence, phase failure, phase asymmetry, overvoltage and undervoltage								
1 ... 20	✓	✓	0.1 … 999.9	0.1 … 999.9	1 CO + 1 Q[2]	160 … 690	**3UG4815-2AA40**	0.147
Monitoring of phase sequence, phase and N conductor failure, phase asymmetry, overvoltage and undervoltage								
1 ... 20	✓	✓	0.1 … 999.9	0.1 … 999.9	1 CO + 1 Q[2]	90 … 400 against N	**3UG4816-2AA40**	0.147

✓ Function supported

[1] Absolute limit values.

[2] In SIO mode.

For accessories, see page 2/304.

Voltage monitoring

Overview

SIRIUS 3UG4832 monitoring relay

The relays monitor 1-phase AC voltages (rms value) and DC voltages against the set limit value for overshoot and undershoot.

Benefits

- Variably adjustable to overshoot, undershoot or range monitoring
- Freely configurable delay times and RESET response
- Width 22.5 mm
- Display and transmission of actual value and status messages to controller
- All versions with removable terminals
- All versions with screw or spring-loaded terminals

Application

- Protection of a plant against destruction due to overvoltage
- Switch-on of a plant at a defined voltage and higher
- Protection from undervoltage due to overloaded supply voltages, particularly with battery power

Technical specifications

3UG4832 monitoring relays

The 3UG4832 voltage monitoring relays are supplied with power through IO-Link or with an external auxiliary voltage of 24 V DC and perform overshoot, undershoot or range monitoring of the voltage depending on parameterization. The devices are equipped with a display and are parameterized by means of three buttons or through IO-Link.

The measuring range extends from 10 to 600 V AC/DC. The limit values for overshoot or undershoot can be freely configured within this range. If one of these limit values is reached, the output relay responds according to the set principle of operation as soon as the delay time has elapsed. This tripping delay time *U*▲Del/*U*▼Del can be set from 0 to 999.9 s, as can the ON-delay time onDel. The hysteresis is adjustable from 0.1 to 300 V.

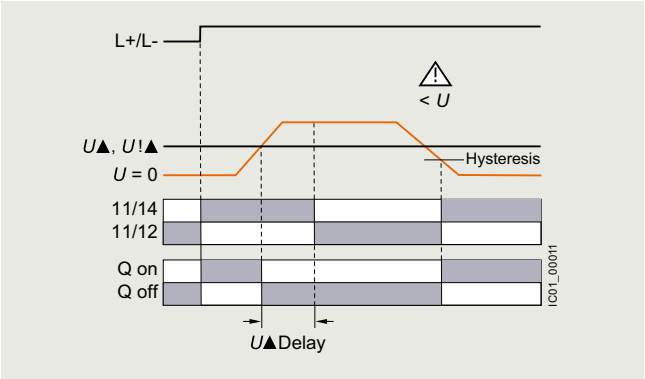
The device can be operated on the basis of either the open-circuit or closed-circuit principle and with Manual or Auto RESET. One output changeover contact is available as a signaling contact, and a semiconductor output is available in addition in SIO mode.

If Manual RESET is selected in the menu (Memory = Yes), the switching relay remains in its current switching state and the current measured value and the symbol for undershooting and overshooting continue to flash, even when the measured variable reaches a permissible value again. This stored fault status can be reset by simultaneously pressing the UP▲ and DOWN▼ keys for 2.5 s.

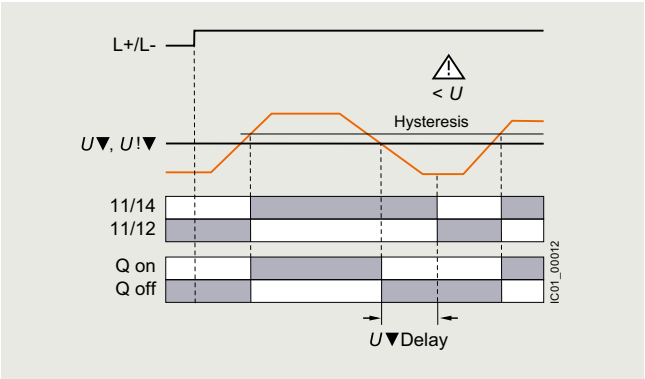
With Manual RESET through IO-Link it is possible in addition to set whether fault messages are to be deleted when the control supply voltage is switched off and on (as Remote RESET) or whether the signals are to be permanently saved even in a voltage failure, with confirmation possible only through local RESET or via IO-Link.

With the closed-circuit principle selected

Overvoltage



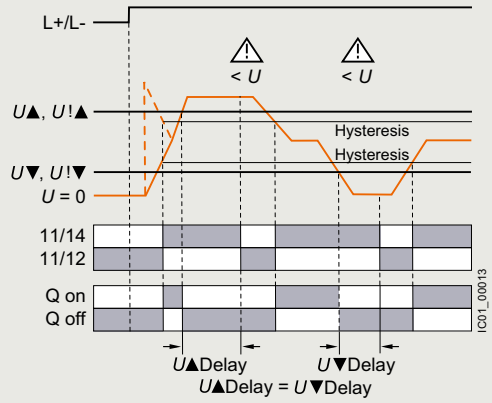
Undervoltage



2

With the closed-circuit principle selected

Range monitoring



Type		3UG4832
General technical specifications		
Rated insulation voltage U_i Pollution degree 2 Overvoltage category III acc. to VDE 0110	V	690
Rated impulse withstand voltage U_{imp}	kV	6
Measuring circuit		
Permissible measuring range 1-phase AC/DC voltage	V	10 … 690
Measuring frequency	Hz	40 ... 500
Setting range 1-phase voltage	V	10 ... 600
Control circuit		
Load capacity of the output relay • Thermal current I_{th}	A	5
Rated operational current I_e at • AC-15/24 ... 400 V • DC-13 at - 24 V - 125 V - 250 V	A A A A	3 1 0.2 0.1
Minimum contact load at 17 V DC	mA	5

Voltage monitoring

Selection and ordering data

- Adjustable via IO-Link and locally, with illuminated LCD
- Power supply with 24 V DC via IO-Link or external auxiliary voltage
- Auto or Manual RESET
- Open-circuit or closed-circuit principle
- 1 CO contact, 1 semiconductor output (in SIO mode)

3UG4832-2AA40

Measuring range	Adjustable hysteresis	ON-delay time adjustable onDel	Tripping delay time separately adjustable *U*▲Del/*U*▼Del	**Spring-loaded terminals**	Weight
				Article No.	
V AC/DC	V	s	s		kg
Monitoring of voltage for overshooting and undershooting					
10 … 600	0.1 ... 300	0 … 999.9	0 … 999.9	**3UG4832-2AA40**	0.147

For accessories, see page 2/304.

* You can order this quantity or a multiple thereof.

Overview

SIRIUS 3UG4822 monitoring relay

The relays monitor 1-phase AC currents (rms value) and DC currents against the set limit value for overshoot and undershoot.

Benefits

- Variably adjustable to overshoot, undershoot or range monitoring
- Freely configurable delay times and RESET response
- Width 22.5 mm
- Display and transmission of actual value and status messages to controller
- All versions with removable terminals
- All versions with screw or spring-loaded terminals

Application

- Overcurrent and undercurrent monitoring
- Monitoring the functionality of electrical loads
- Monitoring for broken conductors

Technical specifications

3UG4822 monitoring relays

The 3UG4822 current monitoring relays are supplied with power through IO-Link or with an external voltage of 24 V DC and perform overshoot, undershoot or range monitoring of the current depending on the parameterization. The devices are equipped with a display and are parameterized using three buttons.

The measuring range extends from 0.05 to 10 A. For larger AC currents the measuring range can be extended by using commercially available current transformers. Using the adjustable transformer factor, the display of the measured primary currents up to 750 A instead of the secondary currents (max. 1 A or 5 A) is possible.

The rms value of the current is measured. The limit values for overshoot or undershoot can be freely configured within this range. If one of these limit values is reached, the output relay responds according to the set principle of operation as soon as the tripping delay time I▲Del/I▼Del has elapsed. This time and the ON-delay time onDel are adjustable from 0 to 999.9 s.

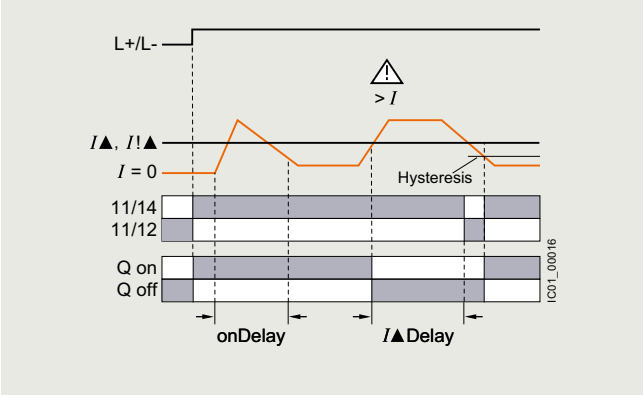
The hysteresis is adjustable from 0.01 to 5 A. The device can be operated with Manual or Auto RESET and on the basis of either the open-circuit or closed-circuit principle. You can decide here whether the output relay is to respond when the supply voltage U_s = ON is applied, or not until the lower measuring range limit of the measuring current (I > 50 mA) is reached. One output changeover contact is available as a signaling contact, and a semiconductor output is available in addition in SIO mode.

If Manual RESET is selected in the menu (Memory = Yes), the switching relay remains in its current switching state and the current measured value and the symbol for undershooting and overshooting continue to flash, even when the measured variable reaches a permissible value again. This stored fault status can be reset by simultaneously pressing the UP▲ and DOWN▼ keys for 2.5 s.

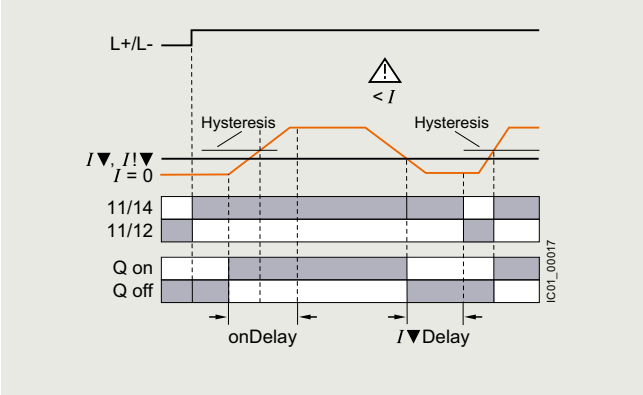
With Manual RESET through IO-Link it is possible in addition to set whether fault messages are to be deleted when the control supply voltage is switched off and on (as Remote RESET) or whether the signals are to be permanently saved even in a voltage failure, with confirmation possible only through local RESET or via IO-Link.

With the closed-circuit principle selected upon application of the control supply voltage

Current overshoot



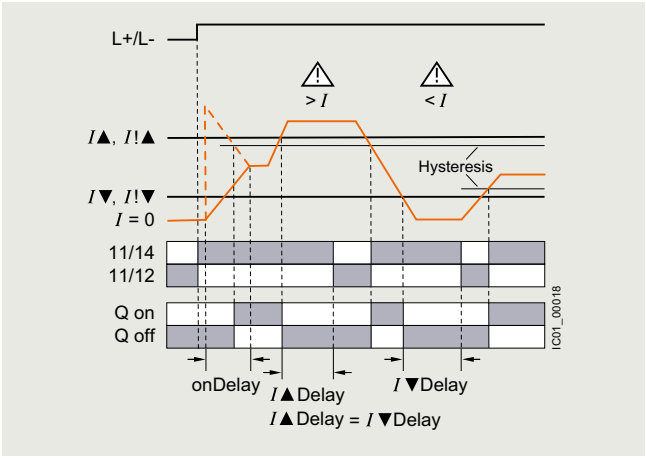
Current undershoot



Current monitoring

With the closed-circuit principle selected
upon application of the control supply voltage

Range monitoring



Type		3UG4822
General technical specifications		
Rated insulation voltage U_i Pollution degree 2 Overvoltage category III acc. to VDE 0110	V	690
Rated impulse withstand voltage U_{imp}	kV	6
Measuring circuit		
Measuring range for 1-phase AC/DC current	A	0.05 … 15
Measuring frequency	Hz	40 ... 500
Setting range for 1-phase current	A	0.05 ... 10
Load supply voltage	V	Max. 300 (with protective separation) Max. 500 (with simple separation)
Control circuit		
Load capacity of the output relay • Thermal current I_{th}	A	5
Rated operational current I_e at • AC-15/24 ... 400 V • DC-13 at - 24 V - 125 V - 250 V	A A A A	3 1 0.2 0.1
Minimum contact load at 17 V DC	mA	5

Selection and ordering data

- Adjustable via IO-Link and locally, with illuminated LCD
- Power supply with 24 V DC via IO-Link or external auxiliary voltage
- Adjustable transformer factor to display the measured primary current when an external current transformer is used
- Auto or Manual RESET
- Open-circuit or closed-circuit principle
- 1 CO contact, 1 semiconductor output (in SIO mode)

3UG4822-2AA40

Measuring range	Adjustable hysteresis	ON-delay time adjustable onDel	Tripping delay time separately adjustable I▲Del/I▼Del	**Spring-loaded terminals**	Weight
A AC/DC	A	s	s	Article No. U	kg
Monitoring of current for overshooting and undershooting					
0.05 ... 10	0.01 ... 5	0.1 … 999.9	0.1 … 999.9	**3UG4822-2AA40**	0.144

For accessories, see page 2/304.

For AC currents I > 10 A it is possible to use commercially available current transformers, e.g. the Siemens 4NC current transformers, as accessories, see Catalog LV 10.

*** You can order this quantity or a multiple thereof.**

Power factor and active current monitoring

Overview

SIRIUS 3UG4841 monitoring relay

The 3UG4841 power factor and active current monitoring devices enable the load monitoring of motors.

Whereas power factor (p.f.) monitoring is used above all for monitoring no-load operation, the active current monitoring option can be used to observe and evaluate the load factor over the entire torque range.

Benefits

- Monitoring of even small 1-phase motors with a no-load supply current below 0.5 A
- Simple determination of threshold values by directly referencing measured variables to motor loading
- Range monitoring and active current measurement enable detection of cable breaks between control cabinets and motors, as well as phase failures
- Power factor (p.f.) and/or I_{res} (active current) can be selected as the measurement principle
- Width 22.5 mm
- Display and transmission of actual value and status messages to controller
- All versions with removable terminals
- All versions with screw or spring-loaded terminals

Application

- No-load monitoring and load shedding, such as in the event of a V-belt tear
- Underload monitoring in the low-end performance range, e.g. in the event of pump no-load operation
- Monitoring of overload, e.g. due to a dirty filter system
- Power factor monitoring in networks for control of compensation equipment
- Broken cable between control cabinet and motor

Technical specifications

3UG4841 monitoring relays

3UG4841 monitoring relays are supplied with power through IO-Link or with an external auxiliary voltage of 24 V DC and are used for performing overshoot, undershoot or range monitoring of the power factor and/or the resulting active current, depending on parameterization. The load to be monitored is connected upstream of the IN terminal. The load current flows through the terminals IN and Ly/N. The setting range for the power factor is 0 to 0.99 and for the active current I_{res} it is 0.2 to 10 A. If the control supply voltage is switched on and no load current flows, the display will show $I < 0.2$ and a symbol for overshoot, undershoot or range monitoring. If the motor is now switched on and the current exceeds 0.2 A, the set ON-delay time onDel begins. During this time, if the set limit values are undershot or exceeded, this does not lead to a relay reaction of the changeover contact. If the operational flowing active current and/or the p.f. value falls below or exceeds the respective set threshold value, the tripping delay time begins. When this time has expired, the relay changes its switch position. The relevant measured variables for overshooting and undershooting in the display flash. If monitoring for active current undershoot is switched off (I_{res}▼= OFF), and if the load current undershoots the lower measuring range threshold (0.2 A), the CO contacts remain unchanged. If a threshold value is set for the monitoring of active current undershooting, then undershooting of the measuring range threshold (0.2 A) will result in a response of the CO contacts.

The relay operates either according to the open-circuit or closed-circuit principle.

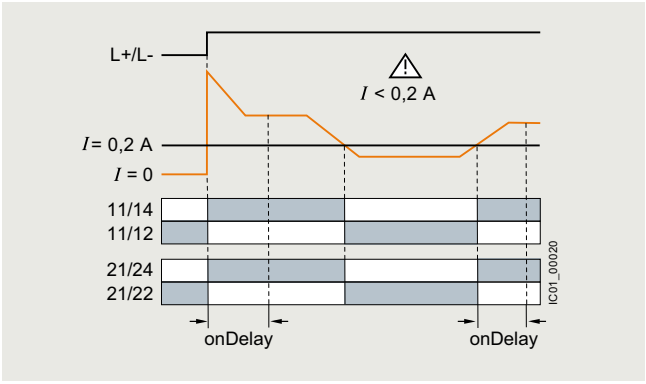
If the device is set to Auto RESET (Memory = No), depending on the set principle of operation, the switching relay returns to its initial state and the flashing ends when the hysteresis threshold is reached.

If Manual RESET is selected in the menu (Memory = Yes), the switching relay remains in its current switching state and the current measured value and the symbol for undershooting and overshooting continue to flash, even when the measured variable reaches a permissible value again. This stored fault status can be reset by simultaneously pressing the UP▲ and DOWN▼ keys for 2.5 s.

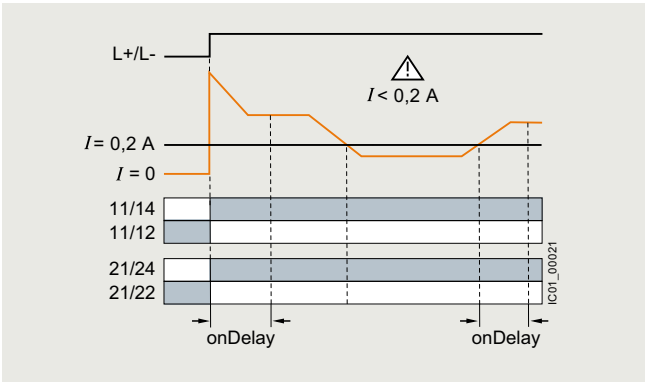
With Manual RESET through IO-Link it is possible in addition to set whether fault messages are to be deleted when the control supply voltage is switched off and on (as Remote RESET) or whether the signals are to be permanently saved even in a voltage failure, with confirmation possible only through local RESET or via IO-Link.

With the closed-circuit principle selected

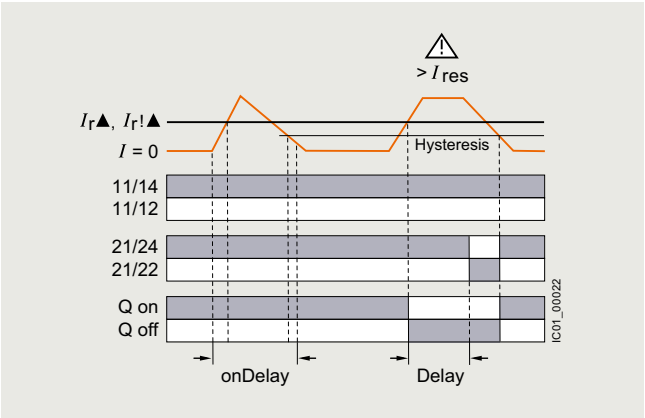
Response in the event of undershooting the measuring range limit with activated monitoring of I_{res}▼



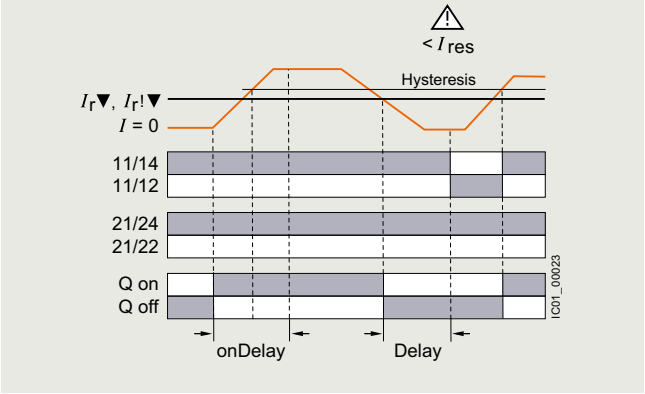
Response in the event of undershooting the measuring range limit with deactivated monitoring of active current undershooting



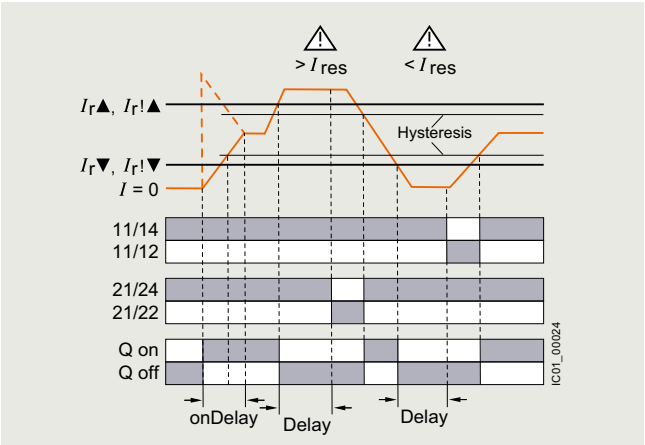
Overshooting of active current



Undershooting of active current



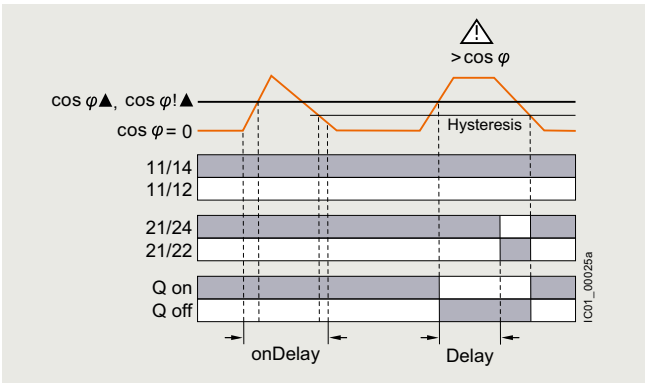
Range monitoring of active current



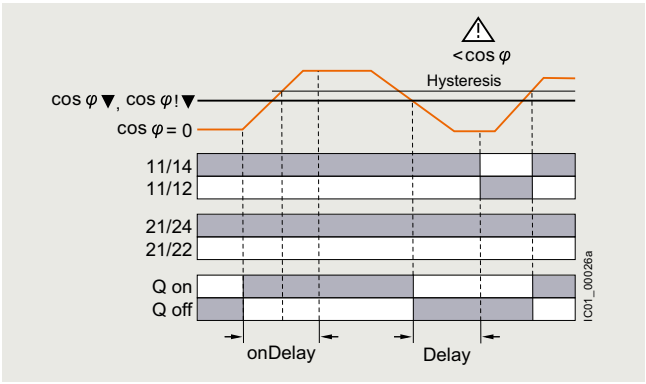
Power factor and active current monitoring

With the closed-circuit principle selected

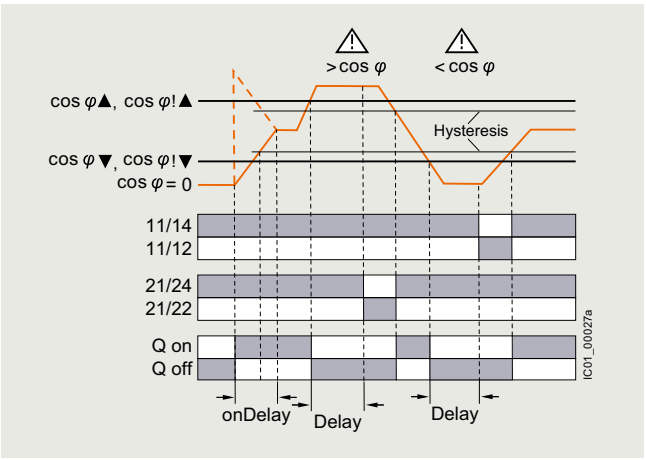
Overshooting of power factor



Undershooting of power factor



Range monitoring of power factor



Type		3UG4841
General technical specifications		
Rated insulation voltage U_i Pollution degree 2 Overvoltage category III according to IEC 60664-1	V	690
Rated impulse withstand voltage U_{imp}	kV	6
Control circuit		
Number of CO contacts for auxiliary contacts		2
Load capacity of the output relay • Thermal current I_{th}	A	5
Rated operational current I_e at • AC-15/24 ... 400 V • DC-13 at - 24 V - 125 V - 250 V	A A A A	3 1 0.2 0.1
Minimum contact load at 17 V DC	mA	5

Selection and ordering data

- For monitoring the power factor and the active current I_{res} (p.f. x I)
- Suitable for 1-phase and 3-phase currents
- Adjustable via IO-Link and locally, with illuminated LCD
- Power supply with 24 V DC via IO-Link or external auxiliary voltage
- Overshoot, undershoot or range monitoring adjustable
- Upper and lower limit values can be adjusted separately
- Permanent display of actual value and tripping state
- 1 CO contact each for undershoot and overshoot, 1 semiconductor output (in SIO mode)

3UG4841-2CA40

Measuring range		Voltage range of the measuring voltage[1]	Hysteresis		ON-delay time adjustable onDel	Tripping delay time separately adjustable U▲Del/ U▼Del, φ▲Del/ φ▼Del	**Spring-loaded terminals**	Weight
For power factor	For active current I_{res}	50/60 Hz AC	Adjustable for power factor	Adjustable for active current I_{res}				
P.f.	A	V	P.f.	A	s	s	Article No.	kg
Monitoring of power factor and active current for overshooting or undershooting								
0.1 ... 0.99	0.2 ... 10	90 ... 690	0.1 ... 0.2	0.1 ... 3	0 ... 999.9	0 ... 999.9	**3UG4841-2CA40**	0.168

[1] Absolute limit values.

For accessories, see page 2/304.

For AC active currents I_{res} > 10 A it is possible to use commercially available current transformers, e.g. Siemens 4NC current transformers, as accessories, see Catalog LV 10.

2

Overview

SIRIUS 3UG4825 monitoring relay

The 3UG4825 residual-current monitoring relays are used in conjunction with the 3UL23 residual-current transformers for monitoring plants in which higher residual currents are increasingly expected due to ambient conditions. Monitoring encompasses pure AC residual currents or AC residual currents with a pulsating DC fault current component (transformer type A in accordance with DIN VDE 0100-530/IEC TR 60755).

Benefits

- High measuring accuracy of ± 7.5%
- Permanent self-monitoring
- Parameterization of the devices locally or via IO-Link possible
- Variable threshold values for warning and disconnection
- Freely configurable delay times and RESET response
- Display and transmission of actual value and status messages to controller
- High level of flexibility and space saving through installation of the transformer inside or outside the control cabinet
- Width 22.5 mm
- All versions with removable terminals
- All versions with screw or spring-loaded terminals

Application

Monitoring of plants in which residual currents can occur, e.g. due to dust deposits or moisture, porous cables and leads, or capacitive residual currents.

Technical specifications

3UG4825 monitoring relays

The main conductor, and any neutral conductor to which a load is connected, are routed through the opening of the toroidal core of a residual-current transformer. A secondary winding is placed around this toroidal core to which the monitoring relay is connected.

If operation of a plant is fault-free, the sum of the inflowing and outward currents equals zero. No current is then induced in the secondary winding of the residual-current transformer.

However, if an insulation fault occurs, the sum of the inflowing currents is greater than that of the outward currents.
The differential current – i.e. the residual current – induces a secondary current in the secondary winding of the transformer. This current is evaluated in the monitoring relay and is used on the one hand to display the actual residual current and on the other, to switch the relay if the set warning or tripping threshold is overshot.

If the measured residual current exceeds the set warning value, the associated changeover contact instantly changes the switching state and an indication appears on the display.

If the measured residual current exceeds the set tripping value, the set delay time begins and the associated relay symbol flashes. On expiry of this time, the associated changeover contact changes the switching state.

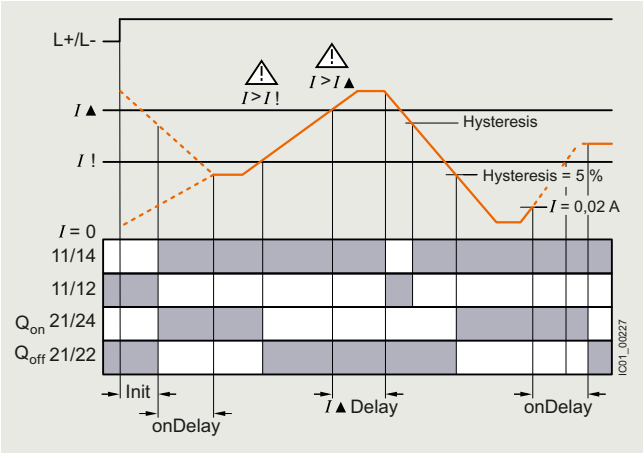
ON-delay time for motor start

To be able to start a drive when a residual current is detected, the output relays switch to the OK state for an adjustable ON-delay time depending on the selected open-circuit or closed-circuit principle.

The changeover contacts do not react if the set threshold values are overshot during this period.

With the closed-circuit principle selected

Residual-current monitoring with Auto RESET (Memory = no)

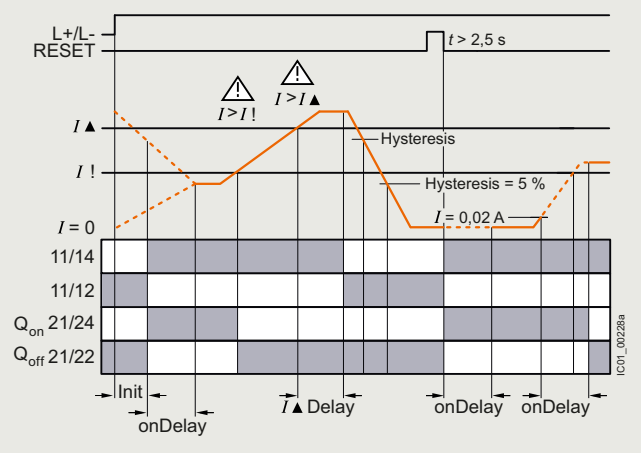


If the device is set to Auto RESET, the relay switches back to the OK state for the tripping value after tripping once the value falls below the set hysteresis threshold and the display stops flashing.

The associated relay changes its switching state if the value falls below the fixed hysteresis value of 5% of the warning value.

Any overshoots are therefore not stored.

Residual-current monitoring with Manual RESET (Memory = yes)



If Manual RESET is selected in the menu, the output relays remain in their current switching state and the current measured value and the symbol for overshooting continue to flash, even when the measured residual current returns to a permissible value. This stored fault status can be reset by simultaneously pressing the UP▲ and DOWN▼ keys for > 2 seconds, or by switching the supply voltage off and back on again.

Note:

The neutral conductor must not be grounded downstream of the summation current transformer as this may impair the function of the residual-current monitoring device.

Type		3UG4825-1CA40, 3UG4825-2CA40
General data		
Insulation voltage for overvoltage category III acc. to IEC 60664 for pollution degree 3, rated value	V	300
Impulse withstand voltage, rated value U_{imp}	kV	4
Control circuit		
Number of CO contacts for auxiliary contacts		2
Thermal current of the non-solid-state contact blocks, maximum	A	5
Current-carrying capacity of the output relay		
• At AC-15 at 250 V at 50/60 Hz	A	3
• At DC-13		
- At 24 V	A	1
- At 125 V	A	0.2
- At 250 V	A	0.1
Operational current at 17 V, minimum	mA	5

2

Selection and ordering data

- For monitoring residual currents from 0.03 to 40 A, from 16 to 400 Hz
- For 3UL23 residual-current transformers with feed-through opening from 35 to 210 mm
- Permanent self-monitoring
- Certified in accordance with IEC 60947, functionality corresponds to IEC 62020
- Digitally adjustable, with illuminated LCD
- Permanent display of actual value and tripping state
- Separately adjustable limit value and warning threshold
- 1 changeover contact each for warning threshold and tripping threshold

3UG4825-2CA40

Measurable current	Adjustable response value current	Switching hysteresis	Adjustable ON-delay time	Control supply voltage At DC, rated value	**Spring-loaded terminals** Article No.	Weight
A	A	%	s	V		kg
0.01 ... 43	0.03 ... 40	0 ... 50	0 ... 999.9	24	**3UG4825-2CA40**	0.147

For accessories, see page 2/304.

For 3UL23 residual-current transformers and accessories for 3UL23, see page 2/270.

* You can order this quantity or a multiple thereof.

Overview

SIRIUS 3UG4851 monitoring relay

3UG4851 monitoring relays are used in combination with a sensor to monitor drives for overspeed and/or underspeed.

Furthermore, the monitoring relays are ideal for all functions where a continuous pulse signal needs to be monitored (e.g. belt travel monitoring, completeness monitoring, passing monitoring, clock-time monitoring).

Benefits

- Variably adjustable to overshoot, undershoot or range monitoring
- Freely configurable delay times and RESET response
- Display and transmission of actual value and fault type to controller
- Use of up to 10 sensors per rotation for extremely slowly rotating motors
- Two- or three-wire sensors and sensors with a mechanical switching output or solid-state output can be connected
- Auxiliary voltage for sensor integrated
- All versions with removable terminals
- All versions with screw or spring-loaded terminals

Application

- Slip or tear of a belt drive
- Overload monitoring
- Transport monitoring for completeness

Technical specifications

3UG4851 monitoring relays

The speed monitoring relay operates according to the principle of period duration measurement.

In the monitoring relay, the time between two successive rising edges of the pulse encoder is measured and compared to the minimum and/or maximum permissible period duration calculated from the set limit values for the speed.

Thus, the period duration measurement recognizes any deviation in speed after just two pulses, even at very low speeds or in the case of extended pulse gaps.

By using up to ten pulse encoders evenly distributed around the circumference, it is possible to shorten the period duration, and in turn the response time. By taking into account the number of sensors in the monitoring relay, the speed continues to be indicated in rpm.

ON-delay time for motor start

To be able to start a motor drive, and depending on whether the open-circuit or closed-circuit principle is selected, the output relay switches to the OK state during the ON-delay time, even if the speed is still below the set value.

The ON-delay time is started by either switching on the auxiliary voltage or, if the auxiliary voltage is already applied, by actuating the respective NC contact (e.g. auxiliary contact).

Speed monitoring with Auto RESET (Memory = no)

If the device is set to Auto RESET, the output relay switches to the OK state, once the adjustable hysteresis threshold is reached in the range of 1 to 99.9 rpm and the flashing stops. Any overshoots or undershoots are therefore not stored.

Speed monitoring with Manual RESET (Memory = yes)

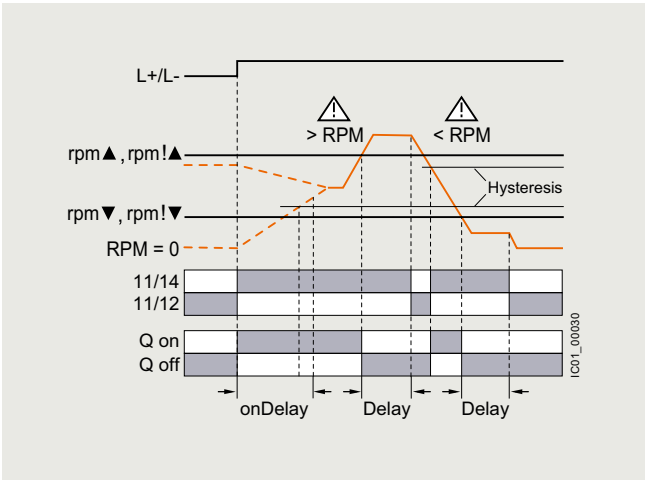
If Manual RESET is selected in the menu, the output relay remains in its current switching state and the current measured value and the symbol for overshooting/undershooting continue to flash, even when the speed returns to a permissible value. This stored fault status can be reset by simultaneously pressing the UP▲ and DOWN▼ buttons for > 2.5 s or by connecting the RESET device terminal to 24 V DC.

With Manual RESET through IO-Link it is possible in addition to set whether fault messages are to be deleted when the control supply voltage is switched off and on (as Remote RESET) or whether the signals are to be permanently saved even in a voltage failure, with confirmation possible only through local RESET, the Remote RESET contact, or via IO-Link.

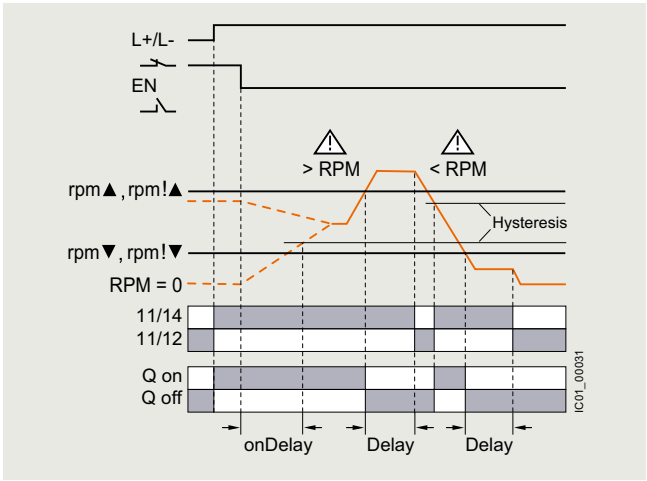
Speed monitoring

With the closed-circuit principle selected

Range monitoring without enable input



Range monitoring with enable input



Type		3UG4851
General technical specifications		
Rated insulation voltage U_i Pollution degree 2 Overvoltage category III acc. to VDE 0110	V	300
Rated impulse withstand voltage U_{imp}	kV	4
Measuring circuit		
Sensor supply		
• For three-wire sensor (24 V/0 V)	mA	Max. 50
• For two-wire NAMUR sensor (8V2)	mA	Max. 8.2
Signal input		
• IN1	kΩ	16, three-wire sensor, pnp operation
• IN2	kΩ	1, floating contact, two-wire NAMUR sensor
Voltage level		
• For level 1 at IN1	V	4.5 ... 30
• For level 0 at IN1	V	0 ... 1
Current level		
• For level 1 at IN2	mA	> 2.1
• For level 0 at IN2	mA	< 1.2
Minimum pulse duration of signal	ms	5
Minimum interval between 2 pulses	ms	5
Control circuit		
Number of CO contacts for auxiliary contacts		1
Load capacity of the output relay Thermal current I_{th}	A	5
Rated operational current I_e at		
• AC-15/24 ... 250 V	A	3
• DC-13 at		
- 24 V	A	1
- 125 V	A	0.2
- 250 V	A	0.1
Minimum contact load at 17 V DC	mA	5

Selection and ordering data

- For speed monitoring in revolutions per minute (rpm)
- Two- or three-wire sensor with mechanical or electronic switching output can be connected
- Two-wire NAMUR sensor can be connected
- Sensor supply 24 V DC/50 mA integrated
- Input frequency 0.1 to 2 200 pulses per minute (0.0017 to 36.7 Hz)
- With or without enable signal for the drive to be monitored
- Adjustable via IO-Link and locally, with illuminated LCD
- Power supply with 24 V DC via IO-Link or external auxiliary voltage
- Overshoot, undershoot or range monitoring adjustable
- Number of pulses per revolution can be adjusted
- Upper and lower limit values can be adjusted separately
- Auto, Manual or Remote RESET options after tripping
- Permanent display of actual value and tripping state
- 1 CO contact, 1 semiconductor output (in SIO mode)

3UG4851-2AA40

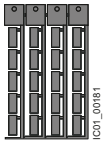
Measuring range	Adjustable hysteresis	ON-delay time adjustable onDel	Tripping delay time separately adjustable rpm▲Del/ rpm▼Del	Pulses per revolution	**Spring-loaded terminals**	Weight
rpm	rpm	s	s		Article No.	kg
Speed monitoring for overshooting and undershooting						
0.1 ... 2 200	OFF 1 ... 99.9	0 ... 999.9	0 ... 999.9	1 ... 10	**3UG4851-2AA40**	0.144

For accessories, see page 2/304.

*** You can order this quantity or a multiple thereof.**

Accessories

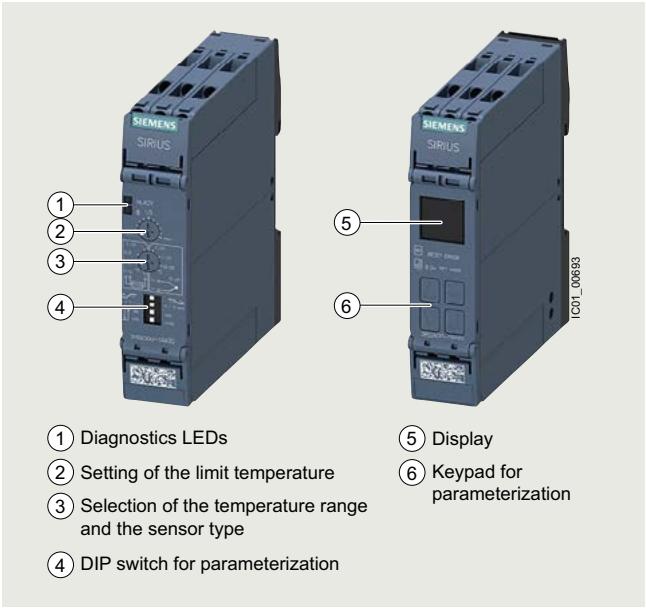
Selection and ordering data

	Use	Version	Article No.	Weight kg
Accessories for enclosures				
 3RP1902	For 3UG48	**Sealable covers** For securing against unauthorized adjustment of setting knobs	**3RP1902**	0.003
 3RP1903	For 3UG48	**Push-in lugs** For screw fixing, 2 units are required for each device	**3RP1903**	0.002
Blank labels				
 3RT2900-1SB20	For 3UG48	**Unit labeling plates** [1] For SIRIUS devices		
		• 20 mm x 7 mm, titanium gray	**3RT2900-1SB20**	0.062
	For 3UG48	**Adhesive labels** For SIRIUS devices, 19 mm x 6 mm, titanium gray	**3RT2900-1SB60**	0.005
Tools for opening spring-loaded terminals				
 3RA2908-1A	For auxiliary circuit connections	**Screwdrivers** For all SIRIUS devices with spring-loaded terminals	**Spring-loaded terminals**	
		Length approx. 200 mm, 3.0 mm x 0.5 mm, titanium gray/black, partially insulated	**3RA2908-1A**	0.050
Software				
	For 3UG48	**SIRIUS Asset Monitor** The MindSphere app enables access to the SIRIUS 3UG48 monitoring relays anytime and anywhere and provides detailed information about the device status and fault messages and warnings.		

[1] PC labeling system for individual inscription of unit labeling plates available from: murrplastik Systemtechnik GmbH.

* You can order this quantity or a multiple thereof.

Overview



SIRIUS 3RS2 temperature monitoring relays

More information

Homepage, see www.siemens.com/sirius-monitoring-relays
Industry Mall, see www.siemens.com/product?3RS2
Conversion tool, see www.siemens.com/conversion-tool

The 3RS2 temperature monitoring relays can be used to measure temperatures in solid, liquid and gas media. The temperature is acquired by means of sensors in the medium, evaluated by the device and monitored for overshoot, undershoot or location within a specified range (window function).

The family comprises an analog multi-function device which can be set using DIP switches and potentiometers, and digital devices which can be parameterized via an intuitive LC display. The digital device is also available as a version with IO-Link.

All 3RS26 digital devices, including the 3RS28 versions with IO-Link, have safety certification according to IEC 61508/62061 or ISO 13849 up to SIL 1/PL c as well as EN 14597 for heat generating systems and EN 50156 for burners.

Furthermore, the functionality of the 3RS26/3RS28 digital devices can be expanded using a 3RS29 sensor expansion module with two additional resistance sensors, e.g. for monitoring 3-phase motors or transformers.

The 3RS29 sensor expansion module also features an additional relay for outputting the sensor status, and an additional analog input 4 to 20 mA. This analog input allows ATEX applications to be implemented when using an intrinsically safe temperature sensor or other appropriate type of protection. The 3RS29 is connected wirelessly via a SIL 1-certified infrared communication interface.

Notes:

The SIRIUS 3RS2 temperature monitoring relays fully replace the 3RS1 predecessor. The large number of 3RS1 analog devices can simply be replaced with the new 3RS25 analog multi-function device. The reduced variety of order numbers means the successors can be selected quickly and easily.

The 3RS2 digital devices fully supersede the functionality of the 3RS1 predecessor in a single device type that is now able to use resistance sensors and thermocouples – all at half the width of 22.5 mm instead of 45 mm.

Analog multi-function devices

SIRIUS 3RS25 analog multi-function device

The analog multi-function device is parameterized using DIP switches and potentiometers. The device can be used to monitor a sensor with a limit value for overshoot or undershoot. The most common temperature ranges with Pt100 resistance sensors or type J or K thermocouples can be used for this purpose. This device can therefore also be used as a compact, easy-to-adjust two-point controller. The relay CO contact output enables loads to be switched directly. The NC contact can optionally be used as a signaling contact.

Digital devices (1 sensor)

SIRIUS 3RS26 digital device (1 sensor) with 3RS29 sensor expansion module

The SIRIUS 3RS26 digital device with display enables sensors with two limit values to be monitored using all common resistance sensors and thermocouples.

General data

The additional limit value means that, in addition to overshoot and undershoot, an additional warning value can be output to the relay outputs. Alternatively, the second monitoring value can also be used to implement range monitoring. The digital devices can thus also be used as compact two or three-step controllers, with Manual RESET or Remote RESET.

Thanks to safety certification, this device can be used in a wide range of applications.

The functionality of the SIRIUS 3RS26 and 3RS28 digital devices can be expanded wirelessly with the sensor expansion module via a SIL 1-certified infrared communication interface. This combination then features three sensors and is designed for monitoring large 3-phase motors and transformers. It goes without saying that the additional sensors can also be used for other applications.

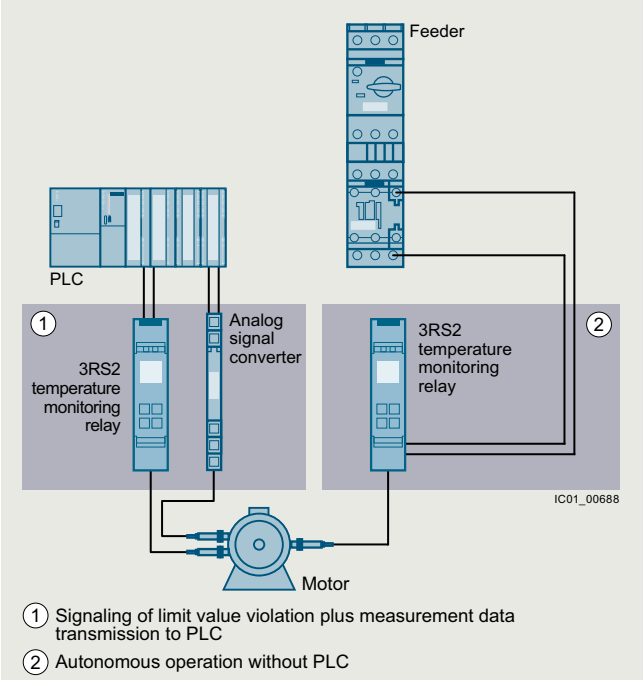
Digital devices (1 sensor) for IO-Link

SIRIUS 3RS28 digital device (1 sensor) for IO-Link with 3RS29 sensor expansion module

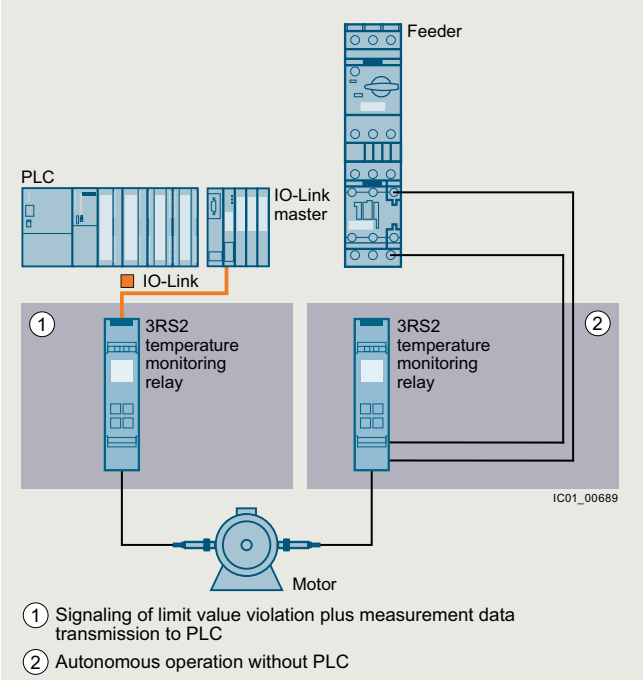
The 3RS28 digital temperature monitoring relays for IO-Link feature an IO-Link communication interface in addition to a display. They include all functions of the 3RS26 digital device and can also be operated on L+/L- as a stand-alone installation with 24 V DC.

Note:

The IO-Link devices can be reset on the display or via IO-Link.



Conventional temperature monitoring relays



Temperature monitoring relays for IO-Link

Notes:

Devices required for communication via IO-Link:

- Any controller that supports IO-Link (e.g. ET 200SP with CPU or S7-1200), see Catalog ST 70.
- IO-Link master (e.g. CM 4xIO-Link for SIMATIC ET 200SP or SM 1278 for S7-1200.

Each monitoring relay requires an IO-Link channel.

Notes on security

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens products and solutions represent only one component of such a concept.

For more information about the subject of Industrial Security, see www.siemens.com/industrialsecurity.

Article No. scheme

Product versions		Article number
Temperature monitoring relays		**3RS2** □ **0 0 –** □ □ □ □ **0**
Device type	e.g. 5 = analogically adjustable	□
Connection type	Screw terminals	**1**
	Spring-loaded terminals (push-in)	**2**
Number of CO contacts	e.g. A = 1 CO contact, B = 2 CO contacts	□
Rated control supply voltage	A = 24 V AC/DC, W = 24 ... 240 V AC/DC	□
Type of rated control supply voltage	3 = AC/DC, 4 = DC	□
Example		**3RS2 5 0 0 – 1 A A 3 0**

Note:

The Article No. scheme shows an overview of product versions for better understanding of the logic behind the article numbers. For your orders, please use the article numbers quoted in the selection and ordering data.

Benefits

- Customary screw and spring-loaded terminals for quick and reliable wiring
- Reduced space requirement in the control cabinet thanks to a consistent width of 22.5 mm
- Easy parameterization thanks to new display and intuitive operating concept
- Reduced stock keeping and logistics thanks to heavily reduced device variance
- Cost savings thanks to additional scalable functionality with integrated infrared interface
- Communication via IO-Link for 3RS28
- Global applicability and exportability thanks to compliance with international standards and certifications
- Problem-free use in a wide range of applications thanks to Safety bundle with certification according to SIL 1/PL c, ATEX, EN 14597 for heat generating systems and EN 50156 for burners
- All versions with removable terminals
- All versions with screw or spring-loaded terminals with push-in functionality

Application

The SIRIUS 3RS2 temperature monitoring relays can be used in almost any application in which temperature overshoot or undershoot is not permitted, e.g. in the monitoring of set temperature limits and the output of alarm messages for:

- Simple and compact two-point control
- Motor and system protection
- Control cabinet temperature monitoring
- Freeze monitoring
- Temperature limits for process variables e.g. in the packaging industry or electroplating
- Controlling equipment and machines such as heating, climate and ventilation systems, solar collectors, heat pumps or warm water supplies
- Motor, bearing and gear oil monitoring
- Monitoring of coolants

Additionally for digital devices

- Simple and compact two-point or three-point control
- Burner acc. to EN 50156
- Temperature monitors or temperature limiters[1)] according to EN 14597
- ATEX explosion protection according to EN 50495

[1)] A 3RS29 sensor expansion module with an additional sensor is required for the function as a temperature limiter.

General data

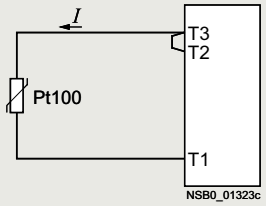
Technical specifications

More information	
Technical specifications, see https://support.industry.siemens.com/cs/ww/en/ps/25719/td Equipment Manual and internal circuit diagrams, see https://support.industry.siemens.com/cs/ww/en/ps/25719/man	FAQs, see https://support.industry.siemens.com/cs/ww/en/ps/25719/faq

Connection of resistance-type thermometers

Two-wire measurement

When two-wire temperature sensors are used, the resistances of the sensor and wiring are added. The resulting systematic error must be taken into account when the evaluation unit is calibrated. A jumper must be clamped between terminals T2 and T3 for this purpose.



Wiring errors

The errors that are generated by the wiring comprise approximately 2.5 K/Ω. If the resistance of the cable is not known and cannot be measured, the wiring errors can also be estimated using the following table.

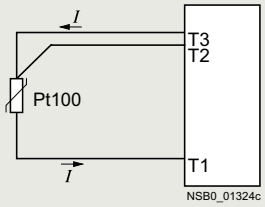
Temperature drift dependent on the length and cross-section of the cable with Pt100 sensors and an ambient temperature of 20 °C, in K:

Cable length in m	Cross-section mm²			
	0.5	0.75	1	1.5
	Temperature drift in K:			
0	0	0	0	0
10	1.8	1.2	0.9	0.6
25	4.5	3.0	2.3	1.5
50	9.0	6.0	4.5	3.0
75	13.6	9.0	6.8	4.5
100	18.1	12.1	9.0	6.0
200	36.3	24.2	18.1	12.1
500	91.6	60.8	45.5	30.2

Example: On a Pt100 sensor with a cable length of 10 m and a conductor cross-section of 1 mm^2 the temperature drift equals 0.9 K.

Three-wire measurement

To minimize the effects of the line resistances, a three-wire circuit is often used. Using the additional cable, two measuring circuits can be formed of which one is used as a reference. The evaluation unit can then automatically calculate the line resistance and take it into account.



Connection of thermocouples

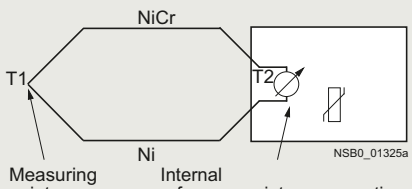
Based on the thermo-electrical effect, a differential temperature measurement will be performed between the measuring point and the evaluation unit.

This principle assumes that the evaluation unit knows the temperature at the clamping point (T2). For this reason, the 3RS2 temperature monitoring relays have an integral reference point compensation that determines this comparison temperature and builds it into the result of the measurement. The thermal sensors and cables must therefore be insulated.

The absolute temperature is therefore calculated from the ambient temperature of the evaluation unit and the temperature difference measured by the thermocouple.

Temperature detection is therefore possible (T1) without needing to know the precise ambient temperature of the clamping point at the evaluation unit (T2).

The connection cable is only permitted to be extended using compensating lines that are made from the same material as the thermocouple. If a different type of conductor is used, an error will result in the measurement.



For more information, see https://www.ephy-mess.com/en

Principle of operation

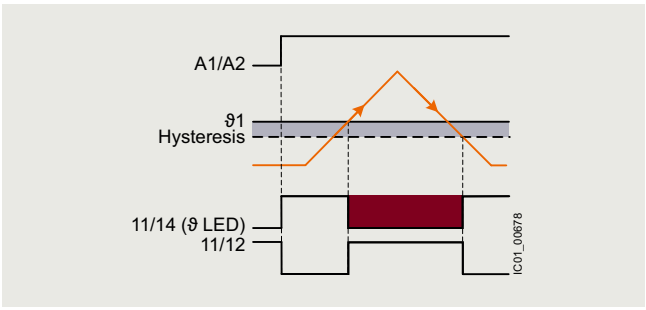
Once the temperature has reached the set threshold value ϑ1, the K1 output relay changes its switching state as soon as the set time *t* has elapsed (K2 responds in the same manner to ϑ2). The delay time can only be adjusted with digital units (on analog units *t* = 0).

When Auto RESET (AUTO RST) is set, the relays return to their original state as soon as the temperature reaches the set hysteresis value.

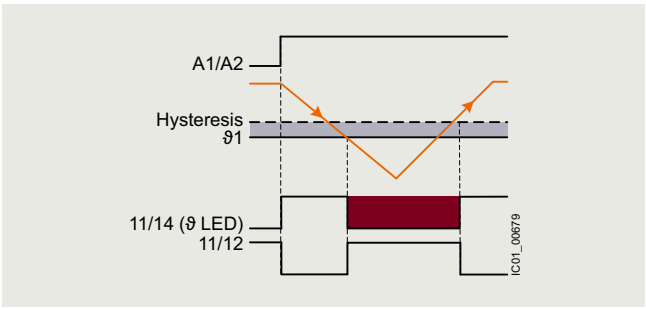
The memory function (MEMORY) allows the status to be saved even in the event of a voltage failure.

3RS25 analog multi-function devices

Temperature overshoot



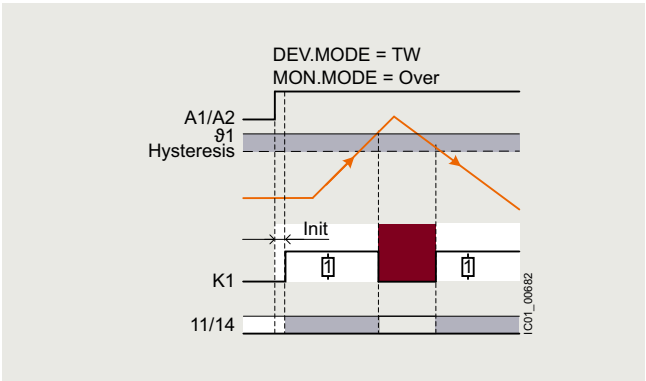
Temperature undershoot



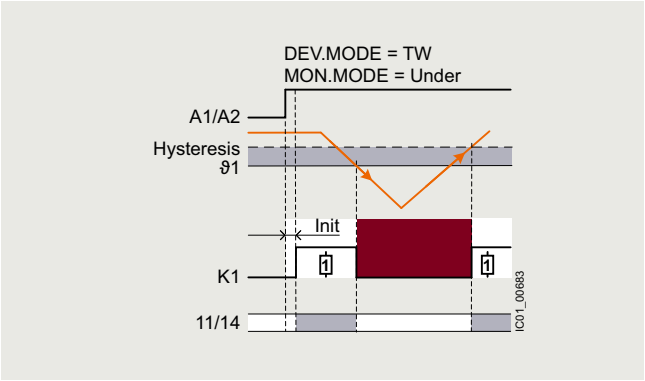
3RS26, 3RS28 digital devices (1 sensor) with Safety function

Temperature monitors according to EN 14597

Temperature overshoot

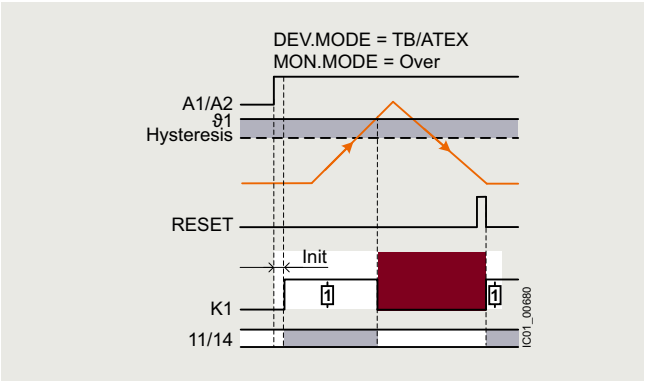


Temperature undershoot

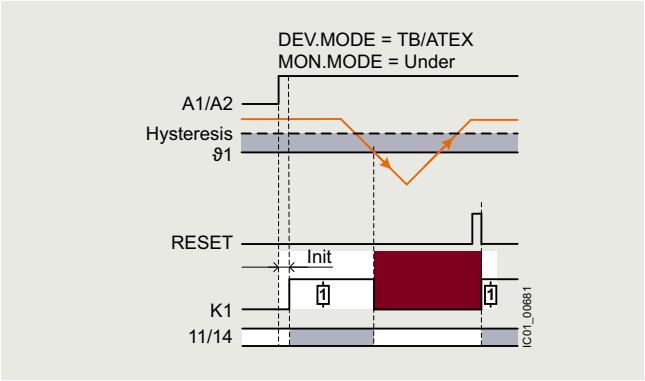


Temperature limiters according to EN 14597/ATEX

Temperature overshoot



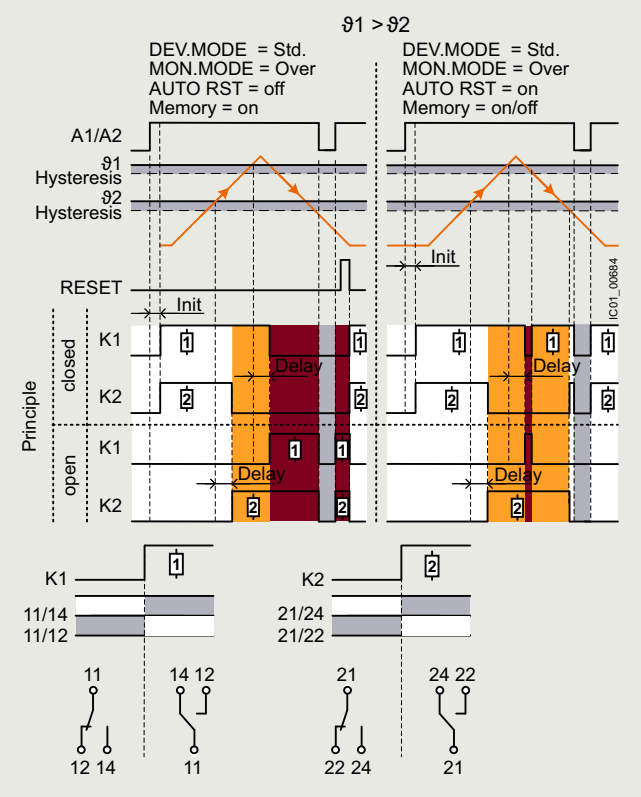
Temperature undershoot



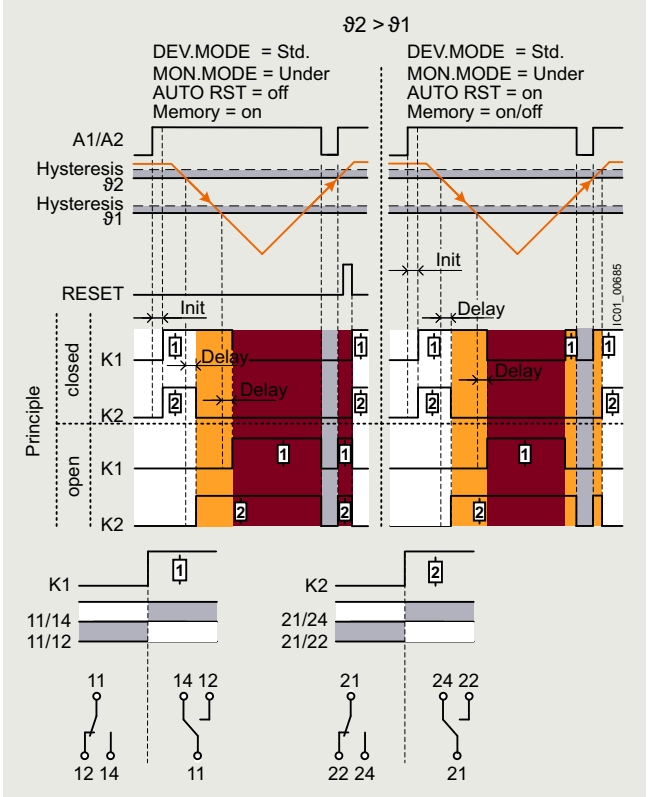
General data

3RS26, 3RS28 digital devices (1 sensor)

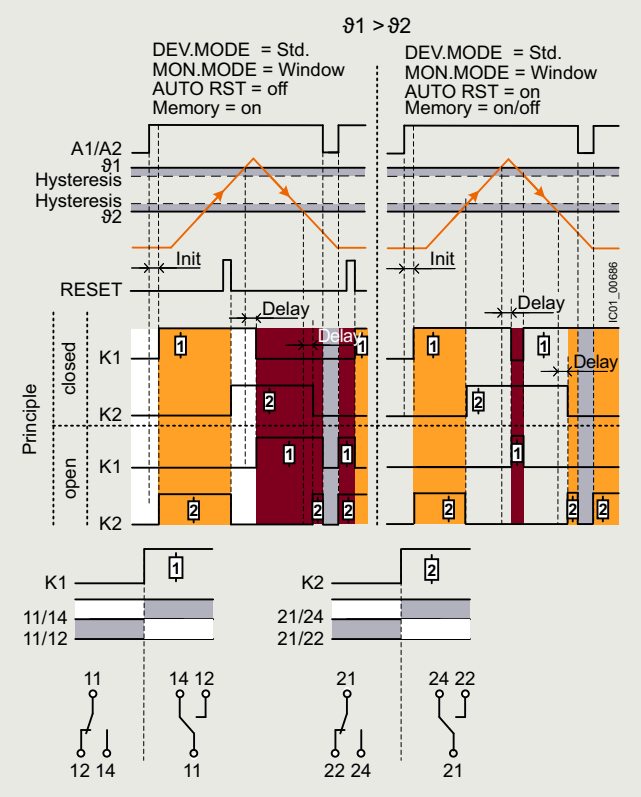
Temperature overshoot



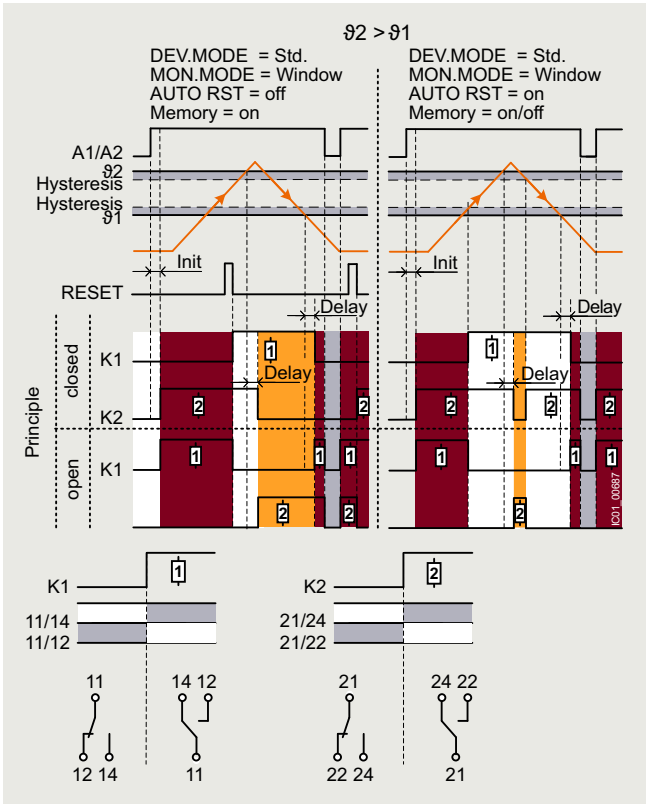
Temperature undershoot



Range monitoring

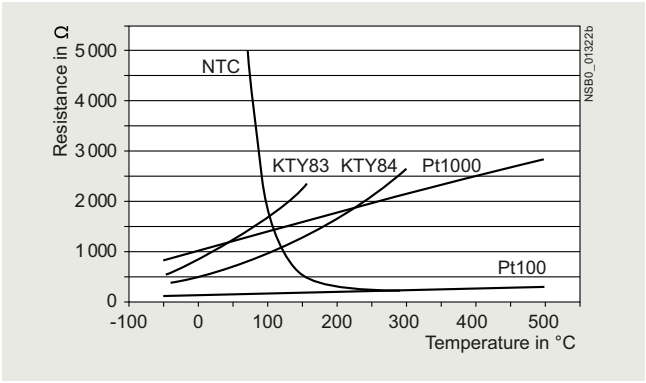


Range monitoring



Characteristic curves

For resistance sensors



Characteristic curves for resistance sensors

The short-circuit and open-circuit detection as well as the measuring range is limited, depending on the sensor type.

Measuring ranges and switch position for analog devices in °C for Pt100 resistance sensor

Measuring range in °C	Switch position in °C										
	min.					1/2					max.
0 ... +100	0	10	20	30	40	50	60	70	80	90	100
0 ... +200	0	20	40	60	80	100	120	140	160	180	200
-50 ... +50	-50	-40	-30	-20	-10	0	10	20	30	40	50

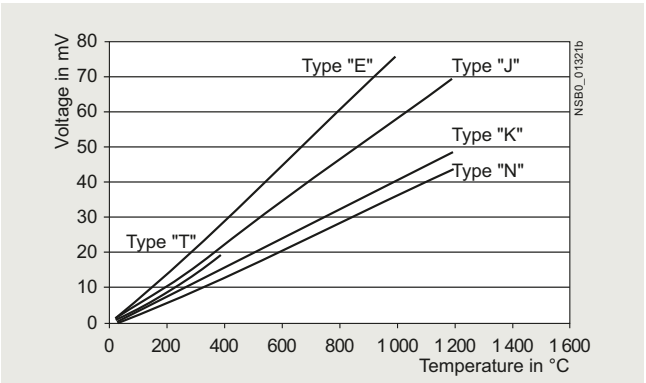
Measuring ranges for digital devices in °C for resistance sensor

Sensor type	Short circuit	Open circuit	3RS26, 3RS28 Measuring range in °C	3RS26, 3RS28 Measuring range in °F
Pt100	✓	✓	-50 ... +750	-58 ... +1 382
Pt1000	✓	✓	-50 ... +500	-58 ... +932
KTY83-110	✓	✓	-50 ... +175	-58 ... +347
KTY84	✓	✓	-40 ... +300	-40 ... +572
NTC[1)]	✓	--	+80 ... +160	+176 ... +320

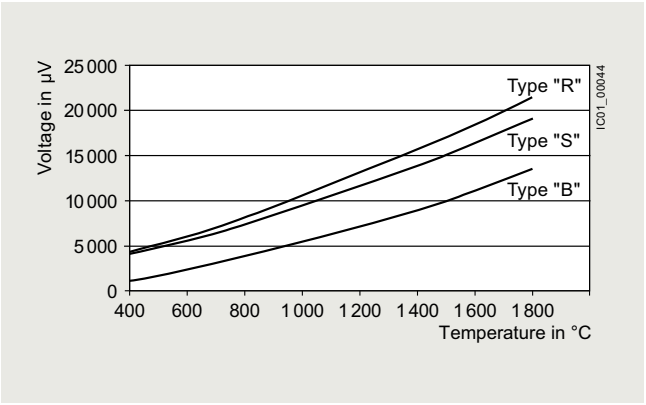
✓ Detection possible
-- Detection not possible

[1)] NTC type: B57227-K333-A1 (100 °C: 1.8 kΩ; 25 °C: 32.762 kΩ).

For thermocouples



Characteristic curves for thermocouples J, K, T, E, N



Characteristic curves for thermocouples S, R and B

Measuring ranges and switch position for analog devices in °C for thermocouple types J, K

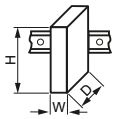
Measuring range in °C	Switch position in °C										
	min.					1/2					max.
0 ... +200	0	20	40	60	80	100	120	140	160	180	200
0 ... +600	0	60	120	180	240	300	360	420	480	540	600
+500 ... +1 000	500	550	600	650	700	750	800	850	900	950	1 000

Measuring ranges for digital devices in °C/°F for thermocouples

Sensor type	Short circuit	Open circuit	3RS26, 3RS28 Measuring range in °C	3RS26, 3RS28 Measuring range in °F
J	--	✓	-99 ... +1 200	-146.2 ... +2 192
K	--	✓	-99 ... +1 350	-146.2 ... +2 462
T	--	✓	-99 ... +400	-146.2 ... +752
E	--	✓	-99 ... +999	-146.2 ... +1 830.2
N	--	✓	-99 ... +1 300	-146.2 ... +2 372
S	--	✓	0 ... +1 750	+32 ... +3 182
R	--	✓	0 ... +1 750	+32 ... +3 182
B	--	✓	+400 ... +1 800	+752 ... +3 272

✓ Detection possible
-- Detection not possible

General data

Type		3RS25-....0	3RS26-....0	3RS28-....0	3RS29-....0
General technical specifications					
Dimensions (W x H x D) 	mm	22.5 x 100 x 90			
Permissible ambient temperature					
• During operation	°C	-25 ... +60			
• During transport	°C	-40 ... +85			
• During storage	°C	-40 ... +85			
Degree of protection IP		IP20			
Mounting position		Any			
Type of mounting		Screw fixing and snap-on mounting on 35 mm standard mounting rail			
Auxiliary circuit					
Type of voltage		AC/DC		DC	AC/DC
Operating range factor of the control supply voltage, rated value					
• At AC at 50 Hz		0.85 ... 1.1		--	0.85 ... 1.1
• At AC at 60 Hz		0.85 ... 1.1		--	0.85 ... 1.1
• At DC		0.85 ... 1.1		0.7 ... 1.25	0.85 ... 1.1
Operating frequency, rated value	Hz	50 ... 60			
Number of measuring circuits		1			3
Number of CO contacts for auxiliary contacts		1	2		0
Product function					
• Removable terminal for auxiliary and control circuit		Yes			
• Auto RESET		Yes			--
• Fault storage		No	Yes		
• External RESET		No	Yes		
ATEX					
Certificate of suitability					
• Relative to ATEX		No	Yes, with 3RS29 sensor expansion module		Yes, with 3RS26/3RS28 digital device
Safety integrity level (SIL) according to IEC 61508		--	1		
Performance level (PL) according to ISO 13849-1		--	c		

Type		3RS2500-1....0 3RS2600-1....0 3RS2800-1....0 3RS2900-1....0	3RS2500-2....0 3RS2600-2....0 3RS2800-2....0 3RS2900-2....0
Type of electrical connection		**Screw terminals**	**Spring-loaded terminals (push-in)**
Tightening torque	Nm	0.6 ... 0.8	--
Type of connectable conductor cross-sections			
• Solid	mm^2	1 x (0.5 ... 4), 2 x (0.5 ... 2.5)	1 x (0.5 ... 4)
• Finely stranded	mm^2		
- Without end sleeves		--	1 x (0.5 ... 4)
- With end sleeves		1 x (0.5 ... 4), 2 x (0.5 ... 2.5)	1 x (0.5 ... 2.5)
• For AWG cables	AWG		
- Solid		1 x (20 ... 12), 2 x (20 ... 14)	1 x (20 ... 12)
- Stranded		--	1 x (20 ... 12)

Selection and ordering data

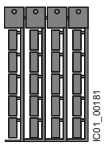
	Number of measuring circuits	Type of sensor/ connectable	Rated control supply voltage U_s 50/60 Hz AC	Suitability for use	Spring-loaded terminals (push-in)	Weight
			V		Article No.	kg
Temperature monitoring relays						
	Analog multi-function device, 1 sensor, 1 threshold value					
 3RS2500-1AA30	1	Resistance sensors: Pt100 Thermocouples: Type J, K	24 AC/DC	--	**3RS2500-2AA30**	0.160
			24 ... 240 AC/DC	--	**3RS2500-2AW30**	0.180
	Digital device, 1 sensor, 2 threshold values					
 3RS2600-1BA30	1	Resistance sensors: Pt100, Pt1000, KTY83-110, KTY84, NTC Thermocouples: Type J, K, T, E, N, S, R, B	24 AC/DC	--	**3RS2600-2BA30**	0.185
			24 ... 240 AC/DC	--	**3RS2600-2BW30**	0.190
	Digital device for IO-Link, 1 sensor, 2 threshold values					
 3RS2800-1BA40	1	Resistance sensors: Pt100, Pt1000, KTY83-110, KTY84, NTC Thermocouples: Type J, K, T, E, N, S, R, B	24 DC	--	**3RS2800-2BA40**	
Sensor expansion modules						
	2 additional resistance sensors, analog input 4 ... 20 mA, ATEX via analog input, status relay					
 3RS2900-1AA30	3	Resistance sensors: Pt100, Pt1000, KTY83-110, KTY84, NTC	24 AC/DC	For 3RS26/ 3RS28 digital devices	**3RS2900-2AA30**	0.169
			24 ... 240 AC/DC		**3RS2900-2AW30**	0.181

For accessories, see page 2/314.

*** You can order this quantity or a multiple thereof.**

Accessories

Selection and ordering data

	Version	Article No.	Weight kg
Terminals for SIRIUS devices in the industrial standard mounting rail enclosure			
 3ZY1122-1BA00	**Removable terminals**	**Screw terminals**	
	• 2-pole, up to 1 x 4 mm² or 2 x 2.5 mm²	**3ZY1122-1BA00**	0.010
		Spring-loaded terminals (push-in)	
	• 2-pole, up to 1 x 4 mm² or 2 x 1.5 mm² (in shared end sleeve)	**3ZY1122-2BA00**	0.008
Accessories for enclosures			
 3ZY1321-2AA00	**Sealing covers**		
	• 22.5 mm	**3ZY1321-2AA00**	0.002
 3ZY1311-0AA00	**Push-in lugs** For wall mounting	**3ZY1311-0AA00**	0.001
 3ZY1440-1AA00	**Coding pins** For removable terminals of SIRIUS devices in the industrial standard mounting rail enclosure; enable the mechanical coding of terminals	**3ZY1440-1AA00**	
  3ZY1450-1AB00	**Hinged cover** Replacement cover, without terminal labeling, titanium gray		
	• 22.5 mm wide	**3ZY1450-1AB00**	0.004
Blank labels			
 3RT2900-1SB20	**Unit labeling plates**[1] For SIRIUS devices		
	• 20 mm x 7 mm, titanium gray	**3RT2900-1SB20**	0.062
Tools for opening spring-loaded terminals			
 3RA2908-1A	**Screwdrivers** For all SIRIUS devices with spring-loaded terminals	**Spring-loaded terminals (push-in)**	
	Length approx. 200 mm, 3.0 mm x 0.5 mm, titanium gray/black, partially insulated	**3RA2908-1A**	0.050

[1] PC labeling system for individual inscription of unit labeling plates available from: murrplastik Systemtechnik GmbH.

For suitable sensors, see www.siemens.com/temperature.

* You can order this quantity or a multiple thereof.

Overview

3SE523., 3SE521., 3SF12.4[1)]

3SE524., 3SF1244[1)]

3SE513., 3SE511.[1)], 3SF1114[1)]

3SE512. 3SF1124[1)]

3SE516.

3SE5413, 3SE5423

3SE5250

	Position switches Standard					Compact design	Open-type
Enclosure							
Plastic	✓	✓	✓	--	--	--	✓
Metal	✓	--	✓	✓	✓	✓	--
Dimensions (W x H x D) in mm	31 × 68 × 33	50 × 53 × 33	40 × 78 × 38	56 × 78 × 38	56 × 100 × 38	30 × 50 × 16 40 × 50 × 16	30 × 48.5 × 20
Degree of protection	IP65, IP66/IP67	IP66/IP67	IP66/IP67	IP66/IP67	IP66/IP67	IP66/IP67	IP10 or IP20
Standards IEC 60947-5-1	Mounting and operating points acc. to EN 50047	Operating points acc. to EN 50047	Mounting and operating points acc. to EN 50041	Operating points acc. to EN 50041	Operating points acc. to EN 50041	--	Mounting and operating points acc. to EN 50047
Approvals	CE, TÜV, UL, CSA, CCC		CE, TÜV, UL, CSA, CCC			CE, UL, CSA, CCC	CE, TÜV, UL, CSA, CCC
Contact blocks							
2 slow-action contacts	1 NO + 1 NC; 2 NC		1 NO + 1 NC; 2 NC		2 × (1 NO + 1 NC)	--	1 NO + 1 NC
2 snap-action contacts	1 NO + 1 NC		1 NO + 1 NC		2 × (1 NO + 1 NC)	1 NO + 1 NC	1 NO + 1 NC
• Short stroke	1 NO + 1 NC		✓		--	--	✓
• Contact distance 2 × 2 mm	1 NO + 1 NC		✓		--	--	✓
3 slow-action contacts	1 NO + 2 NC; 2 NO + 1 NC		1 NO + 2 NC; 2 NO + 1 NC		--	--	1 NO + 2 NC; 2 NO + 1 NC
• With make-before-break	1 NO + 2 NC		1 NO + 2 NC		2 × (1 NO + 2 NC)	--	1 NO + 2 NC
3 snap-action contacts	1 NO + 2 NC		1 NO + 2 NC		--	--	1 NO + 2 NC
Special features							
LED status display	✓		✓		--	--	--
Increased corrosion protection	✓		✓		✓	--	--
ASIsafe integrated	✓		✓		--	--	--
Electrical specifications							
Insulation voltage U_i	400 V		400 V			400 V	400 V
Conventional thermal current I_{th}	6 A/10 A (3-/2-pole)		6 A/10 A (3-/2-pole)			6 A	6 A
Connections							
Cable entry	1 × (M20 × 1.5)	2 × (M20 × 1.5)	1 × (M20 × 1.5)	3 × (M20 × 1.5)	3 × (M20 × 1.5)	--	--
M12 plug, 4-, 5- or 8-pole	✓	✓	✓	✓	✓	✓	--
Plug, 6-pole + PE	--	--	✓	✓	--	--	--
Molded cables	--	--	--	--	--	✓	--
Actuators							
Rounded plungers and roller plungers	✓		✓		✓	--	--
Roller levers and angular roller levers	✓		✓		✓	--	--
Spring rods	✓		✓		--	--	--
Twist levers and rod levers	✓		✓		✓	--	--
Fork lever	--		✓		--	--	--
Hinge switches	--		--		--	--	--
Plungers, twist levers	--		--		✓	✓	✓
Page							
Complete units	1)	1)	1)	1)	1)	2/326	2/327
Modular system	1)	1)	2/339	1)	1)	--	--
Ambient temperature -40 °C	2/334, 2/339	2/339	2/339	2/342	2/343	--	--
ASIsafe	1)	1)	1)	1)	--	--	--

✓ Available

-- Not available

[1)] see Catalog IC 10.





	3SE5232, 3SE5212[1], 3SF12.4[1]	3SE5132[1], 3SE5112[1], 3SF11.4[1]	3SE5232, 3SE5242[1], 3SF12.4[1]	3SE5112[1], 3SE5122[1], 3SF11.4[1]	3SE5322, 3SE5312[1], 3SF13.4[1]
	Safety hinge switches		**Safety switches with separate actuator**		**Safety switches with tumbler**
Enclosure					
Plastic	✓	✓	✓	✓	✓
Metal	✓	✓	✓	✓	✓
Dimensions (W x H x D) in mm	31 × 68 × 33	40 × 78 × 38	31 × 68 × 33, 50 × 53 × 33	40 × 78 × 38, 56 × 78 × 38	54 × 185 × 44
Degree of protection	IP65, IP66/IP67	IP66/IP67	IP65, IP66/IP67	IP66/IP67	IP66/IP67, IP69 (IP69K)
Standards IEC 60947-5-1	Mounting and operating points acc. to EN 50047	Mounting and operating points acc. to EN 50041	Mounting and operating points acc. to EN 50047	Mounting acc. to EN 50041	ISO 14119, IEC 62061/IEC 61508, ISO 13849-1
Approvals	CE, TÜV, UL, CSA, CCC		CE, TÜV, UL, CSA, CCC		CE, TÜV, UL, CSA, CCC
Contact blocks/outputs					
2 slow-action contacts	--		1 NO + 1 NC; 1 NO + 2 NC		--
2 snap-action contacts	1 NO + 1 NC		--		--
• Short stroke	--		--		--
• Contact distance 2 × 2 mm	--		--		--
3 slow-action contacts	--		1 NO + 2 NC		2 × (1 NO + 2 NC)
• With make-before-break	--		--		--
3 snap-action contacts	1 NO + 2 NC		--		--
Electronic safety outputs	--		--		--
Special features					
LED status display	✓		✓		✓
Increased corrosion protection	✓		✓		✓
ASIsafe integrated	✓		✓		✓
Electrical specifications					
Insulation voltage U_i	400 V		400 V		400 V
Conventional thermal current I_{th}	6 A / 10 A (3-/2-pole)		6 A		6 A
Connections					
Cable entry	1 × (M20 × 1.5)	1 × (M20 × 1.5)	1 × (M20 × 1.5), 2 × (M20 × 1.5)	1 × (M20 × 1.5), 3 × (M20 × 1.5)	3 × (M20 × 1.5)
M12 plug, 4-, 5- or 8-pole	✓		✓	✓	✓
Molded cables	--		--	--	--
AS-Interface	--		✓	✓	✓
Actuators					
Plungers, twist levers	--		--	--	--
Separate actuators	--		✓	✓	✓
Hinge switches	✓		--	--	--
Page					
Complete units	1)	1)	1)	1)	1)
Modular system	--	--	--	--	--
Ambient temperature -40 °C	2/336	--	2/345	--	2/346
ASIsafe	1)	1)	1)	1)	1)

✓ Available

-- Not available

1) see Catalog IC 10.

	3SE66, 3SE67	3SE66, 3SE67	3SE63
	Safety switches, solenoid[1]	**Safety switches, solenoid supplementary range**[1)2)]	**RFID safety switches**[1)2)]
Enclosure			
Plastic	✓	✓	✓
Metal	--	--	--
Dimensions (W x H x D) in mm	M30; 25 x 88; 25 x 33	25 x 88; 26 x 36	25 × 91 × 22
Degree of protection	IP67	IP67	IP69 (IP69K)
Standards	IEC 60947-5-3	IEC 60947-5-3	ISO 14119, IEC 60947-5-3, SIL 3 in accordance with IEC 62061/IEC 61508, PL e in accordance with ISO 13849-1
Approvals	CE, TÜV, UL, CSA, CCC	CE, TÜV, UL, CSA	CE, TÜV, UL, CSA
Contact blocks/outputs			
Reed contacts	1 NO + 1 NC 2 NC 1 NO + 1 NC (+ 1 NC signaling contact)	1 NO + 1 NC (+ 1 NC signaling contact) 2 NC 2 NC (+ 1 NC signaling contact)	--
Special features			
LED status display	--	✓	✓
Increased corrosion protection	--	--	✓
ASIsafe integrated	--	--	--
Electrical specifications			
Insulation voltage U_i	100 V AC/DC 24 V DC	75 V DC 50 V AC	--
Conventional thermal current I_{th}	250 mA 400 mA	250 mA	--
Connections			
M8 plug, 4-pole	✓	✓	--
∅ 8 mm, latching connection, plug, 6-pole	--	✓	--
M12 plug, 4-pole	✓	--	✓
Molded cables	✓	✓	--
AS-Interface	--	--	--
Actuators			
RFID	--	--	✓
Switching magnet	✓	✓	--

✓ Available

-- Not available

1) see Catalog IC 10.

2) CCC approval not required for voltages < 36 V.

General data

Overview

Design

All enclosure variants have an integrated chlorinated rubber diaphragm for high functional safety in cold and aggressive environments.

Enclosure sizes

The 3SE5 switches are available in five different enclosure sizes with 2 or 3 contacts and with the XL enclosure:

- Open-type position switch IP20 or IP10
- Plastic enclosures according to EN 50047, 31 mm wide, IP65, 1 cable entry
- Metal enclosures according to EN 50047, 31 mm wide, IP66/IP67, 1 cable entry
- Plastic and metal enclosures according to EN 50041, 40 mm wide, IP66/IP67, 1 cable entry
- Plastic enclosures, 50 mm wide, IP66/IP67, 2 cable entries
- Metal enclosures, 56 mm wide, IP66/IP67, 3 cable entries
- XL metal enclosures with 4 to 6 contacts, 56 mm wide, IP66/IP67, 3 cable entries

Enclosure versions

Various basic switches can be selected for the enclosures of the 3SE5 series:

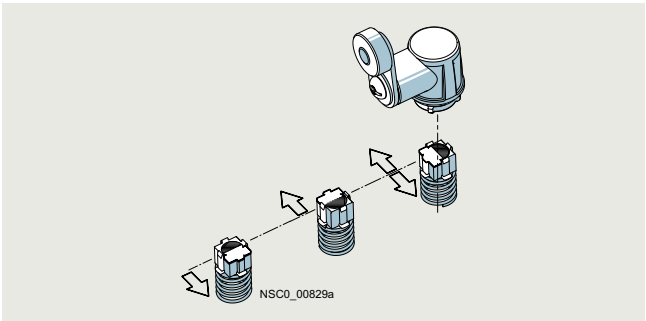
- With contact blocks with two or three contact elements (screw terminals) designed as slow-action or snap-action contacts; the slow-action contacts also with make-before-break
- Optional LED status display
- With assembled M12 device plug, 4- or 5-pole (available as an accessory for self-assembly for the wide enclosure)
- With 6-pole device plug + PE on the metal enclosures
- Versions with increased corrosion protection
- Versions for operating temperatures down to -40 °C
- AS-Interface version with integrated ASIsafe electronics for all enclosure designs

Actuator variants

All actuators can be rotated around the axis in increments of 16 x 22.5°. The following actuator variants are available:

- Plain, rounded and roller plungers
- Roller levers and angular roller levers
- Spring rods
- Twist levers and rod levers with twist actuator
- Fork levers with twist actuator

The actuator rollers are available with various materials and diameters.



Twist actuators for twist levers and rod levers,
with setting of switching direction to right, left, or right/left
(standard for all twist actuators except fork levers)

Cover design

The mechanical position switches have a turquoise cover and the mechanical safety switches have a yellow cover.

Cover colors: position switch turquoise, safety switch yellow

On request the switches can be delivered ex works with a yellow cover. The cover has no effect on the mode of operation. Both versions can be used in safety applications.

Diverse contact types

Exchangeable 2-pole and 3-pole contact blocks for all enclosure sizes.

Contact block for position switches, 3 contacts

The 3-pole contact block with snap-action or slow-action contacts is regularly available for all enclosure forms. The same installation space is required as for a 2-pole block. The version with 1 NO + 2 NC offers, for example, more safety through redundant shutdowns (2 NC contacts) with simultaneous signaling (NO contact). The 3-pole blocks are also available with make-before-break and with 2 NO + 1 NC.

Contact reliability

The contact blocks ensure an extremely high contact stability. This applies even when the devices are switching low voltages and currents.

Positive opening ⊖

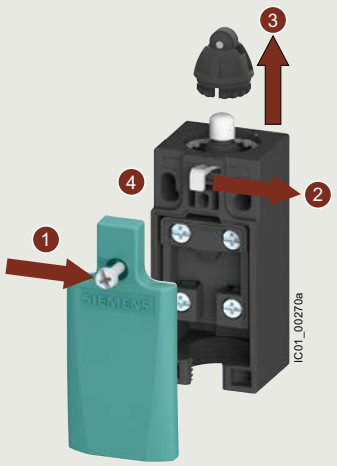
The NC contacts of the switch are forced open mechanically, positively driven and reliably by the plunger. This is referred to as "positive opening".

Optional LED indicators

LED indicators are available for all enclosure sizes except for XL. The enclosures are supplied with an LED signaling indicator (1 × green + 1 × yellow). This is the first time that optical signaling equipment is also available for small standard enclosures according to EN 50047. The LEDs are implemented in 24 V DC and 230 V AC.

Mounting

Easy plug-in method for fast replacement of the actuator heads

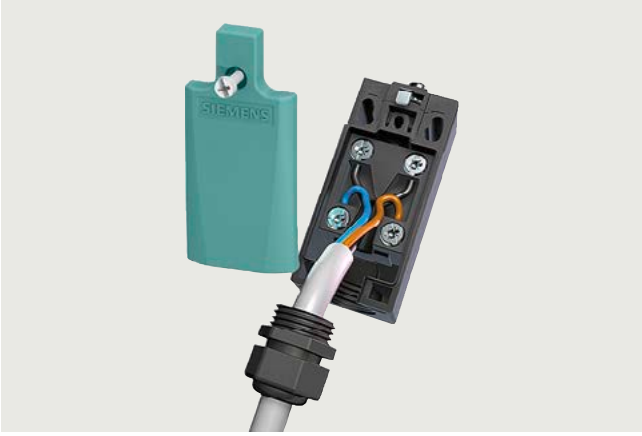


(1) Open the cover
(2) Actuate the locking lever
(3) Replace the actuator head (rotatable in 16 x 22,5° increments)
(4) Lock and close the cover

Replacement of the position switch actuator head in only four steps

Quick-connect technology

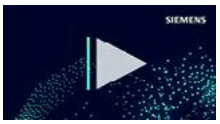
For plastic enclosure with a width of 31 mm



Quick-connect technology for plastic enclosures

These position switches can be wired quickly and easily as an added customer benefit. The connection cable is first connected to the terminals of the contact block and then guided through a slit into the cable gland opening. The time saved through this new connection method is approx. 20 to 25%.

A cable gland with seal must be used with the quick-connect method.



Video: What makes the SIRIUS position switches so flexible?

Video: How easy is it to install the 3SE5232 position switch?

Article No. scheme

Product versions		Article number										
SIRIUS position and safety switches		**3SE**	□	□	□	□	–	□	□	□	□	□
Series			**5**									
Standard	EN 50041 EN 50047 With tumbler			**1** **2** **3**								
Enclosure material and width	e.g. 1 = metal, narrow				□							
Connection	Cable entry Device plug					**2** **4/5**						
LEDs	None 24 V DC 115 V AC 230 V AC							**0** **1** **2** **3**				
Version of contacts	e.g. C = snap-action 1 NO + 1 NC								□			
Version of operating mechanism	e.g. C02 = rounded plunger									□	□	□
Example		**3SE**	**5**	**1**	**1**	**2**	–	**0**	**C**	**C**	**0**	**2**

Note:

The Article No. scheme shows an overview of product versions for better understanding of the logic behind the article numbers.

For your orders, please use the article numbers quoted in the selection and ordering data.

General data

Benefits

The 3SE5 position switches differ from the previous series through the following new characteristics:

- The modular design of the product range allows a number of versions with a smaller number of bearing types for enclosures and operating mechanisms.
- All actuators can be turned around the axis in increments of 22.5° (see figure, page 2/318).
- Rounded and roller plungers according to EN 50041 with 3 mm overtravel (total travel 9 mm) for greater tolerance when switching.
- All enclosure sizes – now also including the small enclosure 31-mm wide – are optionally available with an LED signaling indicator (see page 2/318).
- All enclosure variants have an integrated chlorinated rubber diaphragm for high functional safety in cold and aggressive environments.
- All contact blocks are replaceable.
- The 3-pole contact blocks are available for all enclosure sizes (see figure, page 2/318).
- Conctact blocks with 1 NO + 2 NC slow-action contacts with make-before-break and 2 NO + 1 NC
- The short-stroke contact block 1 NO + 1 NC improves the precision of the switching operation through a reduced actuation path.
- The contact block with 1 NO + 1 NC snap-action contacts with a contact distance of 2 x 2 mm is suitable for simultaneous shutdown and signaling, particularly in the elevator industry.
- XL metal enclosures for accommodating two 2- or 3-pole contact blocks
- Versions with plugs for safe and fast connection, e.g. to fail-safe field modules of the SIMATIC ET 200eco PN or SIMATIC ET 200AL
- The plastic enclosure with a width of 31 mm has simple and fast wiring equipment which makes it possible to save approx. 20 to 25% of the time when connecting (see figure, page 2/318).
- The ASIsafe electronics are integrated in the enclosure for the versions with AS-Interface connection; an additional adapter is not required.

Application

With the standard position switches, mechanical positions of moving machine parts are converted into electrical signals. Through their modular and uniform design and large number of variants, the devices can comply with practically all requirements in industry.

Devices are available with enclosure versions to suit the particular ambient conditions. Different control tasks can be performed with the contact blocks best suited for the particular purpose. And many different actuator variants are available to match the mechanical configuration of the moving machine parts. Dimensions, fixing points and characteristics are largely in accordance with the EN 50041 or EN 50047 standards.

The devices are suitable for use in any climate.

Standards

The switches comply with IEC 60947-5-1 (electromechanical control circuit devices).

The protective measure of "total insulation" by the plastic enclosure is ensured by the use of plastic screw glands.

Safety position switches

For controls according to IEC 60204-1 the devices can be used as a safety position switch. They comply with ISO 14119. A TÜV Certificate is available. To secure position switches against changes in their position, positively-driven techniques must be employed on installation.

Safety circuits

Standards IEC 60947-5-1 require positive opening of the NC contacts. In other words, for the purposes of personal safety, the assured opening of NC contacts is expressly stipulated for the electrical equipment of machines in all safety circuits and marked in accordance with the standard IEC 60947-5-1 with the symbol ⊖.

SIL 1 according to IEC 62061/IEC 61508 or PL c according to ISO 13849-1 can be attained with the 3SE5 position switches with ⊖ if the corresponding fail-safe evaluation units are selected and correctly installed (e.g. the 3SK safety relays or matching devices from the ASIsafe, SIMATIC or SINUMERIK product ranges).

If a second position switch with ⊖ is used, SIL 3 / PL e can be attained.

In addition to positive opening, the operating mechanism (actuators) must also have a positively-driven connection to the enclosure. The corresponding operating mechanisms are marked in the catalog with ⊖.

Contacts for every application

- Snap-action contacts: NC and NO contacts switch simultaneously – regardless of the actuating speed (v_{min} = 0.01 m/s) and contact erosion.
- Slow-action contacts: Difference in travel between "NC contact opens" and "NO contact closes"; the switching speed is the same as or proportional to the actuating speed (v_{min} = 0.4 m/s).
- Slow-action contacts with make-before-break: e.g. suitable for adding a second function to a sequence control.

Operating mechanisms for every application

Plain, rounded and roller plungers

- Operation in direction of the plunger axis or in case of roller plunger with bar at right angles to the plunger axis.
- The roller plunger is recommended for lateral actuation and relatively long overtravel.

Roller levers and angular roller levers

- For actuators made of finely ground steel in the form of cams, bars (approach angle 30°) or cam disks.

Spring rods

- Can be used for undefined actuations and changing starting conditions
- Starting from any direction is possible

Twist levers and rod levers

- For high starting speeds (v = 1.5 m/s)
- Variety of starting options
- Insensitive to oil, grinding dust, dirt and coarse-grained material
- Adjustment of the lever in increments of 10°
- Can be adjusted with left or right switching

Fork levers

- Switchable in two directions
- Latching actuator
- For reciprocating movements

Monitoring with safe evaluation units from the 3SK series

Safe evaluation units		**Maximum achievable safety level according to type of switch**				
		Compact	Standard	Hinge	Separate actuator	Tumbler
 3SK		 3SE54 ➔	 3SE51/3SE52 ➔	 3SE51/3SE52 ➔	 3SE51/3SE52 ➔	 3SE53 ➔
Use of only one position/safety switch						
Monitoring with 1 contact: 1 x NC contact		**SIL 1 / PL c**				
Monitoring with 2 contacts: 2 x NC contact or 1 x NC contact + 1 x NO contact		**SIL 1 / PL c**		**SIL 2 / PL d**		
Use of a second position/safety switch						
Standard switch	3SE51/3SE52/3SE54	**SIL 3 / PL e**				
Safety switch/hinge switch	3SE51/3SE52					
Safety switch with separate actuator	3SE51/3SE52					
Safety switch with tumbler	3SE53					

Note:

Taking account of certain fault exclusions (e.g. actuator breakage), use of just one hinge switch or a switch with separate actuator with or without tumbler up to SIL 2 / PL d is possible as described in the table.

Since the machine manufacturer must provide proof of fault exclusion, the component manufacturer is unable to carry out a definitive assessment of the measures taken.

For more information, see https://support.industry.siemens.com/cs/ww/en/view/35443942.

The maximum achievable SIL or PL always depends on other assumptions as well. Factors to be taken into account include the DC (declaration), the CCF, and the number of actuations.

For information on the safe evaluation units and an introduction to safety systems.

Technical specifications

Type		3SE51..[1], 3SE52..[1]	3SE541.	3SE542.
General data				
Standards		IEC 60947-5-1, ISO 14119		
Rated insulation voltage U_i	V	400[2]	400	
Degree of pollution acc. to IEC 60664-1		Class 3	Class 3	
Rated impulse withstand voltage U_{imp}	kV	6	4	
Rated operational voltage U_e	V	400 AC; over 300 V AC Same potential only[3]	300 AC	
Conventional thermal current I_{th}	A	10	10	
Rated operational current I_e				
• For alternating current 50/60 Hz		I_e / AC-15	I_e / AC-15	
- At 24 V	A	6	6	
- At 120 V	A	6	6	
- At 240 V	A	6	3	
- At 400 V	A	4	--	
• For direct current		I_e / DC-13	I_e / DC-13	
- At 24 V	A	3	3	
- At 125 V	A	0.55	0.55	
- At 250 V	A	0.27	0.27	
- At 400 V	A	0.12	--	
Short-circuit protection[4]				
• With DIAZED fuse links, operational class gG	A	6	10	
• With miniature circuit breaker, characteristic C ($I_{K< 400\ A}$)	A	1	3	
Mechanical service life				
• Basic switch		15 × 10⁶ operating cycles	10 × 10⁶ operating cycles	10 × 10⁶ operating cycles
• With spring rod, 3SE5...-..R..		10 × 10⁶ operating cycles	--	--
• With fork lever, 3SE51..-..T..		1 × 10⁶ operating cycles	--	--
Electrical endurance				
• With 3RH21 contactors size S00 and 3RT contactors sizes S00, S0		10 × 10⁶ operating cycles	500 000 operating cycles	500 000 operating cycles
• For utilization category AC-15 when switching off I_e / AC-15 at 240 V		100 000 operating cycles	100 000 operating cycles	100 000 operating cycles
• With utilization category DC-12/DC-13		For direct current depending on the loading of the switch		
Switching frequency With 3RH21 contactors size S00 and 3RT contactors sizes S00, S0		6 000 operating cycles/h	1 800 operating cycles/h	
Switching accuracy				
• For repeated switching, measured at the plunger of the contact block	mm	0.05	0.05	
• With twist actuators		1°	1°	
Rated data acc. to CSA, UL and UR				
• Rated voltage	V	300	300	
• Uninterrupted current	A	6	10	
• Switching capacity		Heavy duty, A 300 / B 300 / Q 300	A 300 / Q 300	

[1] Special versions, see the respective data sheet.
[2] For slow-action contacts 1 NO + 2 NC with make-before-break ("M") and 2 NO + 1 NC ("P") the following applies: 250 V.
[3] For slow-action contacts 1 NO + 2 NC with make-before-break ("M") and 2 NO + 1 NC ("P") the following applies: Over 250 V AC same potential only.
[4] Without any welds according to IEC 60947-5-1.

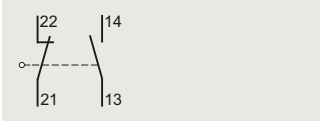
Type		3SE523.	3SE513.	3SE524.	3SE521.	3SE511.	3SE512., 3SE516.	3SE54..	3SE525.
Enclosure									
Enclosure									
• Material		Plastic P66			Zinc die-casting			Zn/Al	--
• Width	mm	31	40	50	31	40	56	30/40	30
Degree of protection on the front acc. to IEC 60529		IP65	IP66/IP67; IP65/IP67 for actuator heads with spring rods and rod levers					IP67	IP20[1], IP10
Ambient temperature									
• During operation	°C	–25 ... +85; –40 ... +85 for 3SE51..-1AJ0 and 3SE52..-1AJ0, -1AY0						-25 ... +85	-25 ... +85
• In operation, switch with LEDs	°C	-25 ... +60						--	--
• Storage, transport	°C	-40 ... +90						-40 ... +90	-40 ... +90
Mounting position		Any							
Connection									
Cable entry		1 x (M20 x 1.5)		2 x (M20 x 1.5)	1 x (M20 x 1.5)		3 x (M20 x 1.5)	--	--
Conductor cross-sections									
• Solid	mm²	1 x (0.5 ... 1.5), 2 x (0.5 ... 0.75)							
• Finely stranded with end sleeve	mm²	1 x (0.5 ... 1.5), 2 x (0.5 ... 0.75)							
• AWG cables, solid or stranded	AWG	1 x (AWG 20 ... 16), 2 x (AWG 20 ... 18)							
Tightening torque, contact block	Nm	0.8 ... 1.0							
Protective conductor connection inside enclosure		--			M3.5			--	--

[1] With the conductor connected and the clamping screw tightened.

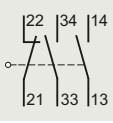
Circuit diagrams

Enclosure widths 31, 40, 50 and 56 mm

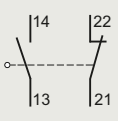
Slow-action contacts
1 NO + 1 NC
3SE5...-.B..., -.R...



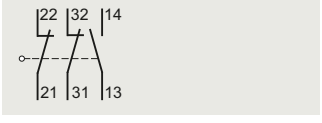
Slow-action contacts
2 NO + 1 NC
3SE5...-.P...



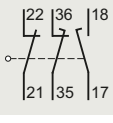
Snap-action contacts
1 NO + 1 NC
3SE5...-.C..., -.F..., -.G..., -.H..., -.N...



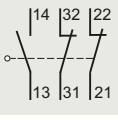
Slow-action contacts
1 NO + 2 NC
3SE5...-.K..., -.Q...



Slow-action contacts
1 NO + 2 NC with
make-before-break, 3SE5...-.M...

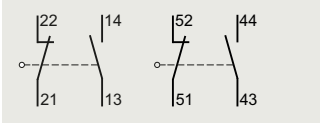


Snap-action contacts
1 NO + 2 NC
3SE5...-.L...

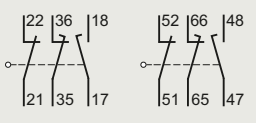


XL enclosures, width 56 mm

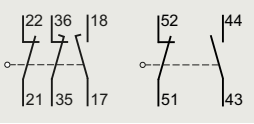
Slow-action contacts
2 × (1 NO + 1 NC)
3SE5162-0B...



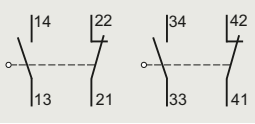
Slow-action contacts
2 x (1 NO + 2 NC) with
make-before-break,
3SE5162-0D...



Slow-action contacts
1 NO + 2 NC with make-before-break,
1 NO + 1 NC
3SE5162-0E...

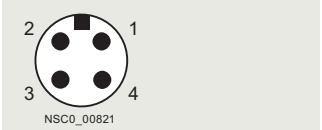


Snap-action contacts
2 × (1 NO + 1 NC)
3SE5162-0C...

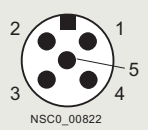


3SE5 pin assignment

M12 device plugs, 4-pole
3SY3127



M12 device plugs, 5-pole
3SY3128, 3SX5100-1SS51,
PE on pin 3, 3SX5100-1SS05
without PE



M12 device plugs, 8-pole
3SX5100-1SS08

Device plugs, 6-pole + PE
3SY3131

Type	Device plugs	Contacts	LEDs	Connections								
	Type	Version	Version	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	PE
M12 device plugs, 4-, 5- or 8-pole												
3SE5..4-0....-1AC4, 3SE5..4-0....-1AJ1[1]	3SY3127	1 NO + 1 NC	--	21	22	13	14	--	--	--	--	--
3SE5..4-0....-1AL0, 3SE5..4-0....-1AJ2[1]	3SY3128	1 NO + 1 NC	--	21	22	13	14	PE	--	--	--	--
3SE5..4-0....-1AE0	3SY3127	2 NC	--	21	22	31	32	--	--	--	--	--
3SE5..4-0....-1AE1, 3SE5..4-0....-1AJ4[1]	3SY3128	2 NC	--	21	22	31	32	PE	--	--	--	--
3SE5..4-0....-1AE2	3SX5100-1SS51	2 NC	--	21	31	--	22	32	--	--	--	--
3SE5..4-0....-1AE3	3SX5100-1SS51	2 NC	--	21	31	PE	22	32	--	--	--	--
3SE5..4-1B...-1AF3	3SX5100-1SS05	1 NO + 1 NC slow-action	2 LEDs	21	22	14 / LED gn	13/ LED ye	Ground LED	--	--	--	--
3SE5..4-1C...-1AF3	3SX5100-1SS05	1 NO + 1 NC snap-action	2 LEDs	21	22	13 / LED gn	14 / LED ye	Ground LED	--	--	--	--
3SE5..4-1C...-1AF5	3SX5100-1SS05	1 NO + 1 NC snap-action	2 LEDs	21 21/13 jumper	22	13 / Ground LED	14 / LED ye	PE	--	--	--	--
3SE5..4-1L...-1AD4	--	1 NO + 2 NC snap-action	2 LEDs	21	22	13 / LED gn	14 / LED ye	31	32	Ground LED	PE	--
Device plugs, 6-pole + PE												
3SE5..5-0....-1AD0	3SY3131	1 NO + 1 NC	--	21	22	13	14	--	--	--	--	✓
3SE5..5-0....-1AD1	3SY3131	1 NO + 2 NC	--	21	22	13	14	31	32	--	--	✓

Legend:
gn = green, ye = yellow
✓ Connected
-- Not available

[1] Version for ambient temperatures down to -40 °C.

General data

2

Options

On the following pages you will find selection tables for complete units as well as components of the modular system.

☐ Complete units

◇ Modular system

The differences between the units are indicated in the selection and ordering data by the symbols shown on orange backgrounds.

Using the modular system you can assemble switch variants which are not available as complete units. Each complete unit can also be supplied as a module.

A basic switch for the modular system comprises an enclosure with a contact block and a cover. Among the basic switches the following versions, for example, can be selected:

- Basic enclosure with rounded plunger
- Version with increased corrosion protection
- Version with M12 device plug and/or with 2 LEDs
- Version with M12 device plug or 6-pole + PE

Support functions

The 3SE5/3SF1 position and safety switches can also be ordered using an online configurator.

This also enables a complete documentation to be prepared:

- Product data sheets
- Dimensional drawings
- Operating travel diagrams
- CAD data in 2D and 3D model images
- Ordering data
- Product photos

For the online configurator, see www.siemens.com/sirius/configurators.

Complete units

Ordering example

Required:
- Position switch according to EN 50047 in a plastic enclosure
- Contact block with slow-action contacts 1 NO + 1 NC
- Angular roller lever, metal lever and plastic roller

To be ordered:

Version	Complete units ☐
	Article No.
Complete units · Enclosure width 31 mm	
 ***Angular roller levers***	
With metal lever and plastic roller 13 mm	
• Slow-action contacts 1 NO + 1 NC	**3SE5232-0BF10**

Modular system

Ordering example 1

Required:
- Position switch according to EN 50047 in a plastic enclosure
- Contact block with slow-action contacts 1 NO + 1 NC
- Angular roller lever, metal lever and plastic roller

To be ordered separately:

Version	Modular system ◇
	Article No.
Basic switches · Enclosure width 31 mm	
 ***Rounded plungers***	
• Slow-action contacts 1 NO + 1 NC	**3SE5232-0BC05**
	+
Operating mechanisms	
 **Angular roller levers**	
• Metal levers plastic rollers	**3SE5000-0AF10**

Ordering example 2

Required:
- Position switch according to EN 50047 in a plastic enclosure
- Contact block with slow-action contacts 1 NO + 1 NC
- Twist levers, high-grade steel lever and plastic roller

To be ordered separately:

Version	Modular system ◇
	Article No.
Basic switches · Enclosure width 31 mm	
 ***Rounded plungers***	
• Slow-action contacts 1 NO + 1 NC	**3SE5232-0BC05**
	+
Twist actuators	
 **Twist actuators**	**3SE5000-0AK00**
 **Twist levers**	
• High-grade steel levers plastic rollers	**3SE5000-0AA31**

Overview

Compact design in width 30 mm

Particularly in harsh environments or on equipment with limited space, the small 3SE54 position switches in compact design with a depth of 16 mm and a weight of only 80 g (without cable) are ideal. Above all the versions with molded cable can be mounted in the most confined spaces.

3SE54 compact position switches are available in two different widths as complete units:

- The 3SE5413 series complies with the EU standard and features a 30-mm-wide enclosure with drilled holes at a spacing of 20 mm.
- The 3SE5423 series meets the requirements of the US market and features a 40-mm-wide enclosure with drilled holes at a spacing of 25 mm.

Both the enclosure and the actuator head are made of metal and comply with the high degree of protection IP67.

The following actuators are available:

- Rounded plungers
- Rounded plungers with central fixing
- Rounded plungers with external seal
- Roller plungers
- Roller plungers with central fixing
- Twist levers
- Twist levers with a smaller mounting depth and lower height
- Twist levers, adjustable length

The contact block is designed with snap-action contacts 1 NO + 1 NC. The NC contact complies with the requirements for positive opening acc. to IEC 60947-5-1.

Connection:

- With molded cable, length 2 m or 5 m
- With M12 device plug and connection cable, M12 socket, 5-pole, with open end, length 5 m

Safety circuits

Standards IEC 60947-5-1 require positive opening of the NC contacts. In other words, for the purposes of personal safety, the assured opening of NC contacts is expressly stipulated for the electrical equipment of machines in all safety circuits and marked in accordance with the standard IEC 60947-5-1 with the symbol ⊖.

SIL 1 according to IEC 62061/IEC 61508 or PL c according to ISO 13849-1 can be attained with the 3SE5 position switches with ⊖ if the corresponding fail-safe evaluation units are selected and correctly installed (e.g. the 3SK safety relays or matching devices from the ASIsafe, SIMATIC or SINUMERIK product ranges).

If a second 3SE5 position switch with ⊖ is used, SIL 3 / PL e can be attained.

Benefits

- Very compact yet with the same rating as the 3SE51 standard switches, for notable space savings in confined installation conditions
- Various actuator versions available
- Roller plungers can be rotated 90°
- Twist levers can be rotated 180°; twist lever can be adjusted in 15° increments
- Time is saved when mounting the fully assembled unit
- With metal enclosure of degree of protection IP67, ideal for use in rough industrial environments
- Insensitive to electromagnetic interference

Compact design

Selection and ordering data

2 snap-action contacts 1 NO + 1 NC · Degree of protection IP67 · With connecting cable or M12 device plug

	Operating mechanism	Enclosure width mm		Article No.	Weight kg
Complete units · Enclosure width 30 or 40 mm					
 3SE5413-0CC20-1EA2	***Rounded plungers***				
	Standard mounting				
	• With connection cable, 2 m	30	➔	**3SE5413-0CC20-1EA2**	0.289
		40	➔	**3SE5423-0CC20-1EA2**	0.312
	• With connection cable, 5 m	30	➔	**3SE5413-0CC20-1EA5**	0.564
	• With M12 device plug, 5-pole	30	➔	**3SE5413-0CC20-1EB1**	0.091
		40	➔	**3SE5423-0CC20-1EB1**	0.113
 3SE5413-0CC21-1EA2	**With central fixing M12 x 1**				
	• With connection cable, 2 m	30	➔	**3SE5413-0CC21-1EA2**	0.296
		40	➔	**3SE5423-0CC21-1EA2**	0.324
 3SE5413-0CC22-1EA2	**With external seal**				
	• With connection cable, 2 m	30	➔	**3SE5413-0CC22-1EA2**	0.288
		40	➔	**3SE5423-0CC22-1EA2**	0.328
 3SE5413-0CD20-1EA2	***Roller plungers***				
	Standard mounting				
	• With connection cable, 2 m	30	➔	**3SE5413-0CD20-1EA2**	0.272
		40	➔	**3SE5423-0CD20-1EA2**	0.298
	- Actuator head rotated 90°	30	➔	**3SE5413-0CD23-1EA2**	0.281
	• With connection cable, 5 m	30	➔	**3SE5413-0CD20-1EA5**	0.556
	• With M12 device plug, 5-pole	30	➔	**3SE5413-0CD20-1EB1**	0.099
		40	➔	**3SE5423-0CD20-1EB1**	0.114
 3SE5413-0CD23-1EA2	**With central fixing M12 x 1**				
	• With connection cable, 2 m	30	➔	**3SE5413-0CD21-1EA2**	0.300
		40	➔	**3SE5423-0CD21-1EA2**	0.318
 3SE5413-0CN20-1EA2	***Twist levers***				
	Standard mounting				
	• With connection cable, 2 m	30	➔	**3SE5413-0CN20-1EA2**	0.330
		40	➔	**3SE5423-0CN20-1EA2**	0.353
	• With connection cable, 5 m	30	➔	**3SE5413-0CN20-1EA5**	0.580
	• With M12 device plug, 5-pole	30	➔	**3SE5413-0CN20-1EB1**	0.133
		40	➔	**3SE5423-0CN20-1EB1**	0.148
	Twist levers with a smaller mounting depth and lower height				
	• With connection cable, 2 m	30	➔	**3SE5413-0CP20-1EA2**	0.314
	Twist levers, adjustable length				
	• With connection cable, 2 m	30	➔	**3SE5413-0CQ20-1EA2**	0.353
Connection cable					
 3SX5601-3SB55	**Connection cable** with M12 socket, 5-pole, open end, length 5 m	--		**3SX5601-3SB55**	0.206

➔ Positive opening according to IEC 60947-5-1, Annex K, or positively driven actuator, necessary in safety circuits.

* You can order this quantity or a multiple thereof.

Overview

Open-type design

Their compact design makes these switches particularly suitable for use in confined conditions. The mountings and operating points comply with EN 50047.

The switches are equipped with two or three contacts in snap-action, slow-action or slow-action with make-before-break versions. The stroke is 6 mm.

The empty enclosure can be equipped with all contact block versions.

Improved version

The switches have a robust metal plunger with increased abrasion resistance (instead of the rounded plunger). This enables the switch to be approached from a 30° angle.

Selection and ordering data

2 or 3 contacts · Degree of protection IP20[1] (2 contacts), IP10 (3 contacts) · Mounting and operating points acc. to EN 50047

	Version	Contacts		Article No.	Weight kg
Plastic enclosures · Enclosure width 30 mm					
 3SE5250-0BC05	**With metal plunger**				
	• Slow-action contacts	1 NO + 1 NC	➔	**3SE5250-0BC05**	0.044
		1 NO + 2 NC	➔	**3SE5250-0KC05**	0.045
		2 NO + 1 NC	➔	**3SE5250-0PC05**	0.044
	- With make-before-break	1 NO + 2 NC	➔	**3SE5250-0MC05**	0.044
	• Snap-action contacts	1 NO + 1 NC	➔	**3SE5250-0CC05**	0.043
		1 NO + 2 NC	➔	**3SE5250-0LC05**	0.045
 3SE5250-0KC05					
 3SE5250-0AC05	• Empty enclosures without contact block	--	➔	**3SE5250-0AC05**	0.026
 3SE5050-0BA00	**Contact blocks with 2 contacts** For open-type design[2]				
	• Slow-action contacts	1 NO + 1 NC	➔	**3SE5050-0BA00**	0.020
	• Snap-action contacts	1 NO + 1 NC			
	- Standard		➔	**3SE5050-0CA00**	0.020
	- Contact distance 2 × 2 mm		➔	**3SE5050-0GA00**	0.022
	- Short stroke		➔	**3SE5050-0NA00**	0.020

➔ Positive opening according to IEC 60947-5-1, Annex K, or positively driven actuator, necessary in safety circuits.

1) With the conductor connected and the clamping screw tightened.

2) Contact blocks with 3 contacts.

*** You can order this quantity or a multiple thereof.**

General data

Overview

More information	
Homepage, see www.siemens.com/sirius-position-switches Industry Mall, see www.siemens.com/product?3SE Configurator, see www.siemens.com/sirius/configurators	Configuration Manual, see https://support.industry.siemens.com/cs/ww/en/view/43920150

Safety switches with separate actuator are used where the position of doors, covers or protective grilles must be monitored for safety reasons.

3SE5 safety switches with separate actuator have the same enclosures as the 3SE5 position switches (modular system).

3SE5 safety switches with head for separate actuator

Design

Enclosure sizes

The 3SE5 safety switches are available in four different enclosure sizes:

- Plastic enclosures according to EN 50047, 31 mm wide, IP65, 1 cable entry
- Metal enclosures according to EN 50047, 31 mm wide, IP66/IP67, 1 cable entry
- Plastic and metal enclosures according to EN 50041, 40 mm wide, IP66/IP67, 1 cable entry
- Plastic enclosures, 50 mm wide, IP66/IP67, 2 cable entries
- Metal enclosures, 56 mm wide, IP66/IP67, 3 cable entries

Also available are safety switches in the 3SE2 series which have been developed in this form according to general market requirements:

- Molded-plastic enclosures outside of the standards, enclosure width 52 mm, IP67

Enclosure versions

Various basic versions can be selected for the enclosures of the 3SE5 series:

- Available with 2- or 3-pole contact blocks designed as slow-action contacts
- Optional LED status display
- With mounted 4- or 5-pole M12 device plug, also for connection to field modules, such as SIMATIC ET 200 (available for the wide enclosures as an accessory for self-assembly)
- With 6-pole device plug + PE on the metal enclosures
- Similarly with a combination of plug and LED indicators
- AS-Interface version with integrated ASIsafe electronics for all enclosure designs

For a description of the basic switches, see page 2/318.

Operation

The actuator head is included in the scope of supply. For actuation from four directions it can be adjusted through 4 × 90°. The switches can also be approached from above.

The actuator heads of the 3SE2243 and 3SE2257 switches with special enclosures cannot be changed. The switches can be approached from the two broad sides and from above.

The actuator is not included in the scope of supply of the safety switches and must be ordered separately from a choice of different versions to suit the application (see page 2/335).

The actuator is encoded. Simple overruling by hand or auxiliary devices is impossible.

Radius actuators

The safety switches with radius actuators are particularly suitable for rotary protective devices. The movable actuation key allows even small radii to be approached. Damage to the switch and the actuator due to inaccurate approach is prevented.

Locking devices

A high-grade steel blocking insert for attaching up to eight padlocks is available for even more security.

Blocking inserts with padlock

Dust protection

For use in dusty environments, a protective cap made of rubber is offered that protects the actuator entries of the actuator head from contamination.

Contact reliability

The contact blocks ensure an extremely high contact stability. This applies even when the devices are switching low voltages and currents.

Positive opening ⊖

The NC contacts of the switch are forced open mechanically, positively driven and reliably by the plunger. This is referred to as "positive opening".

Benefits

The 3SE5 safety switches with separate actuator differ from the previous series through the following new properties:

- All enclosure sizes with increased corrosion protection are optionally available with an LED signaling indicator.
- The 3-pole contact block 1 NO + 2 NC is available for all enclosure sizes.
- The plastic enclosure has simple and fast wiring equipment which makes it possible to save approx. 20 to 25% of the time when connecting.
- The ASIsafe electronics are integrated in the enclosure for the versions with AS-Interface connection; an additional adapter is not required.

Application

Safety switches with separate actuator are used where the position of doors, covers or protective grilles must be monitored for safety reasons.
For more information about the protective door monitoring application, see flyer.

The safety switch can only be operated with the matching coded actuator. Simple overruling by hand or auxiliary devices is impossible.

Devices are available with enclosure versions to suit the particular ambient conditions. The high-grade steel actuator is suitable for extreme ambient conditions down to -40 °C. Different control tasks can be performed with the contact blocks best suited for the particular purpose. Dimensions and fixing points of the enclosure are in accordance with EN 50041 or EN 50047 standards. The devices are suitable for use in any climate.

Standards

The switches comply with IEC 60947-5-1 (Electromechanical Control Circuit Devices).

The protective measure of "total insulation" by the plastic enclosure is ensured by the use of plastic screw glands.

Safety position switches

For controls according to IEC 60204-1 the devices can be used as a safety position switch. They comply with ISO 14119. A TÜV Certificate is available. To secure position switches against changes in their position, positively-driven techniques must be employed on installation.

Safety circuits

Standards IEC 60947-5-1 require positive opening of the NC contacts. In other words, for the purposes of personal safety, the assured opening of NC contacts is expressly stipulated for the electrical equipment of machines in all safety circuits and marked in accordance with the standard IEC 60947-5-1 with the symbol ⊖.

SIL 2 according to IEC 62061/IEC 61508 or PL d according to ISO 13849-1 can be attained with a safety switch with a separate actuator with ⊖ if the corresponding fail-safe evaluation units are selected and correctly installed (e.g. the 3SK safety relays or matching devices from the ASIsafe, SIMATIC or SINUMERIK product ranges).

If a second 3SE5 safety switch with ⊖ is used, SIL 3 / PL e can be attained.

Technical specifications

Type		3SE51..-..V.., 3SE52..-..V..	3SE2257-.XX..		3SE2243-.XX..	
General data						
Standards		IEC 60947-5-1, ISO 14119				
Rated insulation voltage U_i	V	400	500			
Degree of pollution acc. to IEC 60664-1		Class 3	Class 3			
Rated impulse withstand voltage U_{imp}	kV	6				
Rated operational voltage U_e	V	400 AC; over 300 V AC same potential only	500 AC; over 380 V AC same potential only			
Conventional thermal current I_{th}	A	6	10			
Rated operational current I_e			1-pole		3-pole	
• With alternating current 50/60 Hz		I_e / AC-15	I_e / AC-12	I_e / AC-15	I_e / AC-12	I_e / AC-15
- At 24 V	A	6	10	10	10	10
- At 120 V	A	6	10	10	10	10
- At 240 V	A	4	10	6	10	4
- At 400 V	A	4	10	4	10	4
- At 500 V	A	--	10	3	10	3
• For direct current		I_e / DC-13	I_e / DC-12	I_e / DC-13	I_e / DC-12	I_e / DC-13
- At 24 V	A	3	10	10	10	10
- At 125 V	A	0.55	--	--	--	--
- At 250 V	A	0.27	--	--	--	--
- At 110 V	A	--	4	1	4	1
- At 220 V	A	--	1	0.4	1	0.4
- At 400 V	A	0.12	--	--	--	--
- At 440 V	A	--	0.5	0.2	0.5	0.2
Short-circuit protection						
• With DIAZED fuse links, operational class gG	A	6	6			
• With fuse links, quick	A	--	10			
• With miniature circuit breaker, C characteristic ($I_{K< 400\ A}$)	A	1	--			
Mechanical service life		1×10^6 operating cycles				
Electrical endurance						
• With 3RH21 contactors size S00 and 3RT contactors sizes S00, S0		1×10^6 operating cycles	> 1×10^6 operating cycles			
• For utilization category AC-15 when switching off I_e / AC-15 at 240 V		100 000 operating cycles	500 000 operating cycles			
Switching frequency with contactors 3RH21 size S00 and 3RT contactors sizes S00, S0		6 000 operating cycles/h				
Minimum pull-out force for positive opening	N	20	10		30	

Overview

The safety switches with tumbler are exceptional safety-related devices which prevent an unforeseen or intentional opening of protective doors, protective grilles or other covers as long as a dangerous situation is present (i.e. follow-on motion of the switched-off machine).

3SE5 safety switch with tumbler

The safety switches with tumbler are comprised of a switch part with electromechanical tumbler and a mechanical actuator which has to be ordered separately.

They are rugged protective devices that enable the greatest possible safety for man and machine.

The safety switches with tumbler are offered in plastic or metal enclosures.

Dimensions (W × H × D): 54 mm × 185 mm × 43.5 mm

Operation

The actuator head is included in the scope of supply.
For actuation from four directions it can be adjusted through 4 × 90°. The switches can also be approached from above.

The actuator is not included in the scope of supply of the safety switches and must be ordered separately from a choice of different versions to suit the application (see page 2/335).

Actuation data:

- Maximum actuating speed v_{max} = 1.5 m/s
- Minimum actuating speed v_{min} = 0.4 mm/s
- Minimum force in the direction of actuation F_{min} = 30 N

The actuator is encoded. Simple overruling by hand or auxiliary devices is impossible.

Radius actuators

The safety switches with radius actuators are particularly suitable for rotary protective devices. The movable actuation key allows even small radii to be approached. Damage to the switch and the actuator due to inaccurate approach is prevented.

Locking devices

A high-grade steel blocking insert for attaching up to eight padlocks is available for even more security.

Dust protection

For use in dusty environments, a protective cap made of rubber is offered that protects the actuator entries of the actuator head from contamination.

Tumbler

There are two versions for interlocking the actuator:

- Spring-actuated lock (closed-circuit principle) with various release mechanisms
- Solenoid-locked (open-circuit principle)

The spring-actuated lock switch is equipped with an auxiliary release for emergency situations or setup mode. Available as options:

- Escape release or
- Emergency release

Contact blocks

The safety switches with tumbler have one switching block each for:

- Monitoring the actuator or the position of the protective door
- Monitoring the position of the solenoid

The mechanical design of the switch corresponds to the requirements of the fail-safe principle according to ISO 14119.

Optical signaling equipment

The safety switches with tumbler are available with an optional optical signaling device.

The signaling device indicates the switch position of the interlock and the protective device optically by means of two LEDs on the front.

Protective device	Tumbler	Display	Meaning
Closed	Released		Actuator able to be pulled
Closed	Locked		Actuator locked
Open	Released		Actuator pulled

Internal wiring:

- The yellow LED is pre-wired to the solenoid monitoring NO contact.
- The green LED is pre-wired to the actuator monitoring NC contact.
- LED ground is pre-wired to the ground of the solenoid.

Notes:

- The operational voltage must be connected to the corresponding contacts by the customer.
- This voltage for the LEDs must match the operational voltage of the solenoid (same potential).

Benefits

The 3SE53 safety switches provide:

- More safety through higher locking forces:
  - 1 300 N with plastic enclosure
  - 2 600 N with metal enclosure
- Various release mechanisms: lock release, escape release and emergency release
- Two contact blocks each with three contacts as standard equipment, hence fewer versions needed
- Same dimensions for all enclosure versions: plastic, metal or with integrated ASIsafe
- An extensive range of actuators
- An optional LED status display 24 V DC, 115 V or 230 V AC for all switch versions
- Devices with ASIsafe electronics integrated in the enclosure/ wired to 8-pole M12 device plug
- 3SE5322-1S.21-1AG4 series with high degree of protection IP69 (IP69K) in accordance with IEC 60529, cover with foamed seal

Application

The safety switches with tumbler are exceptional safety-related devices which prevent an unforeseen or intentional opening of protective doors, protective grilles or other covers as long as a dangerous situation is present (i.e. follow-on motion of the switched-off machine).

The safety switches with tumbler have the following functions:

- Enabling the machine or process with closed and locked protective device
- Locking the machine or process with opened protective device
- Position monitoring of the protective device and tumbler

Standards

The switches comply with IEC 60947-1 (Low-Voltage Switchgear and Controlgear, General) and IEC 60947-5-1 (Electromechanical Control Circuit Devices).

The mechanical design of the switch corresponds to the requirements of the fail-safe principle according to ISO 14119.

Approvals

The switches are approved for use with locking devices according to ISO 14119 and EN 292, Parts 1 and 2.

These switches are approved according to UL 508, UL 50 and UL 746-C.

Safety circuits

Standards IEC 60947-5-1 require positive opening of the NC contacts. In other words, for the purposes of personal safety, the assured opening of NC contacts is expressly stipulated for the electrical equipment of machines in all safety circuits and marked in accordance with the standard IEC 60947-5-1 with the symbol ⊖.

SIL 2 according to IEC 62061/IEC 61508 or PL d according to ISO 13849-1 can be attained with a safety switch with a tumbler with ⊖ if the corresponding fail-safe evaluation units are selected and correctly installed (e.g. the 3SK safety relays or matching devices from the ASIsafe, SIMATIC or SINUMERIK product ranges).

If a second 3SE5 safety switch with ⊖ is used, SIL 3 / PL e can be attained.

Tumbler

The separate actuator works like a key using coding and protects against manipulation. It transmits the locking force to the protective device and helps to monitor its position.

There are two versions of locking:

Spring-actuated lock (closed-circuit principle)

- In the standard version, the safety switch locks by means of spring force and releases by means of electromagnetic force. In the case of voltage failure, it reliably prevents the protective device from opening when machine parts are still moving.
- The switch is equipped with an auxiliary release for emergency situations or setup mode.
- An auxiliary release which can be secured with a lock to prevent misuse is available as a version.

Auxiliary release

Auxiliary release with lock

The 3SE53 safety switches are also available with an escape release or emergency release.

- Personnel working inside the hazard zone can use the escape release feature to manually release the tumbler without tools from the escape side (hazardous area side) so that they can exit the hazard area. An intentional act (in this case pulling the gray actuator) is required to release the locking mechanism and restore the normal operating state.
- The emergency release enables someone in an emergency situation to manually release the tumbler without tools from the access side (outside the hazardous area). Releasing the lock and restoring the normal operating state must require effort which is comparable to repair activity: in this case disassembly of the red actuator and resetting of the mechanical lock.

Escape release from the front

Emergency release from the back

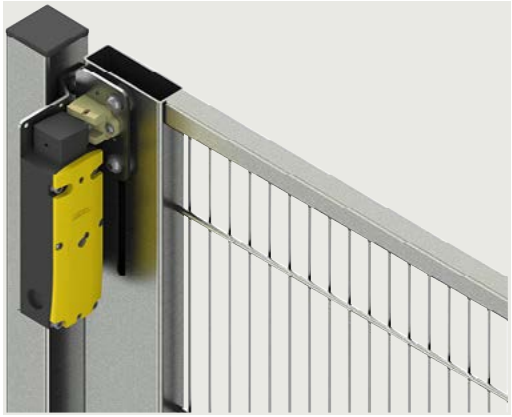
Solenoid-locked (open-circuit principle)

- The second version offers locking by means of electro-magnetic force and release by means of spring force. This version has an advantage when it is necessary to quickly access the machine after a power failure occurs, or in the case of very short coasting times.

General data

Examples of door interlocking

X-Lock door interlocking from Axelent



Door interlocking from Brühl

For the addresses of the door interlock manufacturers.

Technical specifications

Type		3SE5322	3SE5312
General data			
Standards		IEC 60947-5-1, ISO 14119, IEC 62061/IEC 61508	
Rated insulation voltage U_i	V	250	
Degree of pollution acc. to IEC 60664-1		Class 3	
Rated impulse withstand voltage U_{imp}	kV	4	
Rated operational voltage U_e			
• DC	V	24	
• 50/60 Hz AC	V	230	
Conventional thermal current I_{th}	A	6	
Rated operational current I_e			
• With alternating current 50/60 Hz		I_e / AC-15 or B300	
- At 24 V	A	6	
- At 120 V	A	6	
- At 240 V	A	3	
• For direct current		I_e / DC-13 or Q300	
- At 24 V	A	3	
- At 125 V	A	0.55	
- At 250 V	A	0.27	
Solenoid			
• Locking force, max.	N	1 300	2 600
• Locking force according to ISO 14119	N	1 000	2 000
• Power consumption at U_c	W	3.5	
Short-circuit protection[1]			
• With DIAZED fuse links, utilization category gG	A	6	
• With miniature circuit breaker, characteristic C	A	0.5	
Mechanical service life	Operating cycles	1×10^6	
Electrical endurance			
• With 3RH21 contactors size S00 and 3RT contactors sizes S00, S0	Operating cycles	1×10^6	
• For utilization category AC-15 when switching off I_e / AC-15 at 230 V	Operating cycles	100 000	
• With utilization category DC-12/DC-13		For direct current depending on the loading of the switch	
Switching frequency with contactors 3RH21 size S00 and 3RT contactors sizes S00, S0	Operating cycles/h	6 000	
Shock resistance acc. to IEC 60068-2-27	g/ms	30/11	

[1] Without any welds according to IEC 60947-5-1.

Overview

3SE5 hinge switches have the same enclosures as the 3SE5 position switches (modular system).

Hinge switches

Design

Enclosure sizes

The 3SE5 switches are available as complete units in two enclosure sizes:

- Plastic enclosures according to EN 50047, 31 mm wide, IP65, 1 cable entry
- Metal enclosures according to EN 50047, 31 mm wide, IP66/IP67, 1 cable entry
- Plastic and metal enclosures according to EN 50041, 40 mm wide, IP66/IP67, 1 cable entry

Enclosure versions

Various basic versions can be selected for the enclosures:

- With 2- or 3-pole contact blocks, designed as snap-action contacts
- AS-Interface version with integrated ASIsafe electronics for all enclosure designs

For a description of the basic switches, see page 2/318.

Operating mechanism

The hinge switches are provided for mounting on hinges. The actuator head is included in the scope of supply. There are two versions:

- Operating mechanism with hollow shaft, inner diameter 8 mm, outer diameter 12 mm
- Operating mechanism with solid shaft, diameter 10 mm

3SE2283 hinge switches

The 3SE2283 hinge switches with integrated hinge are available in a special design. They are particularly suitable for use in machine doors and flaps.

Benefits

The 3SE5 hinge switches differ from the previous series through the following new characteristics:

- All actuators can be turned around the axis in increments of 22.5° (see figure, page 2/318).
- The new 3-pole contact block 1 NO + 2 NC is available for all enclosure sizes (see figure, page 2/318).
- The plastic enclosure with a width of 31 mm has simple and fast wiring equipment which makes it possible to save approx. 20 to 25% of the time when connecting (see figure, page 2/318).
- The ASIsafe electronics are integrated in the enclosure for the versions with AS-Interface connection; an additional adapter is not required.

Application

The hinge switches are used in those areas where the position of swiveling protective devices such as doors or flaps must be monitored. With these switches, the position of the doors and flaps is converted into electric signals. The switches allow shutdown and signaling without delay in the event of a small opening angle through the snap-action contacts with an operating angle of 10°.

Devices are available with enclosure versions to suit the particular ambient conditions. Different control tasks can be performed with the contact blocks best suited for the particular purpose. Dimensions and fixing points of the enclosures are in accordance with EN 50041 or EN 50047 standards.

The devices are suitable for use in any climate.

Standards

The switches comply with IEC 60947-5-1 (Electromechanical Control Circuit Devices).

The protective measure of "total insulation" by the plastic enclosure is ensured by the use of plastic screw glands.

Safety position switches

For controls according to IEC 60204-1 the devices can be used as a safety position switch. To secure position switches against changes in their position, positively-driven techniques must be employed on installation.

Safety circuits

Standards IEC 60947-5-1 require positive opening of the NC contacts. In other words, for the purposes of personal safety, the assured opening of NC contacts is expressly stipulated for the electrical equipment of machines in all safety circuits and marked in accordance with IEC 60947-5-1 with the symbol ➔.

SIL 2 according to IEC 62061/IEC 61508 or PL d according to ISO 13849-1 can be attained with a 3SE5 safety hinge switch with ➔ if the corresponding fail-safe evaluation units are selected and correctly installed (e.g. the 3SK safety relays or matching devices from the ASIsafe, SIMATIC or SINUMERIK product ranges).

If a second 3SE5 position switch with ➔ is used, SIL 3 / PL e can be attained.

2

Selection and ordering data

Enclosure width 31 mm acc. to EN 50047

Complete units

2 or 3 contacts · Degree of protection IP65 · Cable entry 1 × (M20 × 1.5) · With increased corrosion protection

	Version	Contacts		Complete units Article No.	Weight kg
Complete units[1] · Enclosure width 31 mm					
 3SE5232-0LK21-1AY0	***Twist levers, 21 mm long, type A, according to EN 50047*** **With plastic roller 19 mm** • Snap-action contacts	1 NO + 2 NC	⊕	**3SE5232-0LK21-1AY0**	0.110
 3SE5232-0LE10-1AY0	***Roller levers, type E, acc. to EN 50047*** **With plastic roller 13 mm** • Snap-action contacts	1 NO + 2 NC	⊕	**3SE5232-0LE10-1AY0**	0.086
 3SE5232-0HK82-1AY0	***Rod levers, according to EN 50047*** **With plastic rod, length 200 mm** • Snap-action contacts	1 NO + 1 NC		**3SE5232-0HK82-1AY0**	0.131
 3SE5232-0HR01-1AY0	***Spring rods[2], acc. to EN 50047*** **Length 142.5 mm, with plastic plunger 50 mm** • Snap-action contacts	1 NO + 1 NC		**3SE5232-0HR01-1AY0**	0.117

⊕ Positive opening according to IEC 60947-5-1, Annex K, or positively driven actuator, necessary in safety circuits.

1) Popular versions.

2) Degree of protection IP65/IP67.

* You can order this quantity or a multiple thereof.

Selection and ordering data

Enclosure width 54 mm

6 slow-action contacts · 5 directions of approach · Degree of protection IP66/IP67 · Cable entry 3 × (M20 × 1.5) · ISO 14119

	Tumbler[1]	Solenoid, rated operational voltage		Complete units Position monitoring: Actuators: 1 NO + 2 NC Solenoid: 1 NO + 2 NC Article No.	Weight kg
		V			
1 300 N locking force · Enclosure width 54 mm					
 3SE5322-0SD21-1AY0	***Spring-actuated locks***				
	• With auxiliary release from the front	24 DC	➔	**3SE5322-0SD21-1AY0**	0.515

➔ Positive opening according to IEC 60947-5-1, Annex K, or positively driven actuator, necessary in safety circuits.

1) Supplied without actuator. Please order separately.

	Version	Article No.	Weight kg
Accessories			
 3SE5000-0AV01	**Standard actuator** • Length 75.6 mm	**3SE5000-0AV01**	0.035
 3SE5000-0AW51	**High-grade steel actuator, standard**[1] • Length 75.6 mm	**3SE5000-0AW51**	0.046
 3SE5000-0AW52	• With vertical fixing, length 53 mm	**3SE5000-0AW52**	0.073
 3SE5000-0AW53	• With transverse fixing, length 47 mm	**3SE5000-0AW53**	0.066
 3SE5000-0AW57	**Universal radius actuators, heavy duty** • High-grade steel actuators[1], length 77 mm	**3SE5000-0AW57**	0.125

1) Suitable for extreme environmental conditions such as -40 °C.

Selection and ordering data

Enclosure width 31 mm acc. to EN 50047

2 contacts · Degree of protection IP65 · Cable entry 1 × (M20 × 1.5) · With increased corrosion protection

	Version	Contacts		Complete units Article No.	Weight kg
Complete units · Enclosure width 31 mm					
	***Hinge switches, according to EN 50047*** **With hollow shaft D = 8 mm, operating angle 10°** • Snap-action contacts	1 NO + 1 NC	➔	**3SE5232-0HU21-1AY0**	0.117

3SE5232-0HU21-1AY0

➔ Positive opening according to IEC 60947-5-1, Annex K.

* You can order this quantity or a multiple thereof.

Selection and ordering data

Enclosure width 31 mm according to EN 50047 / 50 mm

Complete units

2 or 3 contacts · Degree of protection IP65 (31 mm) or IP66/IP67 (50 mm) · With increased corrosion protection

Version	Contacts		Complete units Article No.	Weight kg
Complete units[1] · Enclosure width 31 mm · Cable entry 1 x (M20 x 1.5)				
 3SE5234-0CD03-1AJ1	***Roller plungers, type C, acc. to EN 50047*** **With plastic roller 10 mm** With M12 device plug, 4-pole (250 V, 4 A)[2] • Snap-action contacts	1 NO + 1 NC	⊖ **3SE5234-0CD03-1AJ1**	0.083
 3SE5232-0CD10-1AJ0	***Roller plungers with central fixing acc. to EN 50047*** • Snap-action contacts	1 NO + 1 NC	⊖ **3SE5232-0CD10-1AJ0**	0.101
 3SE5232-0CK31-1AJ0	***Twist levers, type A, acc. to EN 50047*** **With high-grade steel lever 21 mm and plastic roller 19 mm** • Snap-action contacts	1 NO + 1 NC	⊖ **3SE5232-0CK31-1AJ0**	0.104
 3SE5232-0CK62-1AJ0	***Twist levers, adjustable length, acc. to EN 50047*** **With high-grade steel lever 100 mm, with grid hole and plastic roller 19 mm** • Snap-action contacts	1 NO + 1 NC 1 NO + 2 NC	⊖ **3SE5232-0CK62-1AJ0** ⊖ **3SE5232-0LK62-1AJ0**	0.126 0.130
Complete units[1] · Enclosure width 50 mm · Cable entry 2 x (M20 x 1.5) · Operating points acc. to EN 50047				
 3SE5242-0HK21-1AJ0	***Twist levers*** **With metal lever 21 mm and plastic roller 19 mm** • Snap-action contacts, integrated[3]	1 NO + 1 NC	⊖ **3SE5242-0HK21-1AJ0**	0.120
 3SE5242-0HK62-1AJ0	***Twist levers, adjustable length*** **With high-grade steel lever 100 mm, with grid hole and plastic roller 19 mm** • Snap-action contacts, integrated[3]	1 NO + 1 NC	⊖ **3SE5242-0HK62-1AJ0**	0.134

⊖ Positive opening according to IEC 60947-5-1, Annex K, or positively driven actuator, necessary in safety circuits.

1) Popular versions.

2) Pin assignments, see page 2/323.

3) Subsequent replacement of contact blocks is not possible.

Note:

If the device you require is not available as a complete unit, see "Modular system", page 2/338.

*** You can order this quantity or a multiple thereof.**

2

Modular system

2 or 3 contacts · Degree of protection IP65 (31 mm) or IP66/IP67 (50 mm) · With increased corrosion protection

Version	Contacts		Modular system Article No.	Weight kg
Basic switches · Enclosure width 31 mm · Cable entry 1 x (M20 x 1.5)				
Rounded plungers[1], type B, acc. to EN 50047				
• Slow-action contacts	1 NO + 2 NC	➔	**3SE5232-0KC05-1AJ0**	0.068
• Snap-action contacts	1 NO + 1 NC	➔	**3SE5232-0CC05-1AJ0**	0.069
	1 NO + 2 NC	➔	**3SE5232-0LC05-1AJ0**	0.070
Basic switches · Enclosure width 50 mm · Cable entry 2 x (M20 x 1.5)				
Rounded plungers[1], acc. to EN 50047				
• Slow-action contacts	1 NO + 1 NC	➔	**3SE5242-0BC05-1AJ0**	0.088
• Snap-action contacts, integrated[2]	1 NO + 1 NC	➔	**3SE5242-0HC05-1AJ0**	0.086


3SE5232-0CC05-1AJ0


3SE5242-0BC05-1AJ0

➔ Positive opening according to IEC 60947-5-1, Annex K, or positively driven actuator, necessary in safety circuits.

1) For enclosures with widths of 31 and 50 mm, the basic switch is a complete unit with rounded plungers.

2) Subsequent replacement of contact blocks is not possible.

Note:
For the selection aid, see page 2/324.

Version		Diameter mm		Modular system Article No.	Weight kg
Operating mechanisms					
Roller plungers, type C, acc. to EN 50047					
• Plastic roller		10	➔	**3SE5000-0AD03-1AJ0**	0.030
Roller levers, type E, acc. to EN 50047					
• Metal lever	Plastic roller	13	➔	**3SE5000-0AE10-1AJ0**	0.015
• High-grade steel lever	Plastic roller	13	➔	**3SE5000-0AE12-1AJ0**	0.015
	High-grade steel roller	13	➔	**3SE5000-0AE13-1AJ0**	0.023
Angular roller levers					
• Metal lever	Plastic roller	13	➔	**3SE5000-0AF10-1AJ0**	0.040
• High-grade steel lever	Plastic roller	13	➔	**3SE5000-0AF12-1AJ0**	0.018
Twist actuators					
Twist actuators, for 31/50 mm, EN 50047					
• Switching right and/or left, adjustable		--	➔	**3SE5000-0AK00-1AJ0**	0.026
Levers					
Twist levers 21 mm, straight, type A, acc. to EN 50047					
• Metal lever	Plastic roller	19	➔	**3SE5000-0AA21-1AJ0**	0.015
• High-grade steel lever	Plastic roller	19	➔	**3SE5000-0AA31-1AJ0**	0.015
	High-grade steel roller	19	➔	**3SE5000-0AA32-1AJ0**	0.030
Twist levers 100 mm, adjustable length, with grid hole					
• Metal lever	Plastic roller	19	➔	**3SE5000-0AA60-1AJ0**	0.040
• High-grade steel lever	Plastic roller	19	➔	**3SE5000-0AA62-1AJ0**	0.031


3SE5000-0AD03-1AJ0


3SE5000-0AF10-1AJ0


3SE5000-0AK00-1AJ0


3SE5000-0AA21-1AJ0


3SE5000-0AA60-1AJ0

➔ Positively driven actuator, necessary in safety circuits.

* You can order this quantity or a multiple thereof.

Enclosure width 40 mm acc. to EN 50041

Modular system

2 or 3 contacts · Degree of protection IP66/IP67 · Cable entry 1 × (M20 × 1.5) · With increased corrosion protection

Version	Contacts		Modular system Article No.	Weight kg
Basic switches · Enclosure width 40 mm				
 3SE5132-0CA00-1AJ0				
Rounded plungers, acc. to EN 50041				
• Slow-action contacts	1 NO + 2 NC	➔	**3SE5132-0KA00-1AJ0**	0.091
• Snap-action contacts	1 NO + 1 NC	➔	**3SE5132-0CA00-1AJ0**	0.093
	1 NO + 2 NC	➔	**3SE5132-0LA00-1AJ0**	0.092

➔ Positive opening according to IEC 60947-5-1, Annex K, or positively driven actuator, necessary in safety circuits.

Note:

For the selection aid, see page 2/324.

Version		Diameter mm		Modular system Article No.	Weight kg
Operating mechanisms					
 3SE5000-0AC03-1AJ0					
Rounded plungers, type B, acc. to EN 50041					
• Plastic plunger, with 3 mm overtravel		10	➔	**3SE5000-0AC03-1AJ0**	0.011
 3SE5000-0AD05-1AJ0					
Roller plungers, type C, acc. to EN 50041					
• Plastic plungers	Plastic roller	13	➔	**3SE5000-0AD05-1AJ0**	0.014
 3SE5000-0AE05-1AJ0					
Roller levers					
• Metal levers with plastic base	Plastic roller	22	➔	**3SE5000-0AE05-1AJ0**	0.025
Twist actuators					
 3SE5000-0AH00-1AJ0					
Twist actuators, for 40/56/56 XL mm, EN 50041					
• Switching right and/or left, adjustable		--	➔	**3SE5000-0AH00-1AJ0**	0.032
 3SE5000-0AA01-1AJ0					
Levers					
Twist levers 27 mm, offset, type A, acc. to EN 50041					
• Metal lever	Plastic roller	19	➔	**3SE5000-0AA01-1AJ0**	0.017
• High-grade steel lever	Plastic roller	19	➔	**3SE5000-0AA11-1AJ0**	0.030
 3SE5000-0AA60-1AJ0					
Twist levers 100 mm, adjustable length, with grid hole					
• Metal lever	Plastic roller	19	➔	**3SE5000-0AA60-1AJ0**	0.040
• High-grade steel lever	Plastic roller	19	➔	**3SE5000-0AA62-1AJ0**	0.031

➔ Positively driven actuator, necessary in safety circuits.

2

Selection and ordering data

Enclosure width 31 mm acc. to EN 50047

Complete units

2 or 3 contacts · Degree of protection IP66/IP67 · Cable entry 1 × (M20 × 1.5) · With increased corrosion protection

Version	Contacts		Modular system ◇ Article No.	Weight kg
Complete units · Enclosure width 31 mm				
 3SE5212-0CC05-1AJ0	***Rounded plungers, type B, acc. to EN 50047***			
	• Slow-action contacts	1 NO + 2 NC	➔ **3SE5212-0KC05-1AJ0**	0.188
	• Snap-action contacts	1 NO + 1 NC	➔ **3SE5212-0CC05-1AJ0**	0.185
		1 NO + 2 NC	➔ **3SE5212-0LC05-1AJ0**	0.197
 3SE5214-0CC05-1AJ2	**With M12 device plug, 5-pole (250 V, 4 A)[1)]**			
	• Snap-action contacts	1 NO + 1 NC	➔ **3SE5214-0CC05-1AJ2**	0.192
 3SE5212-0CH22-1AJ0	***Twist levers, type A, acc. to EN 50047***			
	With metal lever 21 mm and high-grade steel roller 19 mm, with twist actuator with enclosure width 40 mm			
	• Snap-action contacts	1 NO + 1 NC	➔ **3SE5212-0CH22-1AJ0**	0.233

➔ Positive opening according to IEC 60947-5-1, Annex K, or positively driven actuator, necessary in safety circuits.

1) Pin assignments, see page 2/323.

Note:

If the device you require is not available as a complete unit, see "Modular system", page 2/341.

* You can order this quantity or a multiple thereof.

Modular system

2 or 3 contacts · Degree of protection IP66/IP67 · Cable entry 1 × (M20 × 1.5) · With increased corrosion protection

Version	Contacts		Modular system Article No.	Weight kg
Basic switches · Enclosure width 31 mm				
 3SE5212-0CC05-1AJ0				
Rounded plungers[1], acc. to EN 50047				
• Slow-action contacts	1 NO + 2 NC	➔	**3SE5212-0KC05-1AJ0**	0.188
• Snap-action contacts	1 NO + 1 NC	➔	**3SE5212-0CC05-1AJ0**	0.185
	1 NO + 2 NC	➔	**3SE5212-0LC05-1AJ0**	0.197

➔ Positive opening according to IEC 60947-5-1, Annex K, or positively driven actuator, necessary in safety circuits.

1) For enclosures with widths of 31 mm, the basic switch is a complete unit with rounded plungers.

Note:

For the selection aid, see page 2/324.

Version		Diameter mm		Modular system Article No.	Weight kg
Operating mechanisms					
 3SE5000-0AD03-1AJ0					
Roller plungers, type C, acc. to EN 50047					
• Plastic roller		10	➔	**3SE5000-0AD03-1AJ0**	0.030
 3SE5000-0AE10-1AJ0					
Roller levers, type E, acc. to EN 50047					
• Metal lever	Plastic roller	13	➔	**3SE5000-0AE10-1AJ0**	0.015
• High-grade steel lever	Plastic roller	13	➔	**3SE5000-0AE12-1AJ0**	0.015
	High-grade steel roller	13	➔	**3SE5000-0AE13-1AJ0**	0.023
 3SE5000-0AF10-1AJ0					
Angular roller levers					
• Metal lever	Plastic roller	13	➔	**3SE5000-0AF10-1AJ0**	0.040
• High-grade steel lever	Plastic roller	13	➔	**3SE5000-0AF12-1AJ0**	0.018
Twist actuators					
 3SE5000-0AK00-1AJ0					
Twist actuators, for 31/50 mm, EN 50047					
• Switching right and/or left, adjustable		--	➔	**3SE5000-0AK00-1AJ0**	0.026
 3SE5000-0AA21-1AJ0					
Levers					
Twist levers 21 mm, straight, type A acc. to EN 50047					
• Metal lever	Plastic roller	19	➔	**3SE5000-0AA21-1AJ0**	0.015
• High-grade steel lever	Plastic roller	19	➔	**3SE5000-0AA31-1AJ0**	0.015
 3SE5000-0AA60-1AJ0					
Twist levers 100 mm, adjustable length, with grid hole					
• Metal lever	Plastic roller	19	➔	**3SE5000-0AA60-1AJ0**	0.040
• High-grade steel lever	Plastic roller	19	➔	**3SE5000-0AA62-1AJ0**	0.031

➔ Positively driven actuator, necessary in safety circuits.

2

Enclosure width 40 mm according to EN 50041 / 56 mm, XL

Complete units

2, 3 or 4 contacts · Degree of protection IP66/IP67 · With increased corrosion protection

	Version	Contacts		Complete units Article No.	Weight kg
Complete units · Enclosure width 40 mm · Cable entry 1 x (M20 x 1.5)					
 3SE5112-0CC02-1AJ0	***Rounded plungers, type B, acc. to EN 50041*** **With high-grade steel plunger 10 mm, with 3 mm overtravel** • Snap-action contacts	1 NO + 1 NC	⊕	**3SE5112-0CC02-1AJ0**	0.360
 3SE5112-0LD02-1AJ0	***Roller plungers, type C, acc. to EN 50041*** **With high-grade steel plunger 13 mm, with 3 mm overtravel** • Snap-action contacts	1 NO + 2 NC	⊕	**3SE5112-0LD02-1AJ0**	0.365
 3SE5112-0LH11-1AJ0	***Twist levers, type A, acc. to EN 50041*** **With high-grade steel lever 27 mm and plastic roller 19 mm** • Snap-action contacts	1 NO + 2 NC	⊕	**3SE5112-0LH11-1AJ0**	0.348
 3SE5112-0CH62-1AJ0	***Twist levers, adjustable length, acc. to EN 50041*** **With high-grade steel lever 100 mm, with grid hole and plastic roller 19 mm** • Snap-action contacts	1 NO + 1 NC	⊕	**3SE5112-0CH62-1AJ0**	0.360
Complete units · Enclosure width 56 mm, XL · Cable entry 3 x (M20 x 1.5) · Operating points acc. to EN 50041					
 3SE5162-0CH12-1AN5	***Twist levers*** **With high-grade steel lever 27 mm and high-grade steel roller 19 mm** • Snap-action contacts	2 × (1 NO + 1 NC)	⊕	**3SE5162-0CH12-1AN5**	0.500
 3SE5162-0CH60-1AJ0	***Twist levers, adjustable length*** **With metal lever 100 mm, with grid hole and plastic roller 19 mm** • Snap-action contacts	2 × (1 NO + 1 NC)	⊕	**3SE5162-0CH60-1AJ0**	0.509
	With high-grade steel lever 100 mm and high-grade steel roller 19 mm • Snap-action contacts	2 × (1 NO + 1 NC)	⊕	**3SE5162-0CH63-1AN6**	0.511

⊕ Positive opening according to IEC 60947-5-1, Annex K or positively driven actuator, necessary in safety circuits.

Note:

If the device you require is not available as a complete unit, see "Modular system", page 2/343.

* You can order this quantity or a multiple thereof.

Enclosure width 40 mm according to EN 50041 / 56 mm / 56 mm, XL

Modular system

2, 3 or 4 contacts · Degree of protection IP66/IP67 · With increased corrosion protection

Version	Contacts		Modular system Article No.	Weight kg
Basic switches · Enclosure width 40 mm · Cable entry 1 x (M20 x 1.5)				
Rounded plungers, acc. to EN 50041				
 3SE5112-0CA00-1AJ0				
• Slow-action contacts	1 NO + 2 NC	➔	**3SE5112-0KA00-1AJ0**	0.298
• Snap-action contacts	1 NO + 1 NC	➔	**3SE5112-0CA00-1AJ0**	0.297
	1 NO + 2 NC	➔	**3SE5112-0LA00-1AJ0**	0.304
Basic switches · Enclosure width 56 mm · Cable entry 3 x (M20 x 1.5)				
Rounded plungers, operating points acc. to EN 50041				
 3SE5122-0CA00-1AJ0				
• Slow-action contacts	1 NO + 2 NC	➔	**3SE5122-0KA00-1AJ0**	0.395
• Snap-action contacts	1 NO + 1 NC	➔	**3SE5122-0CA00-1AJ0**	0.365
	1 NO + 2 NC	➔	**3SE5122-0LA00-1AJ0**	0.380
Basic switches · Enclosure width 56 mm, XL · Cable entry 3 x (M20 x 1.5)				
Rounded plungers, operating points acc. to EN 50041				
 3SE5162-0BA00-1AJ0				
• Slow-action contacts	2 × (1 NO + 1 NC)	➔	**3SE5162-0BA00-1AJ0**	0.450
• Snap-action contacts	2 × (1 NO + 1 NC)	➔	**3SE5162-0CA00-1AJ0**	0.450

➔ Positive opening according to IEC 60947-5-1, Annex K or positively driven actuator, necessary in safety circuits.

Note:

For the selection aid, see page 2/324.

*** You can order this quantity or a multiple thereof.**

2

	Version		Diameter		Modular system ◇ Article No.	Weight kg
			mm			
Operating mechanisms						
 3SE5000-0AC02-1AJ0	**Rounded plungers, type B, acc. to EN 50041**					
	• High-grade steel plunger, with 3 mm overtravel		10	➔	**3SE5000-0AC02-1AJ0**	0.035
 3SE5000-0AD02-1AJ0	**Roller plungers, type C, acc. to EN 50041**					
	• High-grade steel roller, with 3 mm overtravel		10	➔	**3SE5000-0AD02-1AJ0**	0.055
 3SE5000-0AE01-1AJ0	**Roller levers**					
	• Metal lever	Plastic roller	13	➔	**3SE5000-0AE01-1AJ0**	0.027
	• High-grade steel lever	Plastic roller	13	➔	**3SE5000-0AE03-1AJ0**	0.023
 3SE5000-0AF01-1AJ0	**Angular roller levers**					
	• Metal lever	Plastic roller	13	➔	**3SE5000-0AF01-1AJ0**	0.040
	• High-grade steel lever	Plastic roller	13	➔	**3SE5000-0AF03-1AJ0**	0.035
Twist actuators						
 3SE5000-0AH00-1AJ0	**Twist actuators, for 40/56/56 XL mm, EN 50041**					
	• Switching right and/or left, adjustable		--	➔	**3SE5000-0AH00-1AJ0**	0.032
 3SE5000-0AA01-1AJ0	***Levers***					
	Twist levers 27 mm, offset, type A, acc. to EN 50041					
	• Metal lever	Plastic roller	19	➔	**3SE5000-0AA01-1AJ0**	0.017
	• High-grade steel lever	Plastic roller	19	➔	**3SE5000-0AA11-1AJ0**	0.030
 3SE5000-0AA60-1AJ0	**Twist levers 100 mm, adjustable length, with grid hole**					
	• Metal lever	Plastic roller	19	➔	**3SE5000-0AA60-1AJ0**	0.040
	• High-grade steel lever	Plastic roller	19	➔	**3SE5000-0AA62-1AJ0**	0.031

➔ Positively driven actuator, necessary in safety circuits.

* You can order this quantity or a multiple thereof.

Selection and ordering data

Enclosure width 31 mm acc. to EN 50047

Complete units

2 contacts · 5 directions of approach · Degree of protection IP65 · Cable entry 1 × (M20 × 1.5) · With increased corrosion protection

	Version	Contacts		Complete units Article No.	Weight kg
Plastic enclosures · Enclosure width 31 mm acc. to EN 50047					
 3SE5232-0RV40-1AJ0	• Slow-action contacts	1 NO + 1 NC	⊖	**3SE5232-0RV40-1AJ0**	0.115
Metal enclosures · Enclosure width 40 mm acc. to EN 50041					
 3SE5114-0QV40-1AJ4	**With M12 device plug, 5-pole (125 V, 4 A)[1]** • Slow-action contacts	2 NC	⊖	**3SE5114-0QV10-1AJ4**	0.479

⊖ Positive opening according to IEC 60947-5-1, Annex K.

1) Pin assignments, see page 2/323.

	Version	Article No.	Weight kg
Accessories			
 3SE5000-0AW11	**Standard actuators** • With transverse fixing, plastic, length 40 mm	**3SE5000-0AW11**	0.004
 3SE5000-0AW51	**High-grade steel actuators[1]** • Length 75.6 mm	**3SE5000-0AW51**	0.046
 3SE5000-0AW52	• With vertical fixing, length 53 mm	**3SE5000-0AW52**	0.073
 3SE5000-0AW53	• With transverse fixing, length 47 mm	**3SE5000-0AW53**	0.066
 3SE5000-0AW57	**Universal radius actuators, heavy duty** • High-grade steel actuators[1], length 77 mm	**3SE5000-0AW57**	0.125

1) Suitable for extreme environmental conditions such as -40 °C.

2

Selection and ordering data

Enclosure width 54 mm

6 slow-action contacts · 5 directions of approach · Degree of protection IP66/IP67 · Cable entry 3 × (M20 × 1.5)

	Tumbler[1]	Solenoid, rated operational voltage		Complete units Position monitoring: Actuators: 1 NO + 2 NC Solenoid: 1 NO + 2 NC Article No.	Weight
		V			kg
1 300 N locking force · Enclosure width 54 mm acc. to ISO 14119					
 3SE5322-0SL21-1AJ0	**Spring-actuated locks**				
	• With escape release from the front and emergency release from the back	24 DC	➔	**3SE5322-0SL21-1AJ0**	0.860
	• With auxiliary release			**3SE5322-0SD21-1AJ0**	0.505
	• With escape release from the back and auxiliary release from the front, head rotated 180°			**3SE5322-0SG21-1AM5**	0.805

➔ Positive opening according to IEC 60947-5-1, Annex K, or positively driven actuator, necessary in safety circuits.

1) Supplied without actuator. Please order separately.

	Version	Article No.	Weight
			kg
Accessories			
 3SE5000-0AV01	**Standard actuators**		
	• Length 75.6 mm	**3SE5000-0AV01**	0.035
	High-grade steel actuators[1]		
 3SE5000-0AW51	• Length 75.6 mm	**3SE5000-0AW51**	0.046
 3SE5000-0AW52	• With vertical fixing, length 53 mm	**3SE5000-0AW52**	0.073
 3SE5000-0AW53	• With transverse fixing, length 47 mm	**3SE5000-0AW53**	0.066
 3SE5000-0AW57	**Universal radius actuators, heavy duty**		
	• High-grade steel actuators[1], length 77 mm	**3SE5000-0AW57**	.0.125

1) Suitable for extreme environmental conditions such as -40 °C.

* You can order this quantity or a multiple thereof.

Overview

	3SU1.0		
Pushbuttons and indicator lights			
Designs			
Nominal diameter	22 mm		
Version	Plastic		
	Complete units[1]	Compact units[1]	Actuating/ signaling elements
Actuators			
Pushbuttons	✓	--	✓ see p. 2/366
Illuminated pushbuttons	✓	--	✓ see p. 2/367
Mushroom pushbuttons	✓	--	✓ see p. 2/369
EMERGENCY STOP mushroom pushbuttons	✓	--	✓ see p. 2/370
Selector switches	✓	--	✓ see p. 2/372
Key-operated switches	✓	--	✓ see p. 2/374
ID key-operated switches	--	--	✓ see p. 2/376
Twin pushbuttons	--	--	✓ see p. 2/368
Quadruple pushbuttons	--	--	✓ see p. 2/368
Toggle switches	--	--	✓ see p. 2/371
Coordinate switches	✓	--	✓ see p. 2/377
Sensor switches	--	✓	--
Potentiometers	--	✓	--
Pushbuttons with extended stroke	--	✓	--
Indicators			
Indicator lights	✓	--	✓ see p. 2/377
Indicator lights in illuminated pushbutton design	--	--	✓ see p. 2/377
Acoustic signaling devices	--	✓	--
Modules			
Contact modules	✓ see p. 2/386 to 2/388		
LED modules	✓		
AS-Interface modules	✓		
Electronic modules for IO-Link	✓		
Electronic modules for ID key-operated switches	✓		
Modules for PROFINET	✓		
Support terminals	✓		
Connections			
Screw terminals	✓	✓	✓
Spring-loaded terminals	✓	--	✓
Solder pins	--	--	✓
AS-Interface	✓	--	✓
IO-Link	--	--	✓
PROFINET	--	--	✓

✓ Available
-- Not available
[1] see Catalog IC 10.

Introduction

	3SU1.5			3SU1.6			3SB2
Pushbuttons and indicator lights							
Designs							
Nominal diameter	22 mm			30 mm			16 mm
Version	Metal, shiny			Metal, matte, flat			Plastic, round[1]
Actuators	Complete units[1]	Compact units[1]	Actuating/ signaling elements[1]	Complete units	Compact units	Actuating/ signaling elements	
Pushbuttons	✓	--	✓	--	--	✓ see p. 2/379	✓
Illuminated pushbuttons	✓	--	✓	--	--	✓ see p. 2/379	✓
Mushroom pushbuttons	✓	--	✓	--	--	--	--
EMERGENCY STOP mushroom pushbuttons	✓	--	✓	--	--	--	✓
Selector switches	✓	--	✓	--	--	✓ see p. 2/380	✓
Key-operated switches	✓	--	✓	--	--	✓ see p. 2/381	✓
Twin pushbuttons	--	--	✓	--	--	--	--
Toggle switches	--	--	✓	--	--	--	--
Coordinate switches	✓	--	✓	--	--	--	--
Potentiometers	--	✓	--	--	--	--	
Pushbuttons with extended stroke	--	✓	--	--	--	--	--
Indicators							
Indicator lights	✓	--	✓	--	--	✓ see p. 2/381	✓
Acoustic signaling devices	--	✓	--	--	--	--	--
Modules							
Contact modules	✓ see p. 2/386 to 2/388						
LED modules	✓ see p. 2/390						
Wedge bases	--	--	--	--	--	--	✓
AS-Interface modules	✓						
Electronic modules for IO-Link	✓						
Electronic modules for ID key-operated switches	✓						
Modules for PROFINET	✓						
Support terminals	✓						
Connections							
Plug-in connection	--	--	--	--	--	--	✓
Screw terminals	✓	✓	✓	✓	✓	✓	--
Spring-loaded terminals	✓	✓	✓	✓	✓	✓	--
Solder pins	✓	✓	✓	✓	✓	✓	✓
AS-Interface	✓	✓	✓	✓	✓	✓	--
IO-Link	✓	✓	✓	✓	✓	✓	--
PROFINET	--	--	✓	--	--	✓	--

✓ Available

-- Not available

[1] see Catalog IC 10.




	3SU18	3SU18[1)]	3SE7[1)]	3SE29, 3SE39[1)]
	Enclosures	**Two-hand operation consoles**	**Cable-operated switches**	**Foot switches**
Enclosures				
Plastic	✓	✓	--	✓
Metal	✓	✓	✓	✓
Actuators				
Pushbuttons	✓	--	✓	✓
Illuminated pushbuttons		--	--	--
Mushroom pushbuttons	✓	✓	--	--
EMERGENCY STOP mushroom pushbuttons	✓	✓	✓	--
Selector switches	✓	--	--	--
Key-operated switches	✓	--	--	--
Cable-operated switches	--	--	✓	--
Indicators				
Indicator lights	✓	--	✓	--
Acoustic signaling devices	✓	--	--	--
Modules (see p. 2/388)				
1-pole/2-pole	✓/--	✓	--/✓	--/✓
3-pole/4-pole	--	--	✓	✓
Connections				
Screw terminals	✓	✓	✓	✓
AS-Interface	✓	--	--	--
IO-Link	✓	--	--	--
PROFINET	✓	--	--	--
Pages	see p. 2/392	--	--	--

✓ Available
-- Not available

[1)] see Catalog IC 10.


	8WD42, 8WD44[1)]	8WD53[1)]
	Signaling columns	**Integrated signal lamps**
Enclosures		
Plastic	✓	✓
Illumination		
Incandescent lamps	✓	✓
LEDs	✓	✓
Flashlights	✓	✓
Connections		
Screw terminals	✓	✓
Spring-loaded terminals	✓	--
AS-Interface	✓	--
IO-Link	✓	--

✓ Available
-- Not available

[1)] see Catalog IC 10.

General data

2

Overview

SIRIUS ACT pushbuttons and indicator lights

SIRIUS ACT – commanding and signaling

SIRIUS ACT is a modular system of pushbuttons and indicator lights for front plate mounting and rear-mounted electrical modules. Thanks to SIRIUS ACT with PROFINET, pushbuttons and indicator lights can be connected directly via PROFINET to the controller and HMI devices – including with Safety functions. Engineering and commissioning are simplified by the TIA Portal.

Extensive portfolio

- Customized variants, e.g. special tumbler arrangements, labeling, equipped enclosures
- Communication-enabled thanks to direct interfacing to AS-Interface, IO-Link or PROFINET

Diverse possible applications

- National and international approvals
- Many trade approvals
- Short delivery times thanks to global availability

Standards

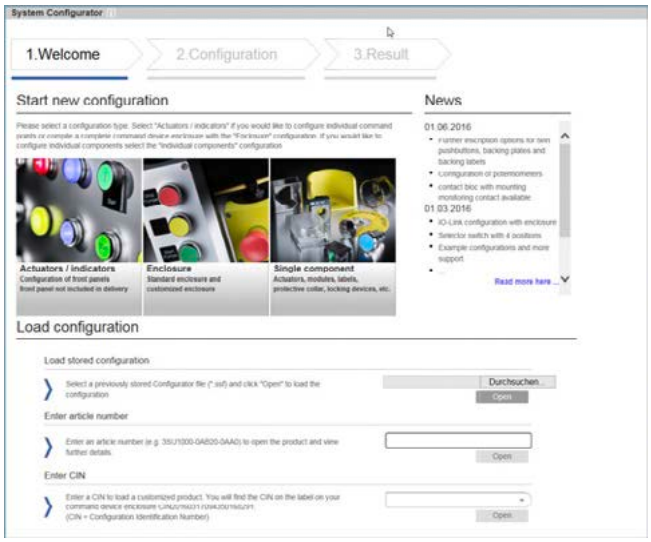
- IEC 60947-1
- IEC 60947-5-1
- IEC 60947-5-5 for EMERGENCY STOP devices

More information

Homepage, see www.siemens.com/sirius-act
Industry Mall, see www.siemens.com/product?3SU1
For configurator, see www.siemens.com/sirius-act/configurator
Conversion tool, see www.siemens.com/conversion-tool
System Manual, see https://support.industry.siemens.com/cs/ww/en/view/107542462
TIA Portal, see www.siemens.com/TIA
TIA Selection Tool Cloud (TST Cloud), see www.siemens.com/tstcloud/?node=SiriusActConfigurator

Video: SIRIUS ACT - Teaser trailer

Configurator



- Fast, simple selection by intuitive navigation through clearly-organized menus using drag & drop
- Image preview of selected components
- Inscription of pushbuttons and labeling plates using the interactive inscription tool
- Once created, a configuration can be ordered as often as required using the customer-specific article number and the CIN (Configuration Identification Number)
- Everything at a glance: Product data sheets, certificates, dimensional drawings, list prices, inscription tool

Video: SIRIUS ACT - Configurator

General data

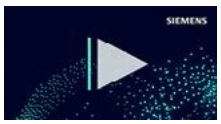
Benefits

Design

Video: SIRIUS ACT - Design

SIRIUS ACT is available in three design lines.

Ruggedness



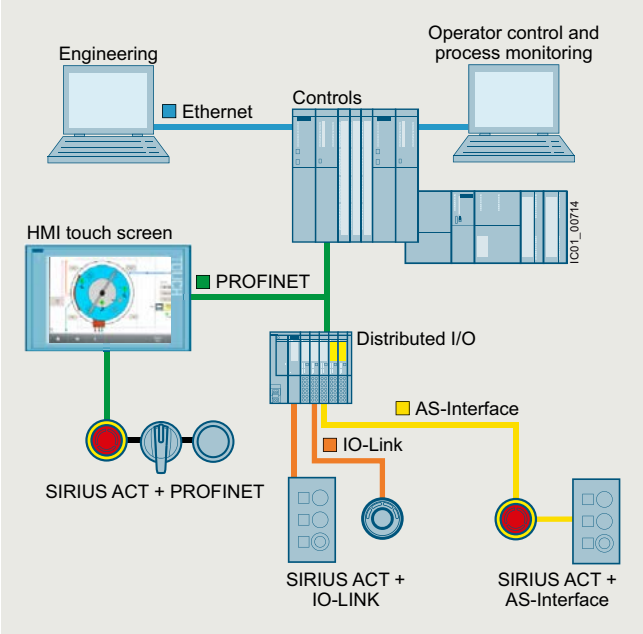
Video: SIRIUS ACT - Ruggedness

- Degree of protection IP66, IP67, IP69 (IP69K)

IP66	
6 = Protection against the ingress of dust	6 = Protection against powerful splashwater
IP67	
6 = Protection against the ingress of dust	7 = Protection against temporary immersion
IP69 (IP69K)	
6 = Protection against the ingress of dust	9 (9K) = Protection against water in high-pressure cleaning (approx. 80 bar) and high water jet temperatures (approx. 80 °C)

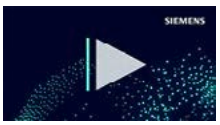
- Service life of 100 000 hours thanks to use of LEDs
- Media resistance (chemicals) thanks to solid stainless steel and high-grade plastics
- Mechanical service life of 10 x 10^6 operating cycles
- Suitable for use in extreme environments
- Reliable, friction-locked fixing with just one screw
- Design stability according to use
- Simple geometry for mounting holes

Communication

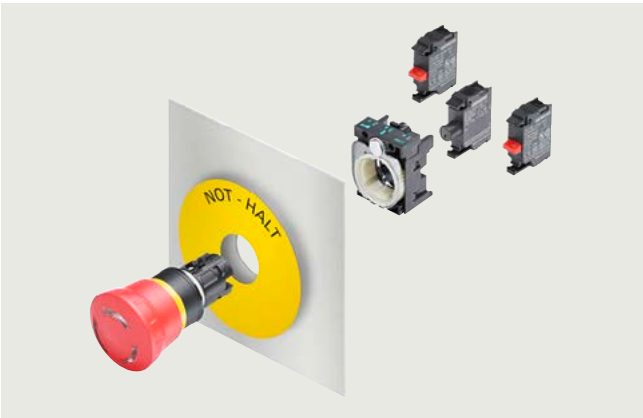


- Direct connection of the enclosure to AS-Interface or IO-Link
- Direct connection in the control cabinet to PROFINET, IO-Link or AS-Interface
- Can be integrated easily via the TIA Portal

Simple installation

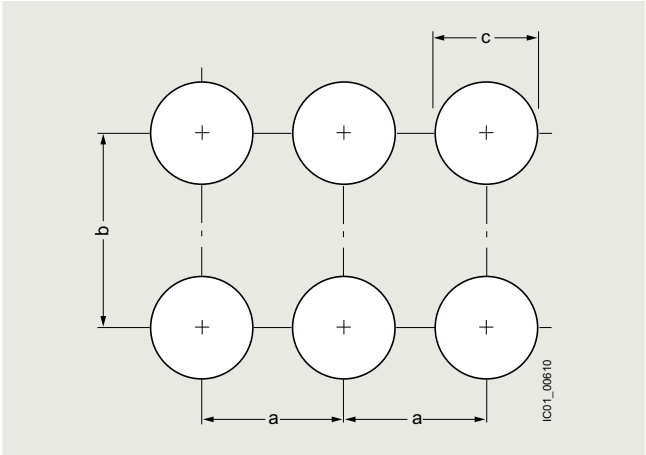


Video: SIRIUS ACT – Installation



- Self-holding function of the actuator when mounting
- Twist prevention integrated into patented holder design
- Stackable contact modules
- Self-explanatory and fast installation using one hand
- Components can be mounted with holder removed
- No special tools required, simple size 2 screwdriver (cross-tip ISO 87641PZD1, flat-head ISO 2380-1 A/B 1x4.5) is sufficient

Mounting dimensions



	Minimum clearance		
	a	b	c
	mm	mm	mm
22 mm, plastic, black 22 mm, metal, shiny For front plate thickness 1 ... 6 mm			
3-slot holder	30	40	$22.3^{+0.4}$
4-slot holder	40	40	$22.3^{+0.4}$
30 mm, metal, matte For front plate thickness 1 ... 4 mm			
3-slot holder	40	45	$30.5^{+0.5}$

Versions

SIRIUS ACT is a modular system of pushbuttons and indicator lights with which customized variants can be configured flexibly.

One command point comprises:

- An actuating or signaling element in front of the control panel
- A holder for securing behind the control panel
- Up to six contact modules and/or one LED module (mounted on the holder), 1-pole contacts can be stacked
- A comprehensive range of accessories for inscription/marking

Complete units

Complete units made up of an actuating or signaling element, holder and contact modules and/or LED modules are offered for the most frequent application cases. The electrical parts are integrated and only have to be wired.

Compact units

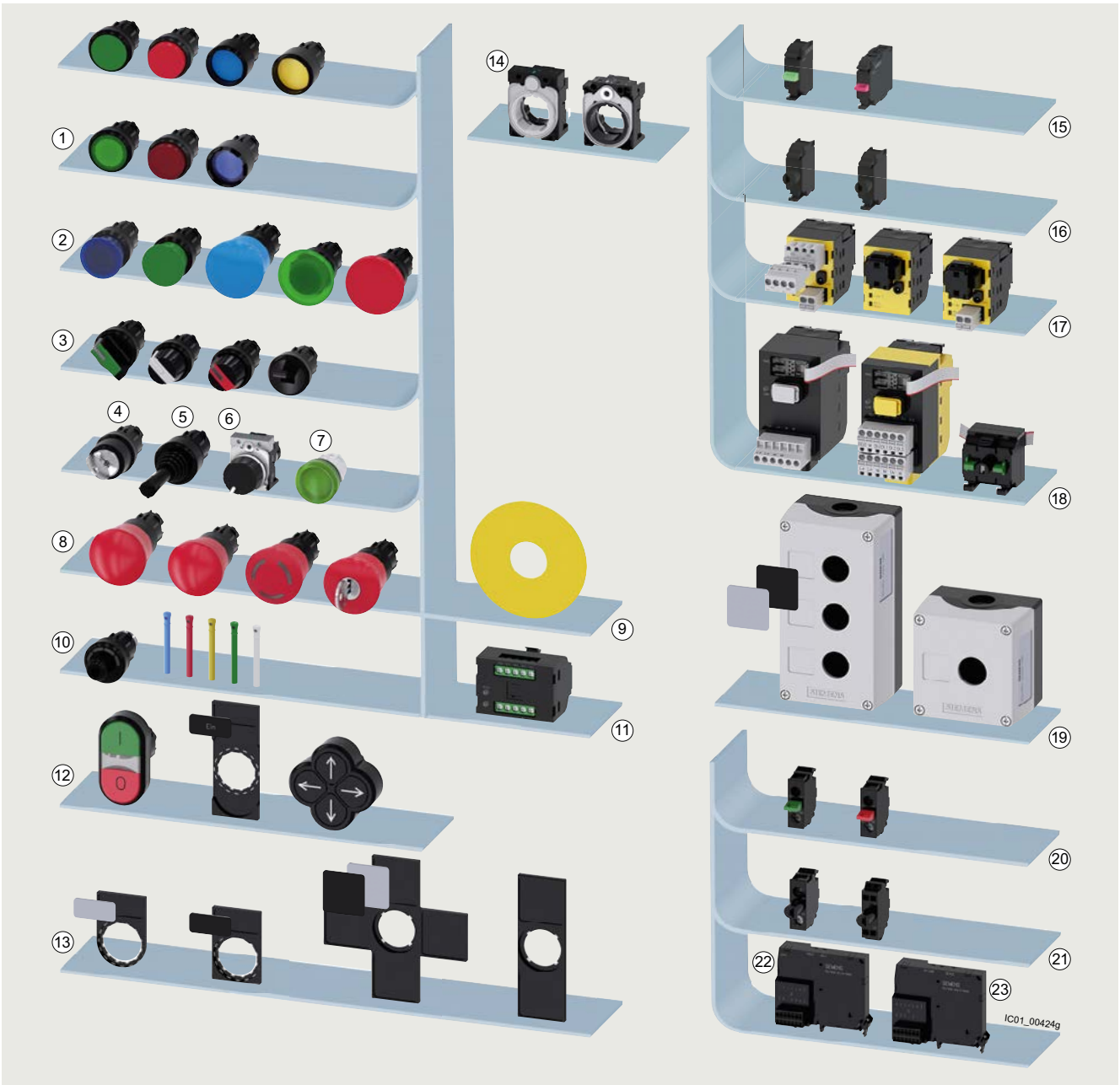
Signaling devices, sensor switches, pushbuttons with extended stroke and potentiometers are available as compact units. The electronic circuitry is already integrated in these devices, i.e. it is not necessary to snap on a contact or LED module.

Complete units[1)]	Compact units[1)]
Plastic, black	Plastic, black
Metal, shiny	Metal, shiny

1) see Catalog IC 10.

General data

Actuating and signaling elements



System overview of SIRIUS ACT pushbuttons and indicator lights from the plastic design line, pushbuttons and indicator lights available in three design lines.

Actuating and signaling elements		Pages
①	Pushbuttons, illuminated pushbuttons	--
②	Mushroom pushbuttons	--
③	Selector switches, toggle switches	2/371, 2/372
④⑤ ⑥⑦	Key-operated switches, coordinate switches Potentiometers, indicator lights	2/374, 2/377 2/377
⑧⑨	EMERGENCY STOP mushroom pushbuttons, backing plates	--
⑩ ⑪	ID key-operated switches, ID keys Electronic modules for ID key-operated switches	2/376 --
⑫	Twin pushbuttons, label holders, labeling plates, quadruple pushbuttons	2/368

Holders and labels		Pages
⑬	Label holders, labeling plates	From 2/397
⑭	Holder	From 2/385

Modules for front plate mounting		Pages
⑮	Contact modules	From 2/386
⑯	LED modules	--
⑰	AS-Interface modules	--
㉓	Electronic modules for IO-Link	--
⑱	Modules for PROFINET: Interface modules, fail-safe interface modules, terminal modules	--

Enclosures		Pages
⑲	Enclosures	From 2/392

Modules for floor mounting		Pages
⑳	Contact modules	From 2/388
㉑	LED modules	From 2/390
㉒	AS-Interface modules	--
㉓	Electronic modules for IO-Link	--

ID key-operated switches

Groups of employees or individuals can be authenticated by means of the ID key-operated switch. The ID key-operated switch is electronic and has four switch positions that are selected by keys with different codes. Using the four ID keys with different codes, it is possible to select 1 to 4 positions. The ID keys are color-coded (yellow, blue, red, green, white) so that they can be clearly differentiated at a glance and used flexibly thanks to four function levels.

Video: SIRIUS ACT ID key-operated switches

RFID authentication solutions

Groups of employees or individuals can be authenticated by means of the ID key-operated switch. Color-coded keys for easy distinction between users.

Different versions of ID key-operated switches are available depending on the following features:

- Front ring material
- Conventional variant: 1 + 4 non-isolated outputs
- Variant with IO-Link: Option of individual coding

Operation:
Insert ID key, turn key to select the position. Standard keys can also be used in conjunction with the electronic module for ID key-operated switches with IO-Link function. The white ID key is supplied without coding.

	3SU1000-4WS10-0AA0 Plastic, black	3SU1500-0AA10-0AA0 Holder, plastic	3SU1550-0AA10-0AA0 Holder, universal
ID key-operated switches			
Number of switching positions	4		
Operating angle	45°		
Operating principle	Latching		
Switch position for key removal	Key removal possible in all 4 positions		
Color	Black		
Pages	2/376		

	3SU1400-1GC10-1AA0[1)]	3SU1400-1GD10-1AA0[1)]
Electronic modules for ID key-operated switches		
Type of power supply	--	Via IO-Link master
Protocol is supported	--	IO-Link protocol
Number of NO contacts	5	5
IO-Link transfer rate	--	COM2 (38.4 kBaud)

[1)] see Catalog IC 10.

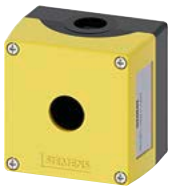
	3SU1900-0FU60-0AA0 ID keys ID group individual	3SU1900-0FV40-0AA0 3SU1900-0FW30-0AA0 3SU1900-0FX20-0AA0 3SU1900-0FY50-0AA0 ID keys
ID keys		
Material	Plastic	Plastic
Version of RFID coding	Individually coded, programmable several times	ID group 1 ID group 2 ID group 3 ID group 4
Color	White	Green Yellow Red Blue
Pages	2/422	2/422

General data

Article No. scheme

Device types




3SU10	3SU11	3SU12	3SU14	3SU15	3SU18	3SU19
Device types						
Actuating and signaling elements	**Complete units**	**Compact units**	**Modules for actuators and indicators**	**Holders with module**	**Enclosures**	**Accessories**

Actuating and signaling elements

Product versions		Article number														
SIRIUS ACT pushbuttons and indicator lights		**3SU1**	□	□	□	–	□	□	□	□	□	–	□	□	□	□
Device type	Actuating and signaling elements		**0**													
Material (front ring)	Plastic, black			**0**												
	Metal, shiny			**5**												
	Metal, matte			**6**												
Illumination	Non-illuminated				**0**											
	Illuminated/transparent				**1**											
	Illuminated/non-illuminated				**2**											
Type of actuator/indicator	Pushbutton					**0**										
	Mushroom pushbutton/EMERGENCY STOP mushroom pushbutton/sensor switch					**1**										
	Selector switch					**2**										
	Twin pushbutton, toggle switch, quadruple pushbutton					**3**										
	Key-operated switch					**4/5**										
	Indicator light/acoustic signaling device					**6**										
	Coordinate switch					**7**										
Design of the actuator/lock	e.g. A = Flat						□									
Function	e.g. B = Momentary contact							□								
Color/key removal position	e.g. 10 = Black, 20 = Red								□	□						
Connection type	None												**0**			
Module/holder equipment	e.g. A = Without module, without holder													□		
Marking	e.g. A = None, C = "I", D = "O", R = "R"														□	
Ambient condition	Standard															**0**
	ATEX Zone 1-2: Intrinsic safety															**2**
Example		**3SU1**	**0**	**0**	**0**	**–**	**0**	**A**	**B**	**1**	**0**	**–**	**0**	**A**	**A**	**0**

Note:

The Article No. scheme shows an overview of product versions for better understanding of the logic behind the article numbers.

For your orders, please use the article numbers quoted in the selection and ordering data.

Complete units

Product versions		Article number
SIRIUS ACT pushbuttons and indicator lights		**3SU1** □ □ □ – □ □ □ □ □ – □ □ □ □
Device type	Complete units	**1**
Material (front ring)	Plastic, black Metal, shiny Metal, matte	**0** **5** **6**
Illumination	Non-illuminated Illuminated (with/without LED, various voltages)	**0** **1** **...** **8**
Type of actuator/indicator	Pushbutton Mushroom pushbutton/EMERGENCY STOP mushroom pushbutton/sensor switch Selector switch Twin pushbutton, toggle switch Key-operated switch Indicator light/acoustic signaling device Coordinate switch	**0** **1** **2** **3** **4/5** **6** **7**
Design of the actuator/lock	e.g. A = Flat	□
Function	e.g. B = Momentary contact	□
Color/key removal position	e.g. 10 = Black, 20 = Red	□ □
Connection type	Screw terminals Spring-loaded terminals	**1** **3**
Module/holder equipment including contact material	e.g. A = Without module, with holder B = 1 NO contact with holder C = 1 NC contact with holder	□
Marking	e.g. A = None, C = "I", D = "O", R = "R"	□
Ambient condition	Standard ATEX Zone 1-2: Intrinsic safety	**0** **2**
Example		**3SU1 1 0 0 – 0 A B 1 0 – 1 B A 0**

Compact units

Product versions		Article number
SIRIUS ACT pushbuttons and indicator lights		**3SU1** □ □ □ – □ □ □ □ □ – □ □ □ □
Device type	Compact units	**2**
Material (front ring)	Plastic, black Metal, shiny Metal, matte	**0** **5** **6**
Illumination	Non-illuminated Illuminated/non-illuminated	**0** **1**
Type of actuator/indicator	Pushbutton Sensor switch Potentiometers Acoustic signaling devices	**0** **1** **2** **6**
Design of the actuator/lock	e.g. A = Flat	□
Function (voltage/resistance)	e.g. B = 24 V AC/DC	□
Color	e.g. 10 = Black, 20 = Red	□ □
Connection type	None Screw terminals M12 connection, 4-pole Spring-loaded terminals	**0** **1** **2** **3**
Module/holder equipment including contact material	e.g. A = Without module, without holder B = 1 NO contact with holder C = 1 NC contact with holder	□
Marking	e.g. A = None	□
Ambient condition	Standard ATEX Zone 1-2: Intrinsic safety	**0** **2**
Example		**3SU1 2 0 1 – 6 A B 1 0 – 1 A A 0**

Note:

The Article No. schemes show an overview of product versions for better understanding of the logic behind the article numbers.

For your orders, please use the article numbers quoted in the selection and ordering data.

General data

2

Modules for actuators and indicators

Product versions		Article number
SIRIUS ACT pushbuttons and indicator lights		**3SU1** □ □ □ – □ □ □ □ □ – □ □ □ □
Device type	Modules for actuators and indicators	**4**
Material (front ring)	Plastic, black	**0**
Illumination	Non-illuminated	**0**
	Illuminated	**1**
Fixing method	Front plate mounting	**1**
	Floor mounting	**2**
	Printed circuit board	**3**
Module type	Contact module	**A**
	LED module	**B**
	LED test module	**C**
	Support terminal	**D**
	AS-Interface module	**E**
	Electronic module for ID key-operated switches	**G**
	Interface modules for PROFINET	**L**
	Terminal modules	**M**
Function/voltage	e.g. B = 24 V AC/DC	□
Color	e.g. 10 = Black, 20 = Red	□ □
Connection type	Screw terminals	**1**
	Screw terminals + insulation piercing method	**2**
	Spring-loaded terminals	**3**
	Spring-loaded terminals + insulation piercing method	**4**
	Socket terminals	**5**
Module equipment including contact material	e.g. A = None B = 1 NO contact, silver C = 1 NC contact, silver	□
Marking	None	**A**
Ambient condition	Standard	**0**
	ATEX Zone 1-2: Intrinsic safety	**2**
Example		**3SU1 4 0 0 – 1 A A 1 0 – 1 B A 0**

Holders

Product versions		Article number
SIRIUS ACT pushbuttons and indicator lights		**3SU1** □ □ □ – □ □ □ □ □ – □ □ □ □
Device type	Holder	**5**
Material (front ring)	Plastic, black	**0**
	Metal, shiny	**1**
	Universal for plastic and metal	**5**
Illumination	Non-illuminated	**0**
	Illuminated	**1**
Fixing method	Without	**0**
	Front plate mounting	**1**
Holder type	3x A	**A**
	4x B	**B**
Function/voltage	Without	**A**
	6 ... 24 V AC/DC	**G**
Color	e.g. 10 = Black, 20 = Red	□ □
Connection type	None	**1**
	Screw terminals	**2**
Module equipment including contact material and slot	e.g. A = None B = 1 NO contact, silver C = 1 NC contact, silver	□
Marking	None	**A**
Ambient condition	Standard	**0**
	ATEX Zone 1-2: Intrinsic safety	**2**
Example		**3SU1 5 0 0 – 0 A A 1 0 – 0 A A 0**

Note:

The Article No. schemes show an overview of product versions for better understanding of the logic behind the article numbers.

For your orders, please use the article numbers quoted in the selection and ordering data.

Enclosures

Product versions		Article number
SIRIUS ACT pushbuttons and indicator lights		**3SU1** □□□ – □□□□□ – □□□□
Device type	Enclosures	**8**
Material (enclosure/front ring)	Plastic, black plastic Metal, shiny metal	**0** **5**
Number of command points	Command point ... Command points	**1** **...** **6**
Type of enclosure	Surface-mounting 4-position selector switch and coordinate switch Palm pushbutton Two-hand operation console	**0** **1** **2** **3**
Equipment	e.g. command point, inscription, module	□□
Communication capability	Without AS-i	**0** **1**
Ambient condition	Standard ATEX Zone 1-2: Intrinsic safety	**0** **2**
Mounting/connection of modules	None Front plate mounting, screw terminals Floor mounting, screw terminals Front mounting, spring-loaded terminals Floor mounting, spring-loaded terminals	**0** **1** **2** **3** **4**
Cable exit from enclosure	None Direct entry of AS-i flat cable at top/on right AS-i insulation piercing method at top/on right	**A** **G** **H**
Design of enclosure top	Center command point With recess for labeling plate With protective collar 4 additional holes (two-hand operation console) 8 additional premachined breaking points (two-hand operation console)	**A** **B** **C** **D** **E**
Color of enclosure top	Gray Yellow	**1** **2**
Example		**3SU1 8 0 1 – 0 A A 0 0 – 0 A A 2**

Accessories

Product versions		Article number
SIRIUS ACT pushbuttons and indicator lights		**3SU1** □□□ – □□□□□ – □□□□
Device type	Accessories	**9**
Material	Plastic, black Metal, shiny Metal, matte	**0** **5** **6**
Illumination	Non-illuminated Illuminated	**0** **1**
Type of accessory (labels, protection, actuator, enclosure)	e.g. 0AB = Insert label	□□□
Color	e.g. 10 = Black, 20 = Red	□□
Marking	e.g. 0AA = None 0AB = ON 0AT = EMERGENCY STOP	□□□
Ambient condition	Standard ATEX Zone 1-2: Intrinsic safety	**0** **2**
Example		**3SU1 9 0 0 – 0 A B 2 0 – 0 A B 0**

Note:

The Article No. schemes show an overview of product versions for better understanding of the logic behind the article numbers.

For your orders, please use the article numbers quoted in the selection and ordering data.

General data

2

Ordering notes for multi-unit packaging

SIRIUS ACT pushbuttons and indicator lights can also be ordered in various types of practical, environment-friendly multi-unit packaging.

Multi-unit packaging with order code X90

When ordering products in multi-unit packaging, the Article No. of the product concerned must be supplemented with **"–Z"** and, in addition, the order code **X90** must be specified.

Ordering example:
3SU1000-0AB20-0AA0-Z X90;
pack of 100


Examples of multi-unit packaging with order code X90

SIRIUS ACT pushbuttons and indicator lights	Multi-unit, quantity per package X90
Complete units (3SU11)	20
Compact units (3SU12)	
• Acoustic signaling devices, pushbuttons with extended stroke, potentiometers	50
Actuating and signaling elements (3SU10)	
• Pushbuttons, illuminated pushbuttons, indicator lights	100
• Stop switches, twin pushbuttons, mushroom pushbuttons 30/40 mm, EMERGENCY STOP mushroom pushbuttons 30/40 mm, toggle switches, selector switches, key-operated switches, ID key-operated switches, coordinate switches	50
• Mushroom pushbuttons 60 mm, EMERGENCY STOP mushroom pushbuttons 60 mm	40
Holders without module (3SU15)	100
Modules for actuators and indicators (3SU14)	
• Contact modules	150
• LED modules	50
Enclosures (3SU18)	
• Empty plastic enclosures	
- 3SU1801-0AA00-0AA2, 3SU1801-0AA00-0AB1	24
- 3SU1801-0AA00-0AC2	18
Accessories (3SU19)	
• Sealing plugs, label holders, EMERGENCY STOP backing plates, labeling plates for potentiometers, EMERGENCY STOP labeling plates for enclosures without recesses and without inscription, single frames, dust caps for key-operated switches, adapters for mounting on standard rails, protective collars for EMERGENCY STOP mushroom pushbuttons (40 mm, for 5 padlocks, yellow)	100
• Labeling plates	150

Multi-unit packaging with order code X05

When ordering products in multi-unit packaging, the Article No. of the product concerned must be supplemented with **"–Z"** and, in addition, the order code **X05** must be specified.

Ordering example:
3SU1500-0AA10-0AA0-Z X05;
pack of 5


Examples of multi-unit packaging with order code X05

SIRIUS ACT pushbuttons and indicator lights	Multi-unit, quantity per package X05
Holders without module (3SU15)	
• Plastic: 3SU1500-0AA10-0AA0	5
• Metal: 3SU1510-0AA10-0AA0	5
• Universal for plastic and metal: 3SU1550-0AA10-0AA0	5
Modules for actuators and indicators (3SU14)	
• Contact modules for front plate mounting	5
- Screw terminals: 3SU1400-1AA10-1BA0, 3SU1400-1AA10-1CA0	
- Spring-loaded terminals: 3SU1400-1AA10-3BA0, 3SU1400-1AA10-3CA0	
• LED modules for front plate mounting	5
- Screw terminals: 3SU1401-1BB00-1AA0, 3SU1401-1BB20-1AA0, 3SU1401-1BB30-1AA0, 3SU1401-1BB40-1AA0, 3SU1401-1BB50-1AA0, 3SU1401-1BB60-1AA0	
- Spring-loaded terminals: 3SU1401-1BB00-3AA0, 3SU1401-1BB20-3AA0, 3SU1401-1BB30-3AA0, 3SU1401-1BB40-3AA0, 3SU1401-1BB50-3AA0, 3SU1401-1BB60-3AA0	
• LED modules for floor mounting	5
- Screw terminals: 3SU1401-2BB00-1AA0, 3SU1401-2BB20-1AA0, 3SU1401-2BB30-1AA0, 3SU1401-2BB40-1AA0, 3SU1401-2BB50-1AA0, 3SU1401-2BB60-1AA0	
- Spring-loaded terminals: 3SU1401-2BB00-3AA0, 3SU1401-2BB20-3AA0, 3SU1401-2BB30-3AA0, 3SU1401-2BB40-3AA0, 3SU1401-2BB50-3AA0, 3SU1401-2BB60-3AA0	

Application

Environmental conditions

The pushbuttons and indicator lights are climate-proof (KTW 24) and suitable for standard industrial applications and operation in marine applications.

Simple electrical equipment

Non-illuminated actuators, contact modules, enclosures and special accessories can be classified as simple electrical equipment according to IEC 60079-11. This means that they may be used in intrinsically safe circuits in potentially explosive atmospheres. An overview of the devices and atmospheres can be found in Confirmation No. 3287.01.

Safety EMERGENCY STOP pushbuttons according to ISO 13850

For controls according to IEC 60204-1, the SIRIUS ACT mushroom pushbuttons are suitable for use as safety EMERGENCY STOP pushbuttons.

Safety circuits

Standard IEC 60947-5-1 requires positive opening.
This means that for the purpose of personal safety, the reliable opening of NC contacts in all safety circuits is expressly prescribed for the electrical equipment of machines and is designated according to IEC 60947-5-1 with the symbol (⊖).

PL e according to ISO 13849-1 can be attained with the EMERGENCY STOP mushroom pushbuttons if the corresponding fail-safe evaluation units are selected and correctly installed, e.g. the 3SK safety relays or matching units from the ASIsafe, SIMATIC or SINUMERIK product ranges.

Technical specifications

More information	
Industry Mall, see www.siemens.com/product?3SU1	Conversion tool, see www.siemens.com/conversion-tool
For configurator, see www.siemens.com/sirius-act/configurator	System Manual, see https://support.industry.siemens.com/cs/ww/en/view/107542462

Type		**3SU1..0-.AA 3SU1..0-.JA**	**3SU1..1-.AA 3SU1..1-.JA**	**3SU1..0-.AB 3SU1..0-.BB 3SU1..0-.CB 3SU1..0-.DB 3SU1..0-.JB**	**3SU1..1-.AB 3SU1..1-.BB 3SU1..1-.JB**	**3SU10.0-.FB**
Type of product		**Pushbuttons**				
Operating principle of the actuating element		Latching		Momentary contact		
Optional expansion of product by light source		No	Yes	No	Yes	No
Mechanical service life (operating cycles) typical		500 000		10 000 000	3 000 000	200 000
Switching frequency, maximum	1/h	1 800		3 600		
Shock resistance according to IEC 60068-2-27		Half-sine wave 50 *g* / 11 ms				
Vibration resistance according to IEC 60068-2-6		10 ... 500 Hz: 5 *g*				
Degree of protection IP		IP66, IP67, IP69 (IP69K)				IP65, IP66
Environmental category during operation according to IEC 60721		3M6, 3S2, 3B2, 3C3, 3K6 (with a relative air humidity of 10 ... 95%)				
Ambient temperature						
• During operation	°C	-25 … +70				
• During storage	°C	-40 … +80				

General data

Type		3SU1.00-.AA 3SU1.00-.BA 3SU1.00-.CA 3SU1.50-.AA 3SU1.50-.BA 3SU1.50-.CA	3SU1.50-.EA	3SU1.01-.AA 3SU1.01-.BA 3SU1.51-.AA 3SU1.51-.BA 3SU1.51-.CA	3SU1.00-.AD 3SU1.00-.BD 3SU1.00-.CD 3SU1.50-.AD 3SU1.50-.BD 3SU1.50-.CD	3SU1.50-.ED	3SU1.01-.AD 3SU1.01-.BD
Type of product		**Mushroom pushbuttons**					
Operating principle of the actuating element		Latching			Momentary contact		
Optional expansion of product by light source		No		Yes	No		Yes
Mechanical service life (operating cycles) typical		500 000	300 000	500 000	10 000 000	300 000	3 000 000
Switching frequency, maximum	1/h	1 800			3 600	1 800	3 600
Shock resistance according to IEC 60068-2-27		Half-sine wave 50 *g* / 11 ms					
Vibration resistance according to IEC 60068-2-6		10 ... 500 Hz: 5 *g*					
Degree of protection IP		IP66, IP67, IP69 (IP69K)	IP65, IP67, IP69 (IP69K)	IP66, IP67, IP69 (IP69K)		IP65, IP67, IP69 (IP69K)	IP66, IP67, IP69 (IP69K)
Environmental category during operation according to IEC 60721		3M6, 3S2, 3B2, 3C3, 3K6 (with a relative air humidity of 10 ... 95%)					
Ambient temperature							
• During operation	°C	-25 … +70					
• During storage	°C	-40 … +80					

Type		3SU1...-.J 3SU1...-.H 3SU1...-.G
Type of product		**EMERGENCY STOP mushroom pushbuttons**
Mechanical service life (operating cycles)		300 000
Switching frequency, maximum	1/h	600
Shock resistance according to IEC 60068-2-27		Half-sine wave 50 *g* / 11 ms
Vibration resistance according to IEC 60068-2-6		10 ... 500 Hz: 5 *g*
Degree of protection IP		IP66, IP67, IP69 (IP69K)
Environmental category during operation according to IEC 60721		3M6, 3S2, 3B2, 3C3, 3K6 (with a relative air humidity of 10 ... 95%)
Ambient temperature		
• During operation	°C	-25 … +70
• During storage	°C	-40 … +80

Type		3SU1.5.-2A 3SU1.5.-2B 3SU1.5.-2C 3SU1.5.-2D 3SU1.5.-2E	3SU1.0.-2A 3SU1.0.-2B 3SU1.0.-2C	3SU1.0.-3E 3SU1.5.-3E	3SU1.0.-4B 3SU1.0.-4C 3SU1.0.-4D 3SU1.0.-4F 3SU1.0.-4G 3SU1.0.-4H 3SU1.0.-4J 3SU1.0.-4L 3SU1.0.-5B 3SU1.0.-5H 3SU1.0.-5P 3SU1.0.-5Q 3SU1.0.-5R 3SU1.0.-5S 3SU1.0.-5T 3SU1.0.-5X	3SU1...-4B 3SU1...-4C 3SU1...-4D 3SU1...-4F 3SU1...-4G 3SU1...-4H 3SU1...-4J 3SU1...-4L 3SU1...-5B 3SU1...-5H 3SU1...-5K 3SU1...-5L 3SU1...-5P 3SU1...-5Q 3SU1...-5R 3SU1...-5S 3SU1...-5T 3SU1...-5X	3SU1.0.-7A 3SU1.0.-7B 3SU1.5.-7A 3SU1.5.-7B
Type of product		**Selector switches**		**Toggle switches**	**Key-operated switches**		**Coordinate switches**
Mechanical service life (operating cycles)		300 000	1 000 000			300 000	250 000
Switching frequency, maximum	1/h	1 800					3 600
Shock resistance according to IEC 60068-2-27		Half-sine wave 50 *g* / 11 ms					
Vibration resistance according to IEC 60068-2-6		10 ... 500 Hz: 5 *g*					
Degree of protection IP		IP66, IP67, IP69 (IP69K)		IP66, IP67, IP69 (IP69K)	IP66, IP67, IP69 (IP69K)		IP65, IP67
Ambient temperature							
• During operation	°C	-25 … +70					
• During storage	°C	-40 … +80					

Type		3SU1400-.AA10-1.A0	3SU1400-1AA10-1GA0, 3SU1400-1AA10-1RA0	3SU1400-1AA10-1HA0	3SU1400-.AA10-3.A0	3SU1400-1AA10-3HA0	3SU1400-3AA10-5.A0
Type of product		**Contact modules**					
Rated insulation voltage	V	500					
Pollution degree		3					
Impulse withstand voltage, rated value	kV	6					
Operational voltage type		AC/DC					
Operational voltage, rated value							
• At AC at 50 Hz	V	5 … 500					
• At DC	V	5 … 500					
Thermal current	A	10					
Operational current, rated value							
• At AC-12							
- At 24 V	A	10					
- At 230 V	A	8					
• At AC-15							
- At 24 V	A	6					
- At 230 V	A	6	4		6		
- At 400 V	A	3					
- At 500 V	A	1.4					
• At DC-12							
- At 24 V	A	10					
- At 48 V	A	5					
- At 110 V	A	2.5					
- At 230 V	A	1		0.3	1	0.3	1
- At 400 V	A	0.3					
- At 500 V	A	0.3		0.2	0.3		
• At DC-13							
- At 24 V	A	3					
- At 48 V	A	1.5					
- At 110 V	A	0.7		0.6	0.7	0.6	0.7
- At 230 V	A	0.3					
- At 400 V	A	0.1					
- At 500 V	A	0.1					
Contact reliability		One contact failure per 100 million switching operations (17 V, 5 mA), one contact failure per 10 million switching operations (5 V, 1 mA)					
Mechanical service life (operating cycles) typical		10 000 000					
Switching frequency, maximum	1/s	3 600					
Fuse link version required for short-circuit protection of the auxiliary switch with type of coordination 1		gG / Dz 10 A, quick-response / Dz 10 A					
Continuous current of miniature circuit breaker C characteristic	A	10					
Vibration resistance according to IEC 60068-2-6		10 ... 500 Hz: 5 *g*					
Shock resistance according to IEC 60068-2-27		Half-sine wave 50 *g* / 11 ms					
Climate class during operation according to IEC 60721		3M6, 3S2, 3B2, 3C3, 3K6 (with a relative air humidity of 10 ... 95%, no condensation permitted in operation)					
Ambient temperature							
• During operation	°C	-25 … +70					
• During storage	°C	-40 … +80					
Degree of protection IP		See product data sheet					
Type of electrical connection		**Screw terminals**			**Spring-loaded terminals**		**Socket terminals (THT)**
Type of connectable conductor cross-sections							
• Solid with end sleeve	mm^2	2 x (0.5 ... 0.75)			--		
• Solid without end sleeve	mm^2	2 x (1.0 ... 1.5)			2 x (0.25 ... 1.5)		--
• Finely stranded with end sleeve	mm^2	2 x (0.5 ... 1.5)			2 x (0.25 ... 0.75)		--
• Finely stranded without end sleeve	mm^2	2 x (1.0 ... 1.5)			2 x (0.25 ... 1.5)		--
• For AWG cables		2 x (18 ... 14)			2 x (24 ... 16)		--
Tightening torque for screw terminals	Nm	0.8 ... 0.9			--		

General data

Type		3SU1401-.....-1	3SU1401-.....-3	3SU1401-.....-5
Type of product		LED module		
Light source integrated in product		Yes		
Type of light source		LED		
Rated insulation voltage	V	320		
Pollution degree		3		
Impulse withstand voltage, rated value	kV	4		
Relative positive tolerance of the operational voltage	%	20		
Relative negative tolerance of the operational voltage	%	20		
Operating time typical	h	100 000		
Vibration resistance according to IEC 60068-2-6		10 ... 500 Hz: 5 *g*		
Shock resistance according to IEC 60068-2-27		Half-sine wave 50 *g* / 11 ms		
Environmental category during operation according to IEC 60721		3M6, 3S2, 3B2, 3K6 (with a relative air humidity of 10 ... 95%, no condensation permitted in operation)		
Ambient temperature				
• During operation	°C	-25 … +70		
• During storage	°C	-40 … +80		
Degree of protection IP of the terminal		See product data sheet		
Type of electrical connection		**Screw terminals**	**Spring-loaded terminals**	**Socket terminals (THT)**

Type		3SU1400-1GC10-1AA0	3SU1400-1GD10-1AA0
Type of product		Electronic modules for ID key-operated switches	
Communication/protocol			
Protocol is supported by IO-Link protocol		No	Yes
Product function		Group ID 24 V DC	IO-Link 24 V DC
IO-Link transfer rate		--	COM2 (38.4 kBaud)
Point-to-point cycle time between the master and the IO-Link device, minimum	ms	--	10
Type of power supply via IO-Link master		--	Yes
Data volume			
• Of the address area of the inputs with cyclic transfer total	bytes	--	2
• Of the address area of the outputs with cyclic transfer total	bytes	--	0
Number of NO contacts		5	
General data			
Impulse withstand voltage, rated value	kV	0.8	
Rated insulation voltage	V	30	
Pollution degree		3	
Type of voltage			
• Of operational voltage		DC	
• Of input voltage		DC	
Operational voltage			
• At DC, rated value	V	24	
• Rated value	V	18 … 30	
Current consumed, maximum	mA	49	
Ambient temperature			
• During operation	°C	-25 … +70	
• During storage	°C	-40 … +80	
Degree of protection IP		See product data sheet	
Touch protection against electric shock		Finger-safe	
Connections			
Type of electrical connection		**Screw terminals**	
Connectable conductor cross-section for auxiliary contacts			
• Solid			
- With end sleeves	mm²	1 x (0.2 ... 2.5), 2 x (0.2 ... 0.75)	
- Without end sleeves	mm²	1 x (0.2 ... 2.5), 2 x (0.2 ... 0.75)	
• Finely stranded			
- With end sleeves	mm²	1 x (0.2 ... 2.5), 2 x (0.25 .. 0.75)	
- Without end sleeves	mm²	1 x (0.2 ... 2.5), 2 x (0.2 ... 0.75)	
AWG number as coded connectable conductor cross-section		26 … 14	
Tightening torque for screw terminals	Nm	0.35 … 0.4	

Type		3SU1400-1LK10-1AA1	3SU1400-1LK10-3AA1	3SU1400-1LL10-1BA1	3SU1400-1LL10-3BA1
Product designation		Interface module		Fail-safe interface module	
Operational voltage type		DC			
Supply voltage at DC rated value	V	24			
Current consumed, maximum	mA	150			
Product function at interface 1 PROFINET IO-Device		Yes			
Type of interface Fast Ethernet interface		Yes			
Type of interface 1 RJ45 (Ethernet) interface		Yes			
Number of ports at the interface 1		1			
Number of modules per rack, maximum		20			
Number of digital outputs		0		1	
Number of digital inputs		0		4	
Software version required for STEP 7 in the TIA Portal		Integrated in the TIA Portal, version 14 SP1 or higher (HSP for V13 and V14)			
Safety integrity level (SIL) according to IEC 62061		--		SIL 3	
Performance level (PL) according to ISO 13849-1		--		e	
Ambient temperature					
• During operation	°C	60 … -25			
• During storage	°C	80 … -40			
Degree of protection IP		See product data sheet			
Connectable conductor cross-section					
• Solid					
- With end sleeves	mm^2	0.2 ... 2.5			
• Finely stranded					
- With end sleeves	mm^2	0.25 … 2.5			
- Without end sleeves	mm^2	0.2 ... 2.5			

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Selection and ordering data

Multi-unit packaging, see page 2/360.	Version of actuating element Front ring version	Operating principle Unlatching method	Color, marking	Article No.	Weight kg
Pushbuttons					
 3SU1000-0AB20-0AD0	**Pushbuttons with flat button** Standard	Momentary contact	Black	**3SU1000-0AB10-0AA0**	0.015
			Black, "O"	**3SU1000-0AB10-0AD0**	0.019
			Red	**3SU1000-0AB20-0AA0**	0.015
			Red, "O"	**3SU1000-0AB20-0AD0**	0.019
			Yellow	**3SU1000-0AB30-0AA0**	0.015
			Green	**3SU1000-0AB40-0AA0**	0.015
			Green, "I"	**3SU1000-0AB40-0AC0**	0.019
			Blue	**3SU1000-0AB50-0AA0**	0.015
			Blue, "R"	**3SU1000-0AB50-0AR0**	0.017
			White	**3SU1000-0AB60-0AA0**	0.015
			White, "I"	**3SU1000-0AB60-0AC0**	0.019
			Clear	**3SU1000-0AB70-0AA0**	0.015
			Gray	**3SU1000-0AB80-0AA0**	0.015
 3SU1000-0AA30-0AA0		Latching Push to unlatch	Black	**3SU1000-0AA10-0AA0**	0.014
			Red	**3SU1000-0AA20-0AA0**	0.014
			Yellow	**3SU1000-0AA30-0AA0**	0.014
			Green	**3SU1000-0AA40-0AA0**	0.014
			Blue	**3SU1000-0AA50-0AA0**	0.017
			White	**3SU1000-0AA60-0AA0**	0.014
 3SU1000-0BB30-0AA0	**Pushbuttons with raised button** Standard	Momentary contact	Black	**3SU1000-0BB10-0AA0**	0.016
			Red	**3SU1000-0BB20-0AA0**	0.016
			Yellow	**3SU1000-0BB30-0AA0**	0.019
			Green	**3SU1000-0BB40-0AA0**	0.016
			Blue	**3SU1000-0BB50-0AA0**	0.017
			White	**3SU1000-0BB60-0AA0**	0.019
 3SU1000-0CB40-0AA0	**Pushbuttons with flat button** Raised	Momentary contact	Black	**3SU1000-0CB10-0AA0**	0.018
			Red	**3SU1000-0CB20-0AA0**	0.021
			Yellow	**3SU1000-0CB30-0AA0**	0.021
			Green	**3SU1000-0CB40-0AA0**	0.020
			Blue	**3SU1000-0CB50-0AA0**	0.019
			White	**3SU1000-0CB60-0AA0**	0.018
 3SU1000-0DB50-0AA0	**Pushbuttons with flat button** Raised, castellated	Momentary contact	Black	**3SU1000-0DB10-0AA0**	0.020
			Red	**3SU1000-0DB20-0AA0**	0.021
			Yellow	**3SU1000-0DB30-0AA0**	0.021
			Green	**3SU1000-0DB40-0AA0**	0.023
			Blue	**3SU1000-0DB50-0AA0**	0.021
			White	**3SU1000-0DB60-0AA0**	0.021

* You can order this quantity or a multiple thereof.

Multi-unit packaging, see page 2/360.

Version of actuating element Front ring version	Operating principle Unlatching method	Color	Article No.	Weight kg
Pushbuttons				
 3SU1001-0AB40-0AA0 **Illuminated pushbuttons with flat button** Standard	Momentary contact	Amber	**3SU1001-0AB00-0AA0**	0.015
		Red	**3SU1001-0AB20-0AA0**	0.015
		Yellow	**3SU1001-0AB30-0AA0**	0.015
		Green	**3SU1001-0AB40-0AA0**	0.015
		Blue	**3SU1001-0AB50-0AA0**	0.024
		White	**3SU1001-0AB60-0AA0**	0.014
		Clear	**3SU1001-0AB70-0AA0**	0.015
 3SU1001-0AA20-0AA0	Latching Push to unlatch	Red	**3SU1001-0AA20-0AA0**	0.014
		Yellow	**3SU1001-0AA30-0AA0**	0.014
		Green	**3SU1001-0AA40-0AA0**	0.014
		Blue	**3SU1001-0AA50-0AA0**	0.014
		White	**3SU1001-0AA60-0AA0**	0.014
		Clear	**3SU1001-0AA70-0AA0**	
 3SU1001-0BB70-0AA0 **Illuminated pushbuttons with raised button** Standard	Momentary contact	Red	**3SU1001-0BB20-0AA0**	0.016
		Yellow	**3SU1001-0BB30-0AA0**	0.016
		Green	**3SU1001-0BB40-0AA0**	0.016
		Blue	**3SU1001-0BB50-0AA0**	0.018
		Clear	**3SU1001-0BB70-0AA0**	0.025
 3SU1001-0DB50-0AA0 **Illuminated pushbuttons with flat button** Raised, castellated	Momentary contact	Blue	**3SU1001-0DB50-0AA0**	0.021
 3SU1000-0HC10-0AA0 **Stop pushbuttons** Standard	Momentary contact, latching by pressing in and turning to the right Rotate to unlatch to the left	Black	**3SU1000-0HC10-0AA0**	0.023
		Red	**3SU1000-0HC20-0AA0**	0.024

*** You can order this quantity or a multiple thereof.**

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Selection and ordering data

Multi-unit packaging, see page 2/360.

Twin pushbuttons

Version of actuating element	Operating principle	Color	Marking Symbol No.	Article No.	Weight kg
 3SU1000-3AB66-0AL0 **Twin pushbuttons** flat, flat	Momentary contact	Green/Red	-- "I"/"O"	**3SU1000-3AB42-0AA0** **3SU1000-3AB42-0AK0**	0.023 0.026
		White/Black	-- "I"/"O"	**3SU1000-3AB61-0AA0** **3SU1000-3AB61-0AK0**	0.023 0.027
		White/White	-- "–"/"+" Arrows, hor. Arrows, vert.	**3SU1000-3AB66-0AA0** **3SU1000-3AB66-0AL0** **3SU1000-3AB66-0AM0** **3SU1000-3AB66-0AN0**	0.024 0.026 0.027 0.025
		Black/Black	-- ○ ○ 5264/5265 (IEC 60417)	**3SU1000-3AB11-0AA0** **3SU1000-3AB11-0AQ0**	0.023 0.023
 3SU1000-3BB42-0AK0 **Twin pushbuttons** flat, raised	Momentary contact	Green/Red	-- "I"/"O"	**3SU1000-3BB42-0AA0** **3SU1000-3BB42-0AK0**	0.025 0.025
		White/Black	-- "I"/"O"	**3SU1000-3BB61-0AA0** **3SU1000-3BB61-0AK0**	0.026 0.030
 3SU1001-3AB42-0AN0 **Twin pushbuttons** flat, flat, illuminated	Momentary contact	Green/Red	-- "I"/"O" Arrows, vert.	**3SU1001-3AB42-0AA0** **3SU1001-3AB42-0AK0** **3SU1001-3AB42-0AN0**	0.022 0.024 0.026
		White/Black	-- "I"/"O"	**3SU1001-3AB61-0AA0** **3SU1001-3AB61-0AK0**	0.025 0.025
		White/White	-- "–"/"+" Arrows, vert. Symbols "Circular saw blade"/ "Tilt tipper"	**3SU1001-3AB66-0AA0** **3SU1001-3AB66-0AL0** **3SU1001-3AB66-0AN0** **3SU1001-3AB66-0AP0**	0.026 0.025 0.024 0.021
 3SU1001-3BB61-0AK0 **Twin pushbuttons** flat, raised, illuminated	Momentary contact	Green/Red	-- "I"/"O"	**3SU1001-3BB42-0AA0** **3SU1001-3BB42-0AK0**	0.025 0.025
		White/Black	-- "I"/"O"	**3SU1001-3BB61-0AA0** **3SU1001-3BB61-0AK0**	0.027 0.025

Selection and ordering data

Quadruple pushbuttons

Version of actuating element	Operating principle	Color	Marking	Article No.	Weight kg
 3SU1000-3FB11-0AU0 **Quadruple pushbuttons** flat	Momentary contact	Black	-- Arrows, vert.; arrows, hor.	**3SU1000-3FB11-0AA0** **3SU1000-3FB11-0AU0**	0.045 0.045

* You can order this quantity or a multiple thereof.

Selection and ordering data

Multi-unit packaging, see page 2/360.

Version of actuating element	Operating principle Unlatching method	Color, marking	Article No.	Weight kg
Mushroom pushbuttons				
 3SU1000-1AD20-0AA0 **Mushroom pushbuttons** 30 mm diameter, 2 positions	Momentary contact	Black Red Yellow Green	**3SU1000-1AD10-0AA0** **3SU1000-1AD20-0AA0** **3SU1000-1AD30-0AA0** **3SU1000-1AD40-0AA0**	0.024 0.018 0.024 0.021
	Latching Pull to unlatch	Black Red Yellow	**3SU1000-1AA10-0AA0** **3SU1000-1AA20-0AA0** **3SU1000-1AA30-0AA0**	0.023 0.023 0.027
 3SU1000-1BD40-0AA0 **Mushroom pushbuttons** 40 mm diameter, 2 positions	Momentary contact	Black Red Yellow Green	**3SU1000-1BD10-0AA0** **3SU1000-1BD20-0AA0** **3SU1000-1BD30-0AA0** **3SU1000-1BD40-0AA0**	0.025 0.026 0.025 0.025
	Latching Pull to unlatch	Black Red Red "O" Yellow Green	**3SU1000-1BA10-0AA0** **3SU1000-1BA20-0AA0** **3SU1000-1BA20-0AD0** **3SU1000-1BA30-0AA0** **3SU1000-1BA40-0AA0**	0.027 0.027 0.029 0.027 0.028
 3SU1000-1CD10-0AA0 **Mushroom pushbuttons** 60 mm diameter, 2 positions	Momentary contact	Black Red Yellow Green	**3SU1000-1CD10-0AA0** **3SU1000-1CD20-0AA0** **3SU1000-1CD30-0AA0** **3SU1000-1CD40-0AA0**	0.029 0.033 0.035 0.032
	Latching Pull to unlatch	Black Red	**3SU1000-1CA10-0AA0** **3SU1000-1CA20-0AA0**	0.035 0.035
 3SU1001-1AD30-0AA0 **Mushroom pushbuttons** 30 mm diameter, 2 positions, illuminated	Momentary contact	Red Yellow Green Blue White Clear	**3SU1001-1AD20-0AA0** **3SU1001-1AD30-0AA0** **3SU1001-1AD40-0AA0** **3SU1001-1AD50-0AA0** **3SU1001-1AD60-0AA0** **3SU1001-1AD70-0AA0**	0.024 0.021 0.021 0.021 0.021 0.025
	Latching Pull to unlatch	Red Yellow Green Blue Clear	**3SU1001-1AA20-0AA0** **3SU1001-1AA30-0AA0** **3SU1001-1AA40-0AA0** **3SU1001-1AA50-0AA0** **3SU1001-1AA70-0AA0**	0.030 0.027 0.026 0.025 0.025
 3SU1001-1BA50-0AA0 **Mushroom pushbuttons** 40 mm diameter, 2 positions, illuminated	Momentary contact	Yellow Green White Clear	**3SU1001-1BD30-0AA0** **3SU1001-1BD40-0AA0** **3SU1001-1BD60-0AA0** **3SU1001-1BD70-0AA0**	0.025 0.025 0.024 0.026
	Latching Pull to unlatch	Red Yellow Green Blue Clear	**3SU1001-1BA20-0AA0** **3SU1001-1BA30-0AA0** **3SU1001-1BA40-0AA0** **3SU1001-1BA50-0AA0** **3SU1001-1BA70-0AA0**	0.027 0.028 0.028 0.028 0.028
Mushroom pushbuttons 40 mm diameter, 2 positions	With positive latching Rotate to unlatch	Black Blue	**3SU1000-1HB10-0AA0** **3SU1000-1HB50-0AA0**	0.046
 3SU1000-1HG10-0AA0 **Mushroom pushbuttons** 40 mm diameter, 2 positions RONIS 455	With positive latching Key-operated release	Black	**3SU1000-1HG10-0AA0**	0.072
Mushroom pushbuttons, 60 mm diameter, 2 positions	With positive latching Rotate to unlatch	Black	**3SU1000-1JB10-0AA0**	0.059

* You can order this quantity or a multiple thereof.

Selection and ordering data

Multi-unit packaging, see page 2/360.	Version of actuating element	Outer diameter of mush-room	Color	Article No.	Weight
		mm			kg
EMERGENCY STOP mushroom pushbuttons, acc. to ISO 13850 and IEC 60947-5-5					
	With pull to unlatch				
 3SU1000-1HA20-0AA0	With positive latching, 2 positions	40	Red	**3SU1000-1HA20-0AA0**	0.049
	With rotate to unlatch				
 3SU1000-1GB20-0AA0	With positive latching, 2 positions	33.8	Red	**3SU1000-1GB20-0AA0**	0.042
 3SU1000-1HB20-0AA0		40	Red	**3SU1000-1HB20-0AA0**	0.046
 3SU1000-1JB20-0AA0		60	Red	**3SU1000-1JB20-0AA0**	0.054
 3SU1000-1LB20-0AA0	With latching, 2 positions	40	Red	**3SU1000-1LB20-0AA0**	0.038
	With rotate to unlatch, can be illuminated				
 3SU1001-1HB20-0AA0	With positive latching, 2 positions	33.8	Red	**3SU1001-1GB20-0AA0**	0.045
		40	Red	**3SU1001-1HB20-0AA0**	0.052
		60	Red	**3SU1001-1JB20-0AA0**	0.060

* You can order this quantity or a multiple thereof.

Multi-unit packaging, see page 2/360.	Version of actuating element	Outer diameter of mushroom	Make of lock	Color	Number of keys	Article No.	Weight
		mm					kg
EMERGENCY STOP mushroom pushbuttons, acc. to ISO 13850 and IEC 60947-5-5							
	With key-operated release						
 3SU1000-1HF20-0AA0	With positive latching, 2 positions	40	RONIS SB30	Red	2	**3SU1000-1HF20-0AA0**	0.071
			RONIS 455	Red	2	**3SU1000-1HG20-0AA0**	
			BKS S1	Red	2	**3SU1000-1HK20-0AA0**	0.100
 3SU1000-1HK20-0AA0			BKS E7	Red	0	**3SU1000-1HM20-0AA0**	0.096
			BKS E9	Red	0	**3SU1000-1HN20-0AA0**	0.095
			O.M.R. 73037	Red	2	**3SU1000-1HQ20-0AA0**	0.115
 3SU1000-1HQ20-0AA0							
			Siemens, SSG10	Red	2	**3SU1000-1HR20-0AA0**	0.109
			Siemens, SSP9	Red	2	**3SU1000-1HS20-0AA0**	0.111
			Siemens, SMS1	Red	2	**3SU1000-1HT20-0AA0**	0.105
 3SU1000-1HR20-0AA0							

Selection and ordering data

Multi-unit packaging, see page 2/360.	Number of switching positions	Number of command points	Color of actuating element	Operating principle of the actuating element	Article No.	Weight
						kg
Toggle switches						
 3SU1000-3EA10-0AA0	2	1	Black	Latching	**3SU1000-3EA10-0AA0**	0.017
				Momentary contact, reset from above	**3SU1000-3EC10-0AA0**	0.020

*** You can order this quantity or a multiple thereof.**

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Selection and ordering data

Multi-unit packaging, see page 2/360.

Selector switches

2 switch positions, can be illuminated

Version of actuating element	Operating principle	Color	Article No.	Weight kg
Selector, short black actuator	Momentary contact, 45° (10:30/12 o'clock), reset from center to left 	Black	**3SU1002-2BC10-0AA0**	0.020
		Red	**3SU1002-2BC20-0AA0**	0.023
		Yellow	**3SU1002-2BC30-0AA0**	0.023
		Green	**3SU1002-2BC40-0AA0**	0.020
		Blue	**3SU1002-2BC50-0AA0**	0.020
		White	**3SU1002-2BC60-0AA0**	0.023
	Latching, 90° (10:30/1:30 o'clock) 	Black	**3SU1002-2BF10-0AA0**	0.032
		Red	**3SU1002-2BF20-0AA0**	0.020
		Yellow	**3SU1002-2BF30-0AA0**	0.120
		Green	**3SU1002-2BF40-0AA0**	0.020
		Blue	**3SU1002-2BF50-0AA0**	0.022
		White	**3SU1002-2BF60-0AA0**	0.023
Selector, long black actuator	Latching, 90° (10:30/1:30 o'clock) 	Black	**3SU1002-2CF10-0AA0**	
		Red	**3SU1002-2CF20-0AA0**	0.026
		White	**3SU1002-2CF60-0AA0**	0.023
Rotary knob	Latching, 90° (10:30/1:30 o'clock) 	Red	**3SU1002-2AF20-0AA0**	0.030
		White	**3SU1002-2AF60-0AA0**	0.028


3SU1002-2BC40-0AA0


3SU1002-2BF30-0AA0


3SU1002-2CF20-0AA0


3SU1002-2AF20-0AA0

*** You can order this quantity or a multiple thereof.**

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Multi-unit packaging, see page 2/360.	Version of actuating element	Operating principle	Color	Article No.	Weight kg
Selector switches					
	3 switch positions, can be illuminated				
 3SU1002-2BM20-0AA0	Selector, short black actuator	Momentary contact, 2x45° (10:30/12/1:30 o'clock), reset from left + right 	Black Red Yellow Green Blue White	**3SU1002-2BM10-0AA0** **3SU1002-2BM20-0AA0** **3SU1002-2BM30-0AA0** **3SU1002-2BM40-0AA0** **3SU1002-2BM50-0AA0** **3SU1002-2BM60-0AA0**	0.022 0.037 0.020 0.020 0.024 0.022
 3SU1002-2BL60-0AA0		Latching, 2x45° (10:30/12/1:30 o'clock) 	Black Red Yellow Green Blue White	**3SU1002-2BL10-0AA0** **3SU1002-2BL20-0AA0** **3SU1002-2BL30-0AA0** **3SU1002-2BL40-0AA0** **3SU1002-2BL50-0AA0** **3SU1002-2BL60-0AA0**	0.022 0.024 0.023 0.023 0.024 0.020
 3SU1002-2BP50-0AA0		Momentary contact/latching, 2x45° (10:30/12/1:30 o'clock), reset from the left, latching to the right 	Black Red Yellow Green Blue White	**3SU1002-2BP10-0AA0** **3SU1002-2BP20-0AA0** **3SU1002-2BP30-0AA0** **3SU1002-2BP40-0AA0** **3SU1002-2BP50-0AA0** **3SU1002-2BP60-0AA0**	0.022 0.023 0.025 0.023 0.020
 3SU1002-2BN30-0AA0		Latching/momentary contact, 2x45° (10:30/12/1:30 o'clock), reset from the right, latching to the left 	Black Red Yellow Green Blue White	**3SU1002-2BN10-0AA0** **3SU1002-2BN20-0AA0** **3SU1002-2BN30-0AA0** **3SU1002-2BN40-0AA0** **3SU1002-2BN50-0AA0** **3SU1002-2BN60-0AA0**	0.020 0.025 0.025 0.020 0.027 0.022
	4 switch positions				
 3SU1000-2AS60-0AA0	Rotary knob	Latching, 4x90° (3/6/9/12 o'clock) 	White	**3SU1000-2AS60-0AA0**	0.027

*** You can order this quantity or a multiple thereof.**

2

Selection and ordering data

Multi-unit packaging, see page 2/360.

Operating principle	Make of lock	Switch position for key removal	Number of keys	Article No.	Weight kg
Key-operated switches					
2 switch positions					
Momentary contact, 45° (10:30/12 o'clock), reset from center to left 	RONIS, SB30	O	2	**3SU1000-4BC01-0AA0**	0.020
	RONIS, 455	O	2	**3SU1000-4CC01-0AA0**	0.020
	O.M.R. 73037, red	O	2	**3SU1000-4FC01-0AA0**	0.020
	O.M.R. 73038, light blue	O	2	**3SU1000-4GC01-0AA0**	0.020
	O.M.R. 73034, black	O	2	**3SU1000-4HC01-0AA0**	0.020
 3SU1000-4JC01-0AA0	O.M.R. 73033, yellow	O	2	**3SU1000-4JC01-0AA0**	0.091
	Siemens, SSG10	O	2	**3SU1000-5BC01-0AA0**	0.020
	Siemens, LSG1	O	2	**3SU1000-5HC01-0AA0**	0.138
	BKS, S1	O	2	**3SU1000-5PC01-0AA0**	0.020
Latching, 90° (10:30/ 1:30 o'clock) 	RONIS, SB30	O O+I I	2 2 2	**3SU1000-4BF01-0AA0** **3SU1000-4BF11-0AA0** **3SU1000-4BF21-0AA0**	0.055 0.055 0.180
 3SU1000-4BF11-0AA0	RONIS, 455	O O+I	2 2	**3SU1000-4CF01-0AA0** **3SU1000-4CF11-0AA0**	0.020 0.020
	RONIS, 421	O+I	2	**3SU1000-4DF11-0AA0**	0.056
	O.M.R. 73037, red	O O+I	2 2	**3SU1000-4FF01-0AA0** **3SU1000-4FF11-0AA0**	0.020 0.020
	O.M.R. 73038, light blue	O O+I	2 2	**3SU1000-4GF01-0AA0** **3SU1000-4GF11-0AA0**	0.020 0.020
	O.M.R. 73034, black	O O+I I	2 2 2	**3SU1000-4HF01-0AA0** **3SU1000-4HF11-0AA0** **3SU1000-4HF21-0AA0**	0.020 0.020 0.020
 3SU1000-4GF11-0AA0	O.M.R. 73033, yellow	O O+I I	2 2 2	**3SU1000-4JF01-0AA0** **3SU1000-4JF11-0AA0** **3SU1000-4JF21-0AA0**	0.020 0.020 0.020
	Siemens, SSG10	O O+I I	2 2 2	**3SU1000-5BF01-0AA0** **3SU1000-5BF11-0AA0** **3SU1000-5BF21-0AA0**	0.136 0.020 0.020
	Siemens, SSG10 with key monitoring	O	2	**3SU1000-5JF01-0AA0**	0.133
	Siemens, LSG1	O O+I	2 2	**3SU1000-5HF01-0AA0** **3SU1000-5HF11-0AA0**	0.020 0.020
 3SU1000-5BF11-0AA0					
	BKS, S1	O O+I I	2 2 2	**3SU1000-5PF01-0AA0** **3SU1000-5PF11-0AA0** **3SU1000-5PF21-0AA0**	0.020 0.020 0.020
	BKS, E1	O O+I	0 0	**3SU1000-5QF01-0AA0** **3SU1000-5QF11-0AA0**	0.020 0.020
	BKS, E2	O O+I	0 0	**3SU1000-5RF01-0AA0** **3SU1000-5RF11-0AA0**	0.020 0.020
	BKS, E7	O O+I	0 0	**3SU1000-5SF01-0AA0** **3SU1000-5SF11-0AA0**	0.020 0.020
 3SU1000-5PF11-0AA0	BKS, E9	O O+I	0 0	**3SU1000-5TF01-0AA0** **3SU1000-5TF11-0AA0**	0.020 0.020

* You can order this quantity or a multiple thereof.

Multi-unit packaging, see page 2/360.

Key-operated switches

Operating principle	Make of lock	Switch position for key removal	Number of keys	Article No.	Weight kg
3 switch positions					
Momentary contact, 2x45° (10:30/12/ 1:30 o'clock), reset from left + right 	RONIS, SB30	O	2	**3SU1000-4BM01-0AA0**	0.020
	O.M.R. 73037, red	O	2	**3SU1000-4FM01-0AA0**	0.020
	O.M.R. 73034, black	O	2	**3SU1000-4HM01-0AA0**	0.090
	Siemens, SSG10	O	2	**3SU1000-5BM01-0AA0**	0.020
	BKS, S1	O	2	**3SU1000-5PM01-0AA0**	0.020
Latching, 2x45° (10:30/12/ 1:30 o'clock) 	RONIS, SB30	O	2	**3SU1000-4BL01-0AA0**	0.020
		I+O+II	2	**3SU1000-4BL11-0AA0**	0.020
		I	2	**3SU1000-4BL21-0AA0**	0.020
		II	2	**3SU1000-4BL31-0AA0**	0.055
		I+II	2	**3SU1000-4BL41-0AA0**	0.054
		O+I	2	**3SU1000-4BL51-0AA0**	0.057
	RONIS, 455	O	2	**3SU1000-4CL01-0AA0**	0.058
		I+O+II	2	**3SU1000-4CL11-0AA0**	0.056
	O.M.R. 73037, red	O	2	**3SU1000-4FL01-0AA0**	0.020
		O+I	2	**3SU1000-4FL51-0AA0**	0.020
	O.M.R. 73038, light blue	O	2	**3SU1000-4GL01-0AA0**	0.091
		I+O+II	2	**3SU1000-4GL11-0AA0**	0.020
	O.M.R. 73034, black	O	2	**3SU1000-4HL01-0AA0**	0.093
		I+O+II	2	**3SU1000-4HL11-0AA0**	0.091
	O.M.R. 73033, yellow	I+O+II	2	**3SU1000-4JL11-0AA0**	0.020
	Siemens, SSG10	O	2	**3SU1000-5BL01-0AA0**	0.020
		I+O+II	2	**3SU1000-5BL11-0AA0**	0.020
		I	2	**3SU1000-5BL21-0AA0**	0.139
		II	2	**3SU1000-5BL31-0AA0**	0.137
		I+II	2	**3SU1000-5BL41-0AA0**	0.020
		O+I	2	**3SU1000-5BL51-0AA0**	0.020
	Siemens, SSG10 with key monitoring	O	2	**3SU1000-5JL01-0AA0**	0.132
	BKS, S1	O	2	**3SU1000-5PL01-0AA0**	0.134
		I+O+II	2	**3SU1000-5PL11-0AA0**	0.020
		I	2	**3SU1000-5PL21-0AA0**	0.134
		II	2	**3SU1000-5PL31-0AA0**	0.020
		I+II	2	**3SU1000-5PL41-0AA0**	0.132
	BKS, E2	I+O+II	0	**3SU1000-5RL11-0AA0**	0.020
	BKS, E9	I+O+II	0	**3SU1000-5TL11-0AA0**	0.020


3SU1000-4BM01-0AA0


3SU1000-4FL01-0AA0


3SU1000-5BL01-0AA0

* You can order this quantity or a multiple thereof.

2

Multi-unit packaging, see page 2/360.	Operating principle	Make of lock	Switch position for key removal	Number of keys	Article No.	Weight kg
Key-operated switches						
	3 switch positions					
 3SU1000-4BP01-0AA0	Momentary contact/latching, 2x45° (10:30/12/ 1:30 o'clock), reset from the left, latching to the right 	RONIS, SB30	O II O+II	2 2 2	**3SU1000-4BP01-0AA0** **3SU1000-4BP31-0AA0** **3SU1000-4BP61-0AA0**	0.056 0.059 0.061
 3SU1000-5BP01-0AA0		Siemens, SSG10	O II O+II	2 2 2	**3SU1000-5BP01-0AA0** **3SU1000-5BP31-0AA0** **3SU1000-5BP61-0AA0**	0.020 0.140 0.136
		BKS, S1	O	2	**3SU1000-5PP01-0AA0**	0.020
 3SU1000-4GN01-0AA0	Latching/momentary contact, 2x45° (10:30/12/ 1:30 o'clock), reset from right, latching to the left 	RONIS, SB30	O I O+I	2 2 2	**3SU1000-4BN01-0AA0** **3SU1000-4BN21-0AA0** **3SU1000-4BN51-0AA0**	0.020 0.020 0.056
		O.M.R. 73038, light blue	O	2	**3SU1000-4GN01-0AA0**	0.087
		O.M.R. 73034, black	I	2	**3SU1000-4HN21-0AA0**	0.092
		Siemens, SSG10	O I O+I	2 2 2	**3SU1000-5BN01-0AA0** **3SU1000-5BN21-0AA0** **3SU1000-5BN51-0AA0**	0.020 0.020 0.020
		BKS, S1	I O+I	2 2	**3SU1000-5PN21-0AA0** **3SU1000-5PN51-0AA0**	0.020 0.020

Selection and ordering data

Multi-unit packaging, see page 2/360.	Operating angle	Operating principle	Switch position for key removal	Color	Article No.	Weight kg
ID key-operated switches						
	4 switch positions					
 3SU1000-4WS10-0AA0	45°	Latching	Key removal possible in all 4 positions	Black	**3SU1000-4WS10-0AA0**	0.023

For ID keys, see page 2/422.

For plastic holders for ID key-operated switches, see page 2/385.

* You can order this quantity or a multiple thereof.

Selection and ordering data

Multi-unit packaging, see page 2/360.	Product function Locking in zero position	Number of switching positions	Operating principle	Direction of actuation	Article No.	Weight kg
Coordinate switches						
 3SU1000-7AA10-0AA0	No	2	Momentary contact	Horizontal	**3SU1000-7AC10-0AA0**	0.036
				Vertical	**3SU1000-7AD10-0AA0**	0.037
			Latching	Horizontal	**3SU1000-7AA10-0AA0**	0.036
				Vertical	**3SU1000-7AB10-0AA0**	0.038
		4	Momentary contact	Horizontal/ Vertical	**3SU1000-7AF10-0AA0**	0.037
			Latching	Horizontal/ Vertical	**3SU1000-7AE10-0AA0**	0.044
 3SU1000-7BA10-0AA0	Yes	2	Momentary contact	Horizontal	**3SU1000-7BC10-0AA0**	0.040
				Vertical	**3SU1000-7BD10-0AA0**	0.044
			Latching	Horizontal	**3SU1000-7BA10-0AA0**	0.045
				Vertical	**3SU1000-7BB10-0AA0**	0.037
		4	Momentary contact	Horizontal/ Vertical	**3SU1000-7BF10-0AA0**	0.044
			Latching	Horizontal/ Vertical	**3SU1000-7BE10-0AA0**	0.045

Selection and ordering data

Multi-unit packaging, see page 2/360.	Type of product	Color	Article No.	Weight kg
Indicator lights				
 3SU1001-6AA40-0AA0	**With smooth lens**	Amber	**3SU1001-6AA00-0AA0**	0.011
		Red	**3SU1001-6AA20-0AA0**	0.012
		Yellow	**3SU1001-6AA30-0AA0**	0.012
		Green	**3SU1001-6AA40-0AA0**	0.012
		Blue	**3SU1001-6AA50-0AA0**	0.012
		White	**3SU1001-6AA60-0AA0**	0.012
		Clear	**3SU1001-6AA70-0AA0**	0.011
Indicator lights in illuminated pushbutton design				
 3SU1001-0AD50-0AA0	--	Red	**3SU1001-0AD20-0AA0**	0.014
		Yellow	**3SU1001-0AD30-0AA0**	0.014
		Green	**3SU1001-0AD40-0AA0**	0.014
		Blue	**3SU1001-0AD50-0AA0**	0.018
		Clear	**3SU1001-0AD70-0AA0**	0.014

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Selection and ordering data

Multi-unit packaging, see page 2/360.	Mounting diameter mm	Material	Color	Article No.	Weight kg
Sealing plugs[1]					
 3SU1900-0FA10-0AA0	22	Plastic	Black	**3SU1900-0FA10-0AA0**	0.011

[1] The sealing plug is mounted with a holder.
Modules might already be mounted on the holder.

	Type of product	Mounting diameter mm	Accessory material	Accessory color	**Screw terminals** Article No.	Weight kg
USB connections						
 3SU1900-0GA10-0AA0	USB 3.0	22	Plastic	Black	**3SU1900-0GA10-0AA0**	0.027
RJ45 connections						
 3SU1900-0GB10-0AA0	RJ-45 Cat. 5e	22	Plastic	Black	**3SU1900-0GB10-0AA0**	0.025

* You can order this quantity or a multiple thereof.

Overview

Actuators and indicators, flat, 30 mm, metal, matte, including adapter (adapter included in scope of supply)

Selection and ordering data

Multi-unit packaging, see page 2/360.	Version	Operating principle	Unlatching method	Color	Article No.	Weight kg
Pushbuttons						
 3SU1060-0JB50-0AA0	**Pushbuttons** with flat button	Momentary contact	--	Black	**3SU1060-0JB10-0AA0**	0.075
				Red	**3SU1060-0JB20-0AA0**	0.074
				Yellow	**3SU1060-0JB30-0AA0**	0.065
				Green	**3SU1060-0JB40-0AA0**	0.075
				Blue	**3SU1060-0JB50-0AA0**	0.075
				White	**3SU1060-0JB60-0AA0**	0.074
				Gray	**3SU1060-0JB80-0AA0**	0.064
				Amber	**3SU1060-0JB00-0AA0**	0.065
 3SU1060-0JA20-0AA0		Latching	Push to unlatch	Black	**3SU1060-0JA10-0AA0**	0.072
				Red	**3SU1060-0JA20-0AA0**	0.064
				Yellow	**3SU1060-0JA30-0AA0**	0.064
				Green	**3SU1060-0JA40-0AA0**	0.063
				Blue	**3SU1060-0JA50-0AA0**	0.065
				White	**3SU1060-0JA60-0AA0**	0.064
 3SU1061-0JB40-0AA0	**Illuminated pushbuttons** with flat button	Momentary contact	--	Red	**3SU1061-0JB20-0AA0**	0.074
				Yellow	**3SU1061-0JB30-0AA0**	0.074
				Green	**3SU1061-0JB40-0AA0**	0.073
				Blue	**3SU1061-0JB50-0AA0**	0.074
				Clear	**3SU1061-0JB70-0AA0**	0.074
 3SU1061-0JA30-0AA0		Latching	Push to unlatch	Red	**3SU1061-0JA20-0AA0**	0.064
				Yellow	**3SU1061-0JA30-0AA0**	0.073
				Green	**3SU1061-0JA40-0AA0**	0.064
				Blue	**3SU1061-0JA50-0AA0**	0.070
				Clear	**3SU1061-0JA70-0AA0**	0.064

*** You can order this quantity or a multiple thereof.**

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Selection and ordering data

Multi-unit packaging, see page 2/360.

Selector switches


3SU1062-2DC40-0AA0


3SU1062-2EC20-0AA0


3SU1062-2DL60-0AA0


3SU1062-2EL20-0AA0

Version	Operating principle	Color	Article No.	Weight kg
2 switch positions, can be illuminated				
Selector, short black actuator and front ring for flat mounting	Momentary contact, 45° (10:30/12 o'clock), reset from center to left 	Black Red Green White	**3SU1062-2DC10-0AA0** **3SU1062-2DC20-0AA0** **3SU1062-2DC40-0AA0** **3SU1062-2DC60-0AA0**	0.073 0.083 0.075 0.080
	Latching, 90° (10:30/1:30 o'clock) 	Black Red Green Blue White	**3SU1062-2DF10-0AA0** **3SU1062-2DF20-0AA0** **3SU1062-2DF40-0AA0** **3SU1062-2DF50-0AA0** **3SU1062-2DF60-0AA0**	0.073 0.020 0.075 0.073 0.078
Selector, long black actuator and front ring for flat mounting	Momentary contact, 45° (10:30/12 o'clock), reset from center to left 	Black Red Green White	**3SU1062-2EC10-0AA0** **3SU1062-2EC20-0AA0** **3SU1062-2EC40-0AA0** **3SU1062-2EC60-0AA0**	0.085 0.086 0.085 0.072
	Latching, 90° (10:30/1:30 o'clock) 	Black Red Green White	**3SU1062-2EF10-0AA0** **3SU1062-2EF20-0AA0** **3SU1062-2EF40-0AA0** **3SU1062-2EF60-0AA0**	0.075 0.078 0.073 0.020
3 switch positions (I+O+II), can be illuminated				
Selector, short black actuator and front ring for flat mounting	Momentary contact, 2x45° (10:30/12/1:30 o'clock), reset from left + right 	Black Red Green White	**3SU1062-2DM10-0AA0** **3SU1062-2DM20-0AA0** **3SU1062-2DM40-0AA0** **3SU1062-2DM60-0AA0**	0.074 0.072 0.020 0.073
	Latching, 2x45° (10:30/12/1:30 o'clock) 	Black Red Yellow Green White	**3SU1062-2DL10-0AA0** **3SU1062-2DL20-0AA0** **3SU1062-2DL30-0AA0** **3SU1062-2DL40-0AA0** **3SU1062-2DL60-0AA0**	0.020 0.020 0.080 0.070 0.072
	Momentary contact to the right, latching to the left, 2x45° (10:30/12/1:30 o'clock) 	White	**3SU1062-2DN60-0AA0**	0.073
Selector, long black actuator and front ring for flat mounting	Momentary contact, 2x45° (10:30/12/1:30 o'clock), reset from left + right 	Black Red Green White	**3SU1062-2EM10-0AA0** **3SU1062-2EM20-0AA0** **3SU1062-2EM40-0AA0** **3SU1062-2EM60-0AA0**	0.073 0.072 0.084 0.020
	Latching, 2x45° (10:30/12/1:30 o'clock) 	Black Red Green White	**3SU1062-2EL10-0AA0** **3SU1062-2EL20-0AA0** **3SU1062-2EL40-0AA0** **3SU1062-2EL60-0AA0**	0.075 0.020 0.084 0.020

* You can order this quantity or a multiple thereof.

Selection and ordering data

Multi-unit packaging, see page 2/360.	Make of lock	Operating principle	Switch position for key removal	Number of keys	Article No.	Weight kg
Key-operated switches						
 3SU1060-4LF11-0AA0	***2 switch positions***					
	RONIS, SB30 and front ring for flat installation	Momentary contact, 45° (10:30/12 o'clock), reset from center to left 	O	2	**3SU1060-4LC01-0AA0**	0.116
		Latching, 90° (10:30/1:30 o'clock) 	O O+I I	2 2 2	**3SU1060-4LF01-0AA0** **3SU1060-4LF11-0AA0** **3SU1060-4LF21-0AA0**	0.103 0.100 0.102
 3SU1060-4LL11-0AA0	***3 switch positions***					
	RONIS, SB30 and front ring for flat installation	Latching, 2x45° (10:30/12/ 1:30 o'clock) 	I+O+II	2	**3SU1060-4LL11-0AA0**	0.020
		Momentary contact, 2x45° (10:30/12/ 1:30 o'clock), reset from left + right 	O	2	**3SU1060-4LM01-0AA0**	0.102

Selection and ordering data

Multi-unit packaging, see page 2/360.	Version	Color	Article No.	Weight kg
Indicator lights				
 3SU1061-0JD40-0AA0	**With flat lens**	Red Yellow Green Blue Clear	**3SU1061-0JD20-0AA0** **3SU1061-0JD30-0AA0** **3SU1061-0JD40-0AA0** **3SU1061-0JD50-0AA0** **3SU1061-0JD70-0AA0**	0.073 0.073 0.073 0.062 0.073

*** You can order this quantity or a multiple thereof.**

2

Selection and ordering data

Multi-unit packaging, see page 2/360.

Mounting diameter	Material	Color	Article No.	Weight
mm				kg
Sealing plugs[1]				
30	Metal, matte	Sand gray	**3SU1960-0FA80-0AA0**	0.070

3SU1960-0FA80-0AA0

[1] The sealing plug is mounted with a holder.
Modules might already be mounted on the holder.

Type of product	Mounting diameter	Accessory material	Accessory color	Screw terminals ⊕ Article No.	Weight
	mm				kg
USB connections					
USB 3.0	30	Metal, matte	Sand gray	**3SU1960-0GA80-0AA0**	0.081

3SU1960-0GA80-0AA0

RJ45 connections					
RJ-45 Cat. 5e	30	Metal, matte	Sand gray	**3SU1960-0GB80-0AA0**	0.072

3SU1960-0GB80-0AA0

* You can order this quantity or a multiple thereof.

Options

Special locks for key-operated switches

The plastic and metal key-operated switches of type RONIS, BKS and Siemens (compatible with CES) can be optionally ordered with additional locks.

In this case **"–Z"**, the order code **"Y01"** and the required lock number must be added to the article number of the relevant key-operated switch for standard locking.

Order code	**Y01**
Standard delivery time	25 working days
Additional price per unit	
Ordering example	3SU1000–5BF01–0AA0-Z Y01 Z = SSG18

Ordering notes

- For all special locks, an additional price applies.
- The order code **"Y01"** must be quoted in accordance with the above table. Automated processing of the order with a defined delivery time can be guaranteed only for correctly submitted orders.
- For applications in which access security is important and several lock numbers are used, we recommend the use of BKS or Siemens key-operated switches.
- Special locks for VW (E1, E2, ...) will be delivered without keys, all others with two keys.
- Available special locks
  - Siemens lock (compatible with CES locks): SSG1 to SSG100; SMS1 to SMS100; LSG1; BAZ1, BAZ6, BAZ8, BAZ11, BAZ20, BAZ27, BAZ30, BAZ34; VL1, VL5; TAB501; STGH10; SSP9
  - BKS lock: S1 to S99; E1 to E25 (VW – without key); G3751 (VW – without key)
  - RONIS lock: SB30, SB31, 421, 455
  - OMR lock: 73038, 73037, 73034, 73033
  - For key-operated switches with key monitoring and Siemens lock, locks SSG1 to SSG100 are possible.
  - With the Siemens locks VL1 and VL5, key removal is possible in the O, I, II, O+I and O+II positions.

Note:

Mixing of the special locks listed above from different key-operated switch brands is not possible.

Example:
A RONIS key-operated switch cannot be combined with an SSG10 lock.

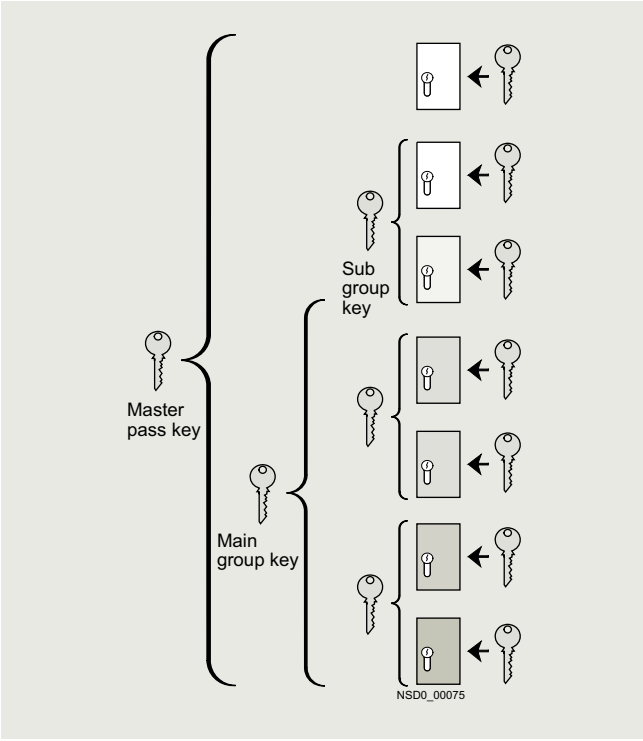
Master and master-pass key systems

The following key systems can be supplied with BKS or Siemens locks:

- Central lock systems
- Master key systems
- Central master key systems
- Master-pass key systems

When placing an order you must supplement the article number of the matching key-operated switches with **"–Z"** and quote the order code **"Y03"**.

Price and delivery time on request.
Email: sirius-attach.aud@siemens.com



Example of master-pass key system

2

Options

Inscription of actuating and signaling elements

Actuating and signaling elements in both plastic and metal version can be optionally inscribed with a laser.

Example of laser inscription

The actuators of the pushbuttons, illuminated pushbuttons, twin pushbuttons, mushroom pushbuttons, illuminated mushroom pushbuttons, EMERGENCY STOP mushroom pushbuttons (without lock), the lenses of the indicator lights, and the acoustic signaling devices can all be inscribed.

Version

The default typeface used for inscriptions with text is Arial and the text is centered.

The font size for illuminated actuators is 2.5 mm, for non-illuminated actuators 3 mm.

Up to 8 characters per line are possible.

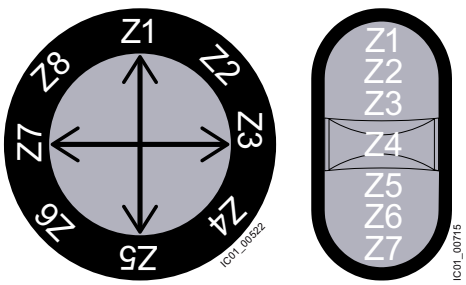
Notes:

Selected pushbuttons and twin pushbuttons can be supplied as standard with inscribed letters or symbols.

Selector switches, key-operated switches and toggle switches can only be inscribed on the front ring in the design lines
- 22 mm, plastic, black and
- Flat, 30 mm, metal matte

(only one text line and the supplement Y19).

Assignment of the positions on the actuator



Front ring and twin pushbutton

Ordering notes

To order, the inscribed actuating and signaling elements can be selected via the SIRIUS ACT configurator. An electronic order form is then generated. For configurator, see www.siemens.com/sirius-act/configurator

When ordering, add **"–Z"** and one of the following codes to the article number of the actuator element or the indicator light:

- **Y10:** Text in upper/lower case, always upper case for beginning of line, e.g. Z1=Lift Z2=Lower
- **Y11:** Text in upper case, e.g. Z1=LIFT Z2=LOWER
- **Y12:** Text in lower case, e.g. Z1=lift off Z2=lower off
- **Y15:** Text in upper/lower case, all words begin with upper case letters, e.g. Z1=Lift Off Z2=Lower Off
- **Y13:** Symbol with number according to ISO 7000 or IEC 60417
- **Y19:** Inscription of choice, text or symbol, can only be ordered via SIRIUS ACT configurator with a Configuration Identification Number (CIN)

When ordering, specify the required inscription without spaces after Z=, Z1=, etc., in addition to the article number and order code (see ordering examples 1 to 3).

In the case of symbols, specify the symbol No. and the standard (see ordering example 2)

In the case of multi-line inscriptions, the text must be assigned to the respective line, e.g. Z1=Lift, Z2=Lower. (see ordering examples 1 and 3)

The SIRIUS ACT configurator must be used to select special inscriptions and symbols (see ordering example 4). In this case a CIN (Configuration Identification Number) is generated for placement of future orders. It is then possible to place an order directly via the SIRIUS ACT configurator using the CIN (shopping cart in the Industry Mall) or via the standard ordering channels.

Standard ordering:

- Configurator: www.siemens.com/sirius-act/configurator
- Industry Mall: www.siemens.com/industrymall

Ordering example 1

A round pushbutton with 2 lines of text is required:

3SU1000-0AB20-0AA0-Z
Y10
Z1=Lift
Z2=Lower

Ordering example 2

A pushbutton inscribed with symbol No. 5389 according to IEC 60417 is required:

3SU1000-0AB20-0AA0-Z
Y13
Z=5389 IEC

Ordering example 3

A selector switch with 2 switch positions and multi-line inscription on the front ring is required:

3SU1002-2BF10-0AA0-Z
Y11
Z8=0
Z2=I

Ordering example 4

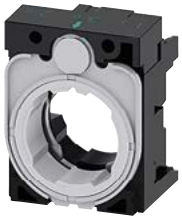
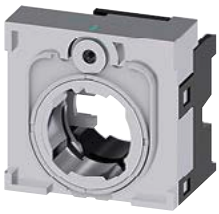
An indicator light with customized inscription is required:

3SU1001-6AA50-0AA0-Z
Y19
CIN.....
(20-digit number generated from the SIRIUS ACT configurator)

Overview

- Plastic holders are attached to actuators and indicators made of plastic (3SU100).
- Metal holders can be attached to all versions of actuators and indicators, with the exception of ID key-operated switches.
- Universal holders can be attached to actuators and indicators made of plastic or metal.
- All metal and universal holders are automatically grounded by their fastening screw. A grounding stud can also be fitted (see page 2/426).

Selection and ordering data

Multi-unit packaging, see page 2/360.	Version	Article No.	Weight kg
Holders without module, plastic			
 3SU1500-0AA10-0AA0	***3x without module***	**3SU1500-0AA10-0AA0**	0.024
 3SU1500-0BA10-0AA0	***4x without module*** For selector switches with 4 switch positions and for coordinate switches	**3SU1500-0BA10-0AA0**	0.035
Holders without module, metal			
 3SU1510-0AA10-0AA0	***3x without module***	**3SU1510-0AA10-0AA0**	0.044
 3SU1550-0BA10-0AA0	***4x without module*** For selector switches with 4 switch positions and for coordinate switches	**3SU1550-0BA10-0AA0**	0.064
Holders without module, universal for plastic and metal			
 3SU1550-0AA10-0AA0	***3x without module***	**3SU1550-0AA10-0AA0**	0.044

* You can order this quantity or a multiple thereof.

Contact modules

Overview

The contact modules are fitted with slow-action contacts (NO contacts or NC contacts). These ensure a high level of contact reliability even with small voltages and currents, such as 5 V/1 mA. They are suitable for use in electronic systems as well as conventional controls. The contact pieces of the NC contacts are positively driven.

Mounting system

- Front plate mounting:
  The contact modules are mounted on the rear face of a holder.
- Floor mounting:
  The contact modules are used in the 3SU18 enclosures and are snapped into the lower part of the enclosure.

Connection methods

The contact modules are available with:

- Screw terminals
- Spring-loaded terminals
- Socket connection (THT) for PCB mounting

The terminal designations of the contact modules comply with EN 50013.

Selection and ordering data

Multi-unit packaging, see page 2/360.

Contact version	Number of NO contacts	Number of NC contacts			Spring-loaded terminals Article No.	Weight kg
Contact modules for front plate mounting						
Silver alloy	1	0			**3SU1400-1AA10-3BA0**	0.009
	0	1	⊖		**3SU1400-1AA10-3CA0**	0.009
	0	1 with installation monitoring[1)]	⊖		**3SU1400-1AA10-3HA0**	0.018
	2	0			**3SU1400-1AA10-3DA0**	0.018
	0	2	⊖		**3SU1400-1AA10-3EA0**	0.017
	1	1	⊖		**3SU1400-1AA10-3FA0**	0.017
	1 leading	1 lagging	⊖		**3SU1400-1AA10-3GA0**	0.016


3SU1400-1AA10-3BA0


3SU1400-1AA10-3HA0


3SU1400-1AA10-3DA0


3SU1400-1AA10-3FA0

⊖ Positive opening according to IEC 60947-5-1, Annex K.
Can be used with 3SK safety relays.
Certificate:

1) The contact module has 1 NO internal contact + 1 NC internal contact. The NO contact is connected in series with the NC contact and brought out at terminal 1-2. When the module is snapped onto the holder, the NO contact closes. It opens when the module is detached from the holder again (the NC contact remains closed). The NC contact opens when the EMERGENCY STOP device is actuated (the NO contact remains closed). The contact is closed only when both the NC and NO contacts are closed. Only suitable for installation in 3SU18 enclosure with one command point and in connection with the adapter 3SU1900-0JF10-0AA0.

* You can order this quantity or a multiple thereof.

2

Multi-unit packaging, see page 2/360.

Contact modules for front plate mounting

Contact version	Number of NO contacts	Number of NC contacts			Spring-loaded terminals Article No.	Weight kg
Gold-plated	1	0			**3SU1400-1AA10-3LA0**	0.010
	0	1	⊖		**3SU1400-1AA10-3MA0**	0.010
	2	0			**3SU1400-1AA10-3NA0**	0.017
	0	2	⊖		**3SU1400-1AA10-3PA0**	0.017
	1	1	⊖		**3SU1400-1AA10-3QA0**	0.017
	1 leading	1 lagging	⊖		**3SU1400-1AA10-3RA0**	0.017

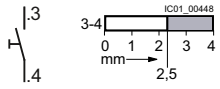
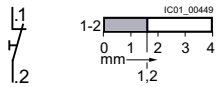
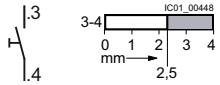
3SU1400-1AA10-3LA0

⊖ Positive opening according to IEC 60947-5-1, Annex K.
Can be used with 3SK safety relays.
Certificate:

Contact modules

Multi-unit packaging, see page 2/360.

Contact modules for floor mounting

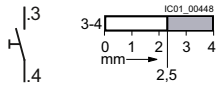
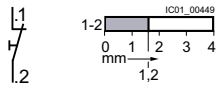
Contact version	Number of NO contacts	Number of NC contacts			Screw terminals Article No.	Weight kg
					Spring-loaded terminals	
Silver alloy	1	0			**3SU1400-2AA10-3BA0**	0.010
	0	1	⊖		**3SU1400-2AA10-3CA0**	0.010
Gold-plated	1	0			**3SU1400-2AA10-3LA0**	0.010


3SU1400-2AA10-3BA0


3SU1400-2AA10-3LA0

Multi-unit packaging, see page 2/360.

Contact modules for mounting on printed circuit boards

Contact version	Number of NO contacts	Number of NC contacts			Socket terminals (THT) Article No.	Weight kg
Silver alloy	1	0			**3SU1400-3AA10-5BA0**	0.004
	0	1	⊖		**3SU1400-3AA10-5CA0**	0.004


3SU1400-3AA10-5BA0

⊖ Positive opening according to IEC 60947-5-1, Annex K.
Can be used with 3SK safety relays.
Certificate:

* You can order this quantity or a multiple thereof.

Overview

LED modules

The commanding and signaling devices can be illuminated via LED modules with integrated LEDs.

Mounting system

- Front plate mounting:
  The LED modules are mounted on the rear face of a holder in the center position.
- Floor mounting:
  The LED modules are used in the 3SU18 enclosures and are snapped into the lower part of enclosure.

Connection methods

The LED modules are available with:

- Screw terminals
- Spring-loaded terminals
- Socket connection (THT) for PCB mounting

The terminal designations of the LED modules comply with EN 50013.

LED test modules

The LED test modules are used to test the LED modules (AC/DC versions). One LED module is connected to each test module for testing, see page 2/391.

Selection and ordering data

Multi-unit packaging, see page 2/360.

Operational voltage at AC	Operational voltage at DC	Color	Spring-loaded terminals Article No.	Weight kg
V	V			
LED modules[1] for front plate mounting				
24	24	Amber	**3SU1401-1BB00-3AA0**	0.008
		Red	**3SU1401-1BB20-3AA0**	0.008
		Yellow	**3SU1401-1BB30-3AA0**	0.008
		Green	**3SU1401-1BB40-3AA0**	0.008
		Blue	**3SU1401-1BB50-3AA0**	0.008
		White	**3SU1401-1BB60-3AA0**	0.008
		Red/Yellow/Green	**3SU1401-1BB24-3AA0**	0.015
110	--	Amber	**3SU1401-1BC00-3AA0**	0.012
		Red	**3SU1401-1BC20-3AA0**	0.011
		Yellow	**3SU1401-1BC30-3AA0**	0.008
		Green	**3SU1401-1BC40-3AA0**	0.009
		Blue	**3SU1401-1BC50-3AA0**	0.008
		White	**3SU1401-1BC60-3AA0**	0.009
		Red/Yellow/Green	**3SU1401-1BC24-3AA0**	0.012
230	--	Amber	**3SU1401-1BF00-3AA0**	
		Red	**3SU1401-1BF20-3AA0**	0.009
		Yellow	**3SU1401-1BF30-3AA0**	0.009
		Green	**3SU1401-1BF40-3AA0**	0.009
		Blue	**3SU1401-1BF50-3AA0**	0.013
		White	**3SU1401-1BF60-3AA0**	0.009
		Red/Yellow/Green	**3SU1401-1BF24-3AA0**	0.012
6 … 24	6 … 24	Amber	**3SU1401-1BG00-3AA0**	0.009
		Red	**3SU1401-1BG20-3AA0**	0.009
		Yellow	**3SU1401-1BG30-3AA0**	0.010
		Green	**3SU1401-1BG40-3AA0**	0.009
		Blue	**3SU1401-1BG50-3AA0**	0.008
		White	**3SU1401-1BG60-3AA0**	0.009
		Red/Yellow/Green	**3SU1401-1BG24-3AA0**	0.017
24 … 240	24 … 240	Amber	**3SU1401-1BH00-3AA0**	0.140
		Red	**3SU1401-1BH20-3AA0**	0.010
		Yellow	**3SU1401-1BH30-3AA0**	0.010
		Green	**3SU1401-1BH40-3AA0**	0.010
		Blue	**3SU1401-1BH50-3AA0**	0.011
		White	**3SU1401-1BH60-3AA0**	0.010

3SU1401-1BB30-3AA0

[1] Only for use with SIRIUS commanding and signaling devices.

*** You can order this quantity or a multiple thereof.**

LED modules

LED modules for front plate mounting: ATEX Zone 1-2: Intrinsic safety

3SU1401-1BB20-3AA2

Multi-unit packaging, see page 2/360.

Operational voltage at AC V	Operational voltage at DC V	Color	Screw terminals Article No.	Weight kg
			Spring-loaded terminals	
24	24	Amber	**3SU1401-1BB00-3AA2**	0.008
		Red	**3SU1401-1BB20-3AA2**	0.009
		Yellow	**3SU1401-1BB30-3AA2**	0.008
		Green	**3SU1401-1BB40-3AA2**	0.010
		Blue	**3SU1401-1BB50-3AA2**	0.008
		White	**3SU1401-1BB60-3AA2**	0.008

LED modules[1] for floor mounting

3SU1401-2BB20-3AA0

Multi-unit packaging, see page 2/360.

Operational voltage at AC V	Operational voltage at DC V	Color	Screw terminals Article No.	Weight kg
			Spring-loaded terminals	
24	24	Amber	**3SU1401-2BB00-3AA0**	0.010
		Red	**3SU1401-2BB20-3AA0**	0.009
		Yellow	**3SU1401-2BB30-3AA0**	0.009
		Green	**3SU1401-2BB40-3AA0**	0.009
		Blue	**3SU1401-2BB50-3AA0**	0.009
		White	**3SU1401-2BB60-3AA0**	0.010
110	--	Amber	**3SU1401-2BC00-3AA0**	0.010
		Red	**3SU1401-2BC20-3AA0**	0.010
		Yellow	**3SU1401-2BC30-3AA0**	0.017
		Green	**3SU1401-2BC40-3AA0**	0.008
		Blue	**3SU1401-2BC50-3AA0**	0.008
		White	**3SU1401-2BC60-3AA0**	0.008
230	--	Amber	**3SU1401-2BF00-3AA0**	0.008
		Red	**3SU1401-2BF20-3AA0**	0.019
		Yellow	**3SU1401-2BF30-3AA0**	0.011
		Green	**3SU1401-2BF40-3AA0**	0.010
		Blue	**3SU1401-2BF50-3AA0**	0.008
		White	**3SU1401-2BF60-3AA0**	0.012
6 ... 24	6 ... 24	Amber	**3SU1401-2BG00-3AA0**	0.008
		Red	**3SU1401-2BG20-3AA0**	0.009
		Yellow	**3SU1401-2BG30-3AA0**	0.008
		Green	**3SU1401-2BG40-3AA0**	0.008
		Blue	**3SU1401-2BG50-3AA0**	0.008
		White	**3SU1401-2BG60-3AA0**	0.010
24 ... 240	24 ... 240	Amber	**3SU1401-2BH00-3AA0**	0.008
		Red	**3SU1401-2BH20-3AA0**	0.008
		Yellow	**3SU1401-2BH30-3AA0**	0.012
		Green	**3SU1401-2BH40-3AA0**	0.008
		Blue	**3SU1401-2BH50-3AA0**	0.008
		White	**3SU1401-2BH60-3AA0**	0.010

[1] Only for use with SIRIUS commanding and signaling devices.

LED modules for floor mounting: ATEX Zone 1-2: Intrinsic safety

3SU1401-2BB00-3AA2

Multi-unit packaging, see page 2/360.

Operational voltage at AC V	Operational voltage at DC V	Color	Screw terminals Article No.	Weight kg
			Spring-loaded terminals	
24	24	Amber	**3SU1401-2BB00-3AA2**	0.012
		Red	**3SU1401-2BB20-3AA2**	0.008
		Yellow	**3SU1401-2BB30-3AA2**	0.008
		Green	**3SU1401-2BB40-3AA2**	0.008
		Blue	**3SU1401-2BB50-3AA2**	0.008
		White	**3SU1401-2BB60-3AA2**	0.008

* You can order this quantity or a multiple thereof.

Multi-unit packaging, see page 2/360.	Operational voltage at AC	Operational voltage at DC	Color	Socket terminals (THT) Article No.	Weight kg
	V	V			
LED modules[1] for PCB mounting					
 3SU1401-3BA20-5AA0	--	5	Amber Red Yellow Green Blue White	**3SU1401-3BA00-5AA0** **3SU1401-3BA20-5AA0** **3SU1401-3BA30-5AA0** **3SU1401-3BA40-5AA0** **3SU1401-3BA50-5AA0** **3SU1401-3BA60-5AA0**	0.008 0.080 0.005 0.008 0.006 0.003

[1] Only for use with SIRIUS commanding and signaling devices.

Multi-unit packaging, see page 2/360.	Operational voltage at AC	Operational voltage at DC	Screw terminals Article No.	Weight kg
	V	V		
LED test modules[1] for front plate mounting				
 3SU1400-1CK10-1AA0	6 … 240	6 … 240	**3SU1400-1CK10-1AA0**	0.011
LED test modules[1] for floor mounting				
 3SU1400-2CK10-1AA0	6 … 240	6 … 240	**3SU1400-2CK10-1AA0**	0.010

[1] Only to be used for SIRIUS ACT LED modules (6 to 24 V AC/DC, 24 V AC/DC, 24 to 240 V AC/DC).

General data

Overview

Pushbuttons and indicator lights in the enclosure

Enclosures with standard fittings

Enclosed SIRIUS ACT pushbuttons and indicator lights are used as hand-operated command devices for separately allocated control units and cabinets. The devices are suitable for use in any climate and all have degree of protection IP66, IP67, IP69 (IP69K), including those with cable glands.

Standards

IEC 60947-5-1

Versions

The enclosed pushbuttons and indicator lights are available with conventional controls as well as for connection to AS-Interface. The following versions are available:

- Empty enclosures with 1 to 6 command points. The installed components must be ordered separately; modules for floor mounting or 1-pole contact and LED modules for front plate mounting can be used, see page 2/386 onwards.
- Enclosures with standard fittings with 1 to 3 command points, e.g. EMERGENCY STOP enclosure with EMERGENCY STOP mushroom pushbutton
- Enclosures with customized fittings with 1 to 6 command points
- Special enclosure for selector switches (4 switch positions), coordinate switches, ID key-operated switches and sensor switches

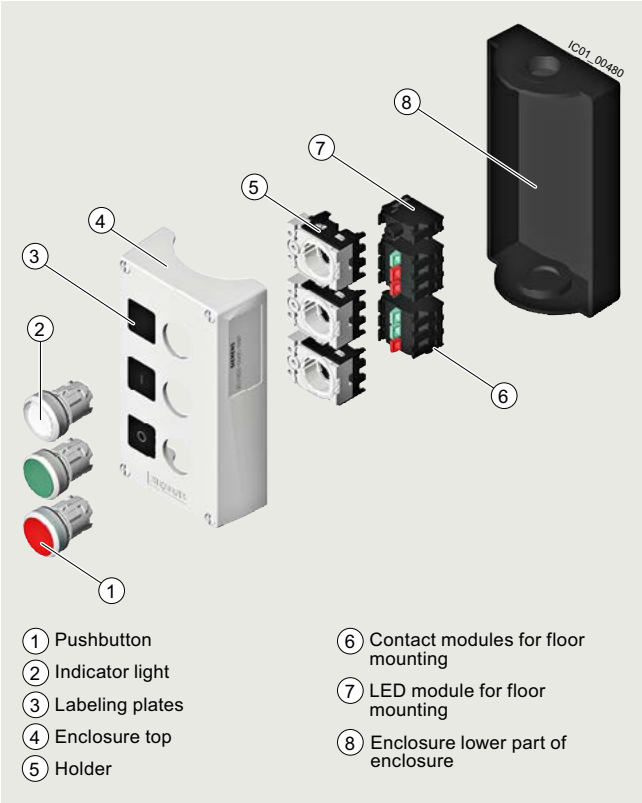
Color of the enclosures

Top:

- Gray, RAL 7035
- Pantone yellow C, for EMERGENCY STOP

Lower part:

- Black, RAL 9005



Setup of the pushbuttons and indicator lights in the enclosure

Customized enclosures

The fittings and labeling of the command points can be chosen using the configurator on the internet. The prices depend on the equipment selected, see www.siemens.com/sirius-act/configurator.

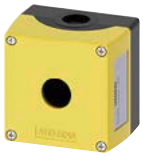
It is also possible to create a combination of two enclosures using connectors.

Application

The enclosures are climate-proof (KTW 24) according to EN ISO 6270-2 and are suitable for stationary use, and for use in marine applications.

Selection and ordering data

Color of enclosure top	Number of command points	Enclosure version	Article No.	Weight kg
Enclosures for surface mounting				
Plastic				
Yellow	1	Center command point	**3SU1801-0AA00-0AA2**	0.251
		With protective collar	**3SU1801-0AA00-0AC2**	0.311
		With recess for labeling plate	**3SU1801-0AA00-0AB2**	0.253
	2	With recess for labeling plate	**3SU1802-0AA00-0AB2**	0.300
Gray	1	With recess for labeling plate	**3SU1801-0AA00-0AB1**	0.253
	2	With recess for labeling plate	**3SU1802-0AA00-0AB1**	0.305
	3	With recess for labeling plate	**3SU1803-0AA00-0AB1**	0.373
	4	With recess for labeling plate	**3SU1804-0AA00-0AB1**	0.440
	6	With recess for labeling plate	**3SU1806-0AA00-0AB1**	0.615
Metal				
Yellow	1	Center command point	**3SU1851-0AA00-0AA2**	0.485
		With protective collar	**3SU1851-0AA00-0AC2**	0.612
		With recess for labeling plate	**3SU1851-0AA00-0AB2**	0.499
		With protective collar for 5 padlocks, EMERGENCY STOP mushroom 40 mm and EMERGENCY STOP mushroom 40 mm with RONIS key-operated release	**3SU1851-0AA00-0AF2**	0.580
		With protective collar for 5 padlocks, EMERGENCY STOP mushroom 40 mm with BKS, Siemens, OMR key-operated release	**3SU1851-0AA00-0AG2**	0.593
		With protective collar for 5 padlocks, mushroom 60 mm	**3SU1851-0AA00-0AH2**	0.590
		With protective collar for 5 padlocks, mushroom 60 mm, horizontal mounting	**3SU1851-0AA00-0AJ2**	0.584
Gray	1	With protective collar for 5 padlocks, mushroom 60 mm	**3SU1851-0AA00-0AH1**	0.602
		With protective collar for 5 padlocks, mushroom 60 mm, horizontal mounting	**3SU1851-0AA00-0AJ1**	0.571
		With recess for labeling plate	**3SU1851-0AA00-0AB1**	0.505
		With protective collar	**3SU1851-0AA00-0AC1**	0.605
	2	With recess for labeling plate	**3SU1852-0AA00-0AB1**	0.570
	3	With recess for labeling plate	**3SU1853-0AA00-0AB1**	0.700
	4	With recess for labeling plate	**3SU1854-0AA00-0AB1**	0.830
	6	With recess for labeling plate	**3SU1856-0AA00-0AB1**	1.082
Enclosure for selector switches (4 switch positions), coordinate switches, ID key-operated switches and sensor switches				
Plastic, front plate mounting				
Gray	1	Center command point	**3SU1801-1AA00-1AA1**	0.264
Metal, front plate mounting				
Gray	1	Center command point	**3SU1851-1AA00-1AA1**	0.487


3SU1801-0AA00-0AA2


3SU1802-0AA00-0AB1


3SU1851-0AA00-0AC2


3SU1851-0AA00-0AH1


3SU1853-0AA00-0AB1


3SU1854-0AA00-0AB1


3SU1801-1AA00-1AA1

* You can order this quantity or a multiple thereof.

2

Overview

Labels can be inserted for identification purposes for the 22 mm and 30 mm design lines of the pushbuttons (clear) and illuminated pushbuttons with flat button. These insert labels are made of transparent plastic with black inscription; they can be fitted in any 90° angle.

Inscription

The inscription is in upper/lower case, all words begin with upper case letters. Graphic symbols, including those not listed in the catalog, are according to ISO 7000 or IEC 60417.

The insert labels without inscription are suitable for user marking with permanent pen.

For customized inscriptions, see "Options", page 2/396.

Selection and ordering data

Color	Marking	Article No.	Weight kg
Insert labels			
	For self-inscription		
Milky white/black (label/lettering)	None	**3SU1900-0AB71-0AA0**	36.000
	With customized inscription		
Milky white/black (label/lettering)	For inscriptions or symbols, see "Options", page 2/396.	**3SU1900-0AB71-0AZ0**	
	Inscription in German		
Milky white/black (label/lettering)	Ein	**3SU1900-0AB71-0AB0**	0.400
	Aus	**3SU1900-0AB71-0AC0**	0.040
	Auf	**3SU1900-0AB71-0AD0**	0.100
	Ab	**3SU1900-0AB71-0AE0**	
	Vor	**3SU1900-0AF0**	0.040
	Zurück	**3SU1900-0AG0**	0.020
	Rechts	**3SU1900-0AH0**	0.400
	Links	**3SU1900-0AJ0**	0.100
	Halt	**3SU1900-0AK0**	0.100
	Zu	**3SU1900-0AL0**	
	Schnell	**3SU1900-0AM0**	
	Langsam	**3SU1900-0AN0**	0.200
	Betrieb	**3SU1900-0AP0**	0.100
	Störung	**3SU1900-0AQ0**	0.033
	Einrichten	**3SU1900-0AR0**	0.600
	Inscription in English		
Milky white/black (label/lettering)	On	**3SU1900-0DJ0**	1.000
	Off	**3SU1900-0DK0**	0.059
	Up	**3SU1900-0DL0**	0.050
	Down	**3SU1900-0DM0**	0.050
	Forward	**3SU1900-0DN0**	0.050
	Right	**3SU1900-0DQ0**	
	Left	**3SU1900-0DR0**	0.100
	Stop	**3SU1900-0DS0**	0.400
	Start	**3SU1900-0DT0**	
	Reset	**3SU1900-0DU0**	0.046
	Test	**3SU1900-0DV0**	0.038
	Open	**3SU1900-0DW0**	0.040
	Close	**3SU1900-0DX0**	0.040
	Running	**3SU1900-0EB0**	0.400
	Fast	**3SU1900-0EE0**	0.400
	Slow	**3SU1900-0EF0**	0.400

3SU1900-0AB71-0AA0

3SU1900-0AB71-0AB0

3SU1900-0AB71-0DN0

* You can order this quantity or a multiple thereof.

Insert labels

	Color	Marking	Symbol No.	Article No.	Weight kg
 3SU1900-0AB71-0QC0	***With symbol (ON/OFF)***				
	Milky white/black (label/lettering)	O	5008 IEC	**3SU1900-0AB71-0QA0**	0.046
		I	5007 IEC	**3SU1900-0AB71-0QB0**	0.036
		II	--	**3SU1900-0AB71-0QC0**	0.039
		III	--	**3SU1900-0AB71-0QD0**	0.100
 3SU1900-0AB71-0QT0	***With symbol (graphic)***				
	Milky white/black (label/lettering)	ARROW DIRECTION TO RIGHT	5022 IEC	**3SU1900-0AB71-0QR0**	0.080
		ARROW DIRECTION UP AND TO LEFT	--	**3SU1900-0AB71-0QS0**	0.050
		CLOCKWISE ROTATION	0004 ISO	**3SU1900-0AB71-0QT0**	0.060
		COUNTERCLOCKWISE ROTATION	--	**3SU1900-0AB71-0QU0**	0.050
		RAPID TRAVERSE	0266 ISO	**3SU1900-0AB71-0QV0**	0.050
		FEED	0259 ISO	**3SU1900-0AB71-0QW0**	
		INCREASE, PLUS	5005 IEC	**3SU1900-0AB71-0QX0**	0.080
		DECREASE, MINUS	5006 IEC	**3SU1900-0AB71-0QY0**	0.040
 3SU1900-0AB71-0RB0		ELECTRIC MOTOR	0011 ISO	**3SU1900-0AB71-0RA0**	0.200
		HORN	5014 IEC	**3SU1900-0AB71-0RB0**	0.063
		WATER INLET	--	**3SU1900-0AB71-0RC0**	0.300
		PUMP	0134 ISO	**3SU1900-0AB71-0RD0**	0.200
 3SU1900-0AB71-0RN0		COOLANT PUMP	0355 ISO	**3SU1900-0AB71-0RE0**	0.100
		CLAMP	5653 IEC	**3SU1900-0AB71-0RF0**	0.030
		UNLOCK, UNCLAMP	5652 IEC	**3SU1900-0AB71-0RG0**	0.039
		BRAKE	--	**3SU1900-0AB71-0RH0**	0.100
		RELEASE BRAKE	0021 ISO	**3SU1900-0AB71-0RJ0**	0.060
		INTERLOCK	0022 ISO	**3SU1900-0AB71-0RK0**	
		UNLOCK	0023 ISO	**3SU1900-0AB71-0RL0**	0.067
		SET UP	0910 ISO	**3SU1900-0AB71-0RM0**	1.400
		ON/OFF, MOMENTARY CONTACT TYPE	5011 IEC	**3SU1900-0AB71-0RN0**	0.039
		MANUAL OPERATION	0096 ISO	**3SU1900-0AB71-0RP0**	0.200
		AUTOMATIC CYCLE	0017 ISO	**3SU1900-0AB71-0RQ0**	0.039
		SUCTION	--	**3SU1900-0AB71-0RR0**	0.050
		BLOWING	--	**3SU1900-0AB71-0RS0**	0.100

*** You can order this quantity or a multiple thereof.**

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Options

Customized inscriptions

The labels can be inscribed with text and symbols not listed in the ordering data.

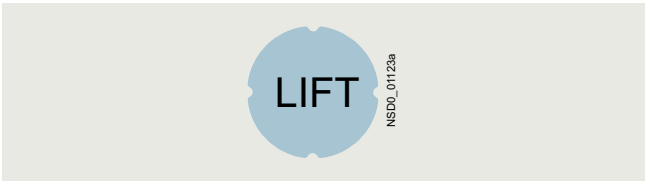
The default typeface used for inscriptions with text is Arial and the text is centered.

The font height is 2.5 mm.

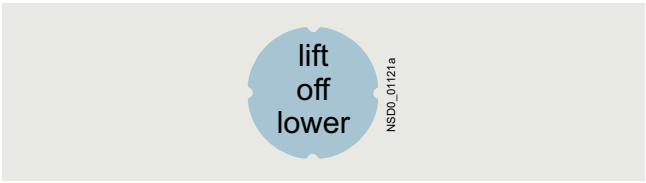
Up to 6 characters per line are possible.

Examples of customized inscriptions

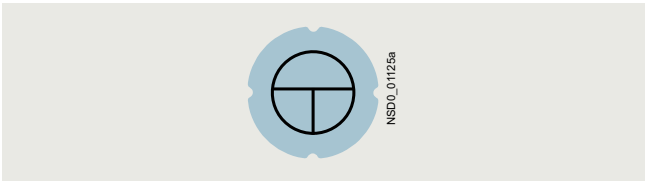
Two-line inscription in upper/lower case (Q0Y)



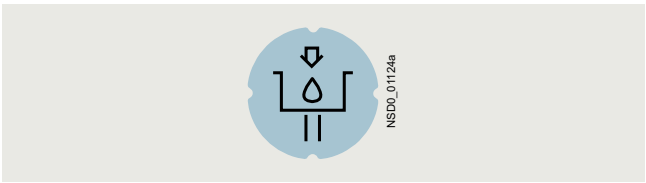
Single-line inscription in upper case (Q1Y)



Three-line inscription in lower case (Q2Y)



Symbol number 5011 according to IEC 60417 (Q3Y)



Any symbol according to order form supplement (Q9Y)

Ordering notes

Append the following order codes to the article number:

- **Q0Y:** Text line(s) in upper/lower case, always upper case for beginning of line,
  e.g. Z1=Lift Z2=Lower
- **Q1Y:** Text line(s) in upper case,
  e.g. Z1=LIFT Z2=LOWER
- **Q2Y:** Text line(s) in lower case,
  e.g. Z1=lift off Z2=lower off
- **Q5Y:** Text line(s) in upper/lower case, all words begin with upper case letters,
  e.g. Z1=Lift Off Z2=Lower Off
- **Q3Y:** Symbol with number according to ISO 7000 or IEC 60417
- **Q9Y:** Inscription of choice, text or symbol, can only be ordered via SIRIUS ACT configurator with a Configuration Identification Number (CIN)

When ordering, specify the required inscription without spaces after Z=, Z1=, etc., in addition to the article number and order code (see ordering examples 1 to 3).

In the case of multi-line inscriptions, the text must be assigned to the respective line,
e.g. Z1=LIFT Z2=LOWER (see ordering example 1).

Symbols can also be ordered with numbers according to ISO 7000 or IEC 60417 (see ordering examples 2 and 3).

The SIRIUS ACT configurator must be used to select special inscriptions and symbols (see ordering examples 4). In this case a CIN (Configuration Identification Number) is generated for placement of future orders. It is then possible to place an order directly via the SIRIUS ACT configurator using the CIN (Mall shopping cart) or via the standard ordering channels.

Standard ordering channels:

- Configurator: www.siemens.com/sirius-act/configurator
- Industry Mall: www.siemens.com/industrymall

Ordering example 1

A label with 2 lines of text is required:

3SU1900-0AB71-0AZ0
Q1Y
Z1=LIFT
Z2=LOWER

Ordering example 2

A label inscribed with symbol No. 5011 according to IEC 60417 is required:

3SU1900-0AB71-0AZ0
Q3Y
Z=5011 IEC

Ordering example 3

A label inscribed with symbol No. 1118 according to ISO 7000 is required:

3SU1900-0AB71-0AZ0
Q3Y
Z=1118 ISO

Ordering example 4

A label with customized inscription is required:

3SU1900-0AB71-0AZ0
Q9Y
CIN.....
(20-digit number generated from the SIRIUS ACT configurator)

Selection and ordering data

Multi-unit packaging, see page 2/360.

Material, label holder shape	Mounting diameter	Label holder color	Label fastening method	Labeling plate size Height	Labeling plate size Width	Article No.	Weight
	mm			mm	mm		kg
Label holders for labeling plates							
For 1 labeling plate							
Plastic, with rounded bottom	22	Black	Self-adhesive	12.5	27	**3SU1900-0AG10-0AA0**	0.200
				17.5	27	**3SU1900-0AH10-0AA0**	0.200
				27	27	**3SU1900-0AJ10-0AA0**	0.200
			Snap-on	12.5	27	**3SU1900-0AR10-0AA0**	0.200
				17.5	27	**3SU1900-0AS10-0AA0**	0.200
				27	27	**3SU1900-0AT10-0AA0**	0.200
Plastic, with square bottom	22	Black	Self-adhesive	12.5	27	**3SU1900-0AN10-0AA0**	0.200
				17.5	27	**3SU1900-0AP10-0AA0**	0.200
				27	27	**3SU1900-0AQ10-0AA0**	0.300
For 2 labeling plates							
Plastic, with rounded bottom	22	Black	Self-adhesive	17.5	27	**3SU1900-0BQ10-0AA0**	0.003
			Snap-on	17.5	27	**3SU1900-0BR10-0AA0**	0.003
For 4 labeling plates							
Plastic, with rounded bottom	22	Black	Self-adhesive	17.5	27	**3SU1900-0BS10-0AA0**	0.006
			Snap-on	17.5	27	**3SU1900-0BT10-0AA0**	0.005
For actuators and indicators							
Plastic, with rounded bottom	30	Black	Self-adhesive	17.5	27	**3SU1960-0AH10-0AA0**	0.002
			Snap-on	17.5	27	**3SU1960-0AS10-0AA0**	0.002
Label holders for labeling plates, coordinate switches							
Plastic, with square bottom	22	Black	Self-adhesive	27	27	**3SU1900-0AL10-0AA0**	0.005
Plastic, cross	22	Black	Self-adhesive	27	27	**3SU1900-0AM10-0AA0**	0.010


3SU1900-0AG10-0AA0


3SU1900-0AN10-0AA0


3SU1900-0BQ10-0AA0


3SU1900-0BT10-0AA0


3SU1960-0AH10-0AA0


3SU1900-0AL10-0AA0


3SU1900-0AM10-0AA0

* You can order this quantity or a multiple thereof.

Labels > Label holders for labeling plates

Multi-unit packaging, see page 2/360.	Material, label holder shape	Mounting diameter	Label holder color	Label fastening method	Labeling plate size		Article No.	Weight
					Height	Width		
		mm			mm	mm		kg
Label holders for labeling plates, twin pushbuttons								
 3SU1900-0AK10-0AA0	Plastic, rectangular	22	Black	Self-adhesive	12.5	27	**3SU1900-0AK10-0AA0**	0.300
Single frames								
 3SU1900-0AX10-0AA0	Plastic, square	22	Black	--	29.8	29.8	**3SU1900-0AX10-0AA0**	0.001

*** You can order this quantity or a multiple thereof.**

Overview

Label holders of black plastic, and labeling plates (black with white print or silver-colored with black print) for sticking or snapping in place, are available for labeling. They are not suitable for EMERGENCY STOP buttons. Note mounting dimensions!
The label holders cannot be used in conjunction with sealing plugs, protective caps, protective collars and locking devices.

Inscription

The inscription is in upper/lower case, all words begin with upper case letters. Graphic symbols, including those not listed in the catalog, are according to ISO 7000 or IEC 60417.

For customized inscriptions, see "Options", page 2/405.

Labeling plates for sticking/snapping in place

The labels are available in three sizes:

- 12.5 mm × 27 mm
- 17.5 mm × 27 mm
- 27 mm × 27 mm

For mounting the labeling plates, you can choose between label holders for stick-on or snap-on mounting.

Selection and ordering data

Multi-unit packaging, see page 2/360.	Color	Marking	Symbol No.	Article No.	Weight kg
Labeling plates 12.5 mm x 27 mm					
 3SU1900-0AC16-0AA0	***For self-inscription***				
	Black/white (label/lettering)	None	--	**3SU1900-0AC16-0AA0**	0.052
	With customized inscription				
	Black/white (label/lettering)	For inscriptions or symbols, see "Options", page 2/405.		**3SU1900-0AC16-0AZ0**	
 3SU1900-0AC16-0AG0	***Inscription in German***				
	Black/white (label/lettering)	Ein	--	**3SU1900-0AC16-0AB0**	0.005
		Aus	--	**3SU1900-0AC16-0AC0**	0.067
		Auf	--	**3SU1900-0AD0**	
		Ab	--	**3SU1900-0AE0**	0.200
		Vor	--	**3SU1900-0AF0**	0.200
		Zurück	--	**3SU1900-0AG0**	
		Rechts	--	**3SU1900-0AH0**	0.200
		Links	--	**3SU1900-0AJ0**	0.050
		Halt	--	**3SU1900-0AK0**	0.100
		Zu	--	**3SU1900-0AL0**	0.200
		Betrieb	--	**3SU1900-0AP0**	0.200
		Störung	--	**3SU1900-0AQ0**	0.050
		Hand Auto	--	**3SU1900-0DB0**	0.050
		Hand O Auto	--	**3SU1900-0DD0**	0.052
 3SU1900-0DN0	***Inscription in English***				
	Black/white (label/lettering)	On	--	**3SU1900-0AC16-0DJ0**	0.200
		Off	--	**3SU1900-0AC16-0DK0**	0.100
		Up	--	**3SU1900-0AC16-0DL0**	
		Down	--	**3SU1900-0AC16-0DM0**	0.200
		Forward	--	**3SU1900-0AC16-0DN0**	
		Reverse	--	**3SU1900-0AC16-0DP0**	0.400
		Right	--	**3SU1900-0AC16-0DQ0**	0.040
		Left	--	**3SU1900-0AC16-0DR0**	0.080
		Stop	--	**3SU1900-0AC16-0DS0**	0.033
		Start	--	**3SU1900-0AC16-0DT0**	0.040
		Reset	--	**3SU1900-0AC16-0DU0**	0.055
		Test	--	**3SU1900-0AC16-0DV0**	0.050
		Open	--	**3SU1900-0AC16-0DW0**	0.200
		Close	--	**3SU1900-0AC16-0DX0**	0.200
		Jog	--	**3SU1900-0AC16-0DE0**	0.200
		Running	--	**3SU1900-0AC16-0EB0**	0.200
		Fault	--	**3SU1900-0AC16-0EC0**	0.060
		Run	--	**3SU1900-0AC16-0ED0**	0.063
		Stop Start	--	**3SU1900-0AC16-0DC0**	0.200
		Off On	--	**3SU1900-0AC16-0DH0**	0.040
		Power off	--	**3SU1900-0AC16-0DF0**	0.300
		Power on	--	**3SU1900-0AC16-0DG0**	0.400
		Man O Auto	--	**3SU1900-0AC16-0DY0**	0.059
		Man Auto	--	**3SU1900-0AC16-0EA0**	0.400

*** You can order this quantity or a multiple thereof.**

Labels > Labeling plates

Multi-unit packaging, see page 2/360.

Labeling plates 12.5 mm x 27 mm

3SU1900-0AC16-0GA0

Inscription in French

Color	Marking	Symbol No.	Article No.	Weight kg
Black/white (label/lettering)	Marche	--	**3SU1900-0AC16-0GA0**	0.070
	Arrêt	--	**3SU1900-0AC16-0GB0**	0.100
	Montée	--	**3SU1900-0AC16-0GC0**	0.050
	Descente	--	**3SU1900-0AC16-0GD0**	0.100
	Avant	--	**3SU1900-0AC16-0GE0**	0.050
	Retour	--	**3SU1900-0AC16-0GF0**	0.050
	Droite	--	**3SU1900-0AC16-0GG0**	0.200
	Gauche	--	**3SU1900-0AC16-0GH0**	
	Ouvert	--	**3SU1900-0AC16-0GJ0**	0.300
	Fermé	--	**3SU1900-0AC16-0GK0**	0.600
	Rapide	--	**3SU1900-0AC16-0GL0**	
	En service	--	**3SU1900-0AC16-0GM0**	0.200
	Défaut	--	**3SU1900-0AC16-0GN0**	0.060
	Réglage	--	**3SU1900-0AC16-0GP0**	0.100
	Arrêt d'urgence	--	**3SU1900-0AC16-0GQ0**	0.039
	Hors service	--	**3SU1900-0AC16-0GR0**	0.100
	Sous tension	--	**3SU1900-0AC16-0GS0**	0.040
	Manu Auto	--	**3SU1900-0AC16-0GT0**	0.050
	Marche Arrêt	--	**3SU1900-0AC16-0GU0**	0.080
	Réarmement	--	**3SU1900-0AC16-0GV0**	0.060


3SU1900-0AC16-0QG0

With symbol

Color	Marking	Symbol No.	Article No.	Weight kg
Black/white (label/lettering)	O	--	**3SU1900-0AC16-0QA0**	
	I	--	**3SU1900-0AC16-0QB0**	
	O I	--	**3SU1900-0AC16-0QG0**	0.046
	1 2	--	**3SU1900-0AC16-0QJ0**	0.300
	↑ ARROW DIRECTION UP	--	**3SU1900-0AC16-0QS0**	0.400

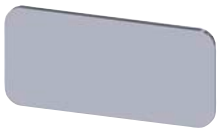
* You can order this quantity or a multiple thereof.

2

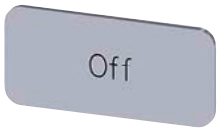
Multi-unit packaging, see page 2/360.

Labeling plates 12.5 mm x 27 mm

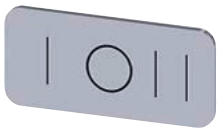
Color	Marking	Symbol No.	Article No.	Weight kg
For self-inscription				
Silver/black (label/lettering)	None	--	**3SU1900-0AC81-0AA0**	0.052
With customized inscription				
Silver/black (label/lettering)	For inscriptions or symbols, see "Options", page 2/405.		**3SU1900-0AC81-0AZ0**	
Inscription in German				
Silver/black (label/lettering)	Ein	--	**3SU1900-0AC81-0AB0**	0.100
	Aus	--	**3SU1900-0AC81-0AC0**	0.100
	Auf	--	**3SU1900-0AD0**	0.080
	Ab	--	**3SU1900-0AE0**	0.100
	Vor	--	**3SU1900-0AF0**	0.100
	Zurück	--	**3SU1900-0AG0**	0.001
	Rechts	--	**3SU1900-0AH0**	0.200
	Links	--	**3SU1900-0AJ0**	0.200
	Halt	--	**3SU1900-0AK0**	0.300
	Zu	--	**3SU1900-0AL0**	0.050
	Schnell	--	**3SU1900-0AM0**	0.050
	Langsam	--	**3SU1900-0AN0**	0.050
	Betrieb	--	**3SU1900-0AP0**	0.080
	Störung	--	**3SU1900-0AQ0**	0.059
	Einrichten	--	**3SU1900-0AR0**	0.200
	Hand Auto	--	**3SU1900-0DB0**	0.080
	Stop Start	--	**3SU1900-0DC0**	6.600
	Hand O Auto	--	**3SU1900-0DD0**	
Inscription in English				
Silver/black (label/lettering)	On	--	**3SU1900-0AC81-0DJ0**	0.400
	Off	--	**3SU1900-0AC81-0DK0**	0.200
	Up	--	**3SU1900-0AC81-0DL0**	0.050
	Down	--	**3SU1900-0AC81-0DM0**	
	Stop	--	**3SU1900-0AC81-0DS0**	0.200
	Start	--	**3SU1900-0AC81-0DT0**	0.040
	Reset	--	**3SU1900-0AC81-0DU0**	0.060
	Test	--	**3SU1900-0AC81-0DV0**	0.200
	Open	--	**3SU1900-0AC81-0DW0**	0.050
	Close	--	**3SU1900-0AC81-0DX0**	0.050
	Man O Auto	--	**3SU1900-0AC81-0DY0**	0.080
	Man Auto	--	**3SU1900-0AC81-0EA0**	0.053
	Running	--	**3SU1900-0AC81-0EB0**	
	Fault	--	**3SU1900-0AC81-0EC0**	
	Fast	--	**3SU1900-0AC81-0EE0**	0.050
	Slow	--	**3SU1900-0AC81-0EF0**	0.050
With symbol				
Silver/black (label/lettering)	O	5008 IEC	**3SU1900-0AC81-0QA0**	0.100
	I	5007 IEC	**3SU1900-0AC81-0QB0**	0.050
	II	--	**3SU1900-0AC81-0QC0**	0.080
	III	--	**3SU1900-0AC81-0QD0**	0.100
	O I	--	**3SU1900-0AC81-0QG0**	0.040
	I O II	--	**3SU1900-0AC81-0QK0**	0.060
	1 O 2	--	**3SU1900-0AC81-0QL0**	0.100
	→ ARROW DIRECTION TO RIGHT	5022 IEC	**3SU1900-0AC81-0QR0**	0.040
	↑ ARROW DIRECTION UP	--	**3SU1900-0AC81-0QS0**	0.050


3SU1900-0AC81-0AA0

3SU1900-0AC81-0AB0



3SU1900-0AC81-0DK0



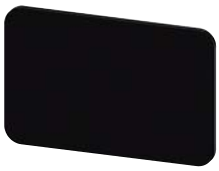
3SU1900-0AC81-0QK0

Labels > Labeling plates

2

Multi-unit packaging, see page 2/360.

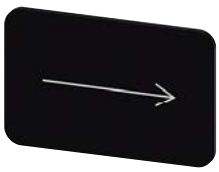
Labeling plates 17.5 mm x 27 mm



3SU1900-0AD16-0AA0

3SU1900-0AD16-0AC0

3SU1900-0AD16-0DK0



3SU1900-0AD16-0QR0

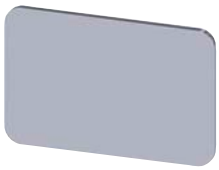
Color	Marking	Symbol No.	Article No.	Weight kg
For self-inscription				
Black/white (label/lettering)	None	--	**3SU1900-0AD16-0AA0**	0.065
With customized inscription				
Black/white (label/lettering)	For inscriptions or symbols, see "Options", page 2/405.		**3SU1900-0AD16-0AZ0**	
Inscription in German				
Black/white (label/lettering)	Ein	--	**3SU1900-0AD16-0AB0**	0.080
	Aus	--	**3SU1900-0AD16-0AC0**	0.400
	Auf	--	**3SU1900-0AD16-0AD0**	0.050
	Ab	--	**3SU1900-0AD16-0AE0**	0.050
	Vor	--	**3SU1900-0AD16-0AF0**	0.100
	Zurück	--	**3SU1900-0AD16-0AG0**	
	Halt	--	**3SU1900-0AD16-0AK0**	0.050
	Zu	--	**3SU1900-0AD16-0AL0**	0.300
	Betrieb	--	**3SU1900-0AD16-0AP0**	0.100
	Störung	--	**3SU1900-0AD16-0AQ0**	0.070
	Hand Auto	--	**3SU1900-0AD16-0DB0**	0.060
Inscription in English				
Black/white (label/lettering)	Stop Start	--	**3SU1900-0AD16-0DC0**	0.200
	On	--	**3SU1900-0AD16-0DJ0**	0.070
	Off	--	**3SU1900-0AD16-0DK0**	0.060
	Up	--	**3SU1900-0AD16-0DL0**	0.050
	Down	--	**3SU1900-0AD16-0DM0**	0.005
	Forward	--	**3SU1900-0AD16-0DN0**	
	Reverse	--	**3SU1900-0AD16-0DP0**	0.100
	Right	--	**3SU1900-0AD16-0DQ0**	0.100
	Stop	--	**3SU1900-0AD16-0DS0**	0.071
	Start	--	**3SU1900-0AD16-0DT0**	0.010
	Open	--	**3SU1900-0AD16-0DW0**	0.100
	Close	--	**3SU1900-0AD16-0DX0**	0.100
	Man Auto	--	**3SU1900-0AD16-0EA0**	0.050
	Running	--	**3SU1900-0AD16-0EB0**	0.060
	Fault	--	**3SU1900-0AD16-0EC0**	0.050
Inscription in French				
Black/white (label/lettering)	Marche	--	**3SU1900-0AD16-0GA0**	0.100
	Arrêt	--	**3SU1900-0AD16-0GB0**	
	Droite	--	**3SU1900-0AD16-0GG0**	0.100
	Gauche	--	**3SU1900-0AD16-0GH0**	0.100
	En service	--	**3SU1900-0AD16-0GM0**	0.200
	Défaut	--	**3SU1900-0AD16-0GN0**	0.100
	Sous tension	--	**3SU1900-0AD16-0GS0**	0.100
	Manu Auto	--	**3SU1900-0AD16-0GT0**	0.100
	Marche Arrêt	--	**3SU1900-0AD16-0GU0**	0.050
	Réarmement	--	**3SU1900-0AD16-0GV0**	0.100
With symbol				
Black/white (label/lettering)	O	5008 IEC	**3SU1900-0AD16-0QA0**	0.080
	I	5007 IEC	**3SU1900-0AD16-0QB0**	0.050
	O I	--	**3SU1900-0AD16-0QG0**	0.080
	→ ARROW DIRECTION TO RIGHT	5022 IEC	**3SU1900-0AD16-0QR0**	0.200
	↑ ARROW DIRECTION UP	--	**3SU1900-0AD16-0QS0**	0.060

* You can order this quantity or a multiple thereof.

2

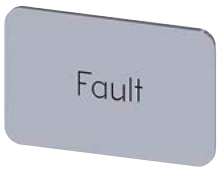
Multi-unit packaging, see page 2/360.

Labeling plates 17.5 mm x 27 mm

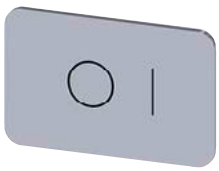


3SU1900-0AD81-0AA0

3SU1900-0AD81-0AP0



3SU1900-0AD81-0EC0



3SU1900-0AD81-0QG0

Color	Marking	Symbol No.	Article No.	Weight kg
For self-inscription				
Silver/black (label/lettering)	None	--	**3SU1900-0AD81-0AA0**	0.060
With customized inscription				
Silver/black (label/lettering)	For inscriptions or symbols, see "Options", page 2/405.		**3SU1900-0AD81-0AZ0**	
Inscription in German				
Silver/black (label/lettering)	Ein	--	**3SU1900-0AD81-0AB0**	0.400
	Aus	--	**3SU1900-0AD81-0AC0**	0.100
	Auf	--	**3SU1900-0AD81-0AD0**	0.400
	Ab	--	**3SU1900-0AD81-0AE0**	
	Vor	--	**3SU1900-0AD81-0AF0**	
	Zurück	--	**3SU1900-0AD81-0AG0**	0.050
	Rechts	--	**3SU1900-0AD81-0AH0**	0.100
	Halt	--	**3SU1900-0AK0**	0.050
	Zu	--	**3SU1900-0AD81-0AL0**	0.400
	Betrieb	--	**3SU1900-0AD81-0AP0**	0.080
	Störung	--	**3SU1900-0AD81-0AQ0**	0.059
	Hand Auto	--	**3SU1900-0AD81-0DB0**	0.400
	Hand O Auto	--	**3SU1900-0DD0**	
Inscription in English				
Silver/black (label/lettering)	On	--	**3SU1900-0AD81-0DJ0**	0.200
	Off	--	**3SU1900-0AD81-0DK0**	
	Stop	--	**3SU1900-0AD81-0DS0**	0.200
	Start	--	**3SU1900-0AD81-0DT0**	0.080
	Reset	--	**3SU1900-0AD81-0DU0**	0.100
	Man O Auto	--	**3SU1900-0AD81-0DY0**	0.300
	Fault	--	**3SU1900-0AD81-0EC0**	0.070
With symbol				
Silver/black (label/lettering)	O	5008 IEC	**3SU1900-0AD81-0QA0**	0.100
	I	5007 IEC	**3SU1900-0AD81-0QB0**	0.200
	O I	--	**3SU1900-0AD81-0QG0**	0.080
	I O II	--	**3SU1900-0AD81-0QK0**	0.060
	1 O 2	--	**3SU1900-0AD81-0QL0**	0.400
	→ ARROW DIRECTION TO RIGHT	5022 IEC	**3SU1900-0AD81-0QR0**	0.200
	↑ ARROW DIRECTION UP	--	**3SU1900-0AD81-0QS0**	0.100

* You can order this quantity or a multiple thereof.

Labels > Labeling plates

Multi-unit packaging, see page 2/360.

Labeling plates 27 mm x 27 mm

3SU1900-0AE16-0AA0

3SU1900-0AE81-0AA0

3SU1900-0AE16-0AD0

3SU1900-0AE16-0DK0

3SU1900-0AE16-0GB0

3SU1900-0AE16-0QG0

Color	Marking	Symbol No.	Article No.	Weight kg
For self-inscription				
Black/white (label/lettering)	None	--	**3SU1900-0AE16-0AA0**	0.094
Silver/black (label/lettering)	None	--	**3SU1900-0AE81-0AA0**	0.094
With customized inscription				
Black/white (label/lettering)	For inscriptions or symbols, see "Options", page 2/405.		**3SU1900-0AE16-0AZ0**	
Silver/black (label/lettering)			**3SU1900-0AE81-0AZ0**	
Inscription in German				
Black/white (label/lettering)	Ein	--	**3SU1900-0AE16-0AB0**	
	Aus	--	**3SU1900-0AE16-0AC0**	0.100
	Auf	--	**3SU1900-0AE16-0AD0**	0.050
	Ab	--	**3SU1900-0AE16-0AE0**	0.100
	Vor	--	**3SU1900-0AE16-0AF0**	0.200
	Zurück	--	**3SU1900-0AE16-0AG0**	0.200
	Rechts	--	**3SU1900-0AE16-0AH0**	0.050
	Links	--	**3SU1900-0AE16-0AJ0**	0.100
	Halt	--	**3SU1900-0AE16-0AK0**	0.400
	Zu	--	**3SU1900-0AE16-0AL0**	0.300
	Betrieb	--	**3SU1900-0AE16-0AP0**	0.100
	Störung	--	**3SU1900-0AE16-0AQ0**	0.200
	Hand Auto	--	**3SU1900-0AE16-0DB0**	0.200
Inscription in English				
Black/white (label/lettering)	On	--	**3SU1900-0AE16-0DJ0**	0.200
	Off	--	**3SU1900-0AE16-0DK0**	
	Up	--	**3SU1900-0AE16-0DL0**	0.100
	Down	--	**3SU1900-0AE16-0DM0**	0.090
	Forward	--	**3SU1900-0AE16-0DN0**	0.300
	Reverse	--	**3SU1900-0AE16-0DP0**	
	Stop	--	**3SU1900-0AE16-0DS0**	0.100
	Start	--	**3SU1900-0AE16-0DT0**	
	EMERGENCY STOP	--	**3SU1900-0AE16-0DA0**	0.300
	Stop Start	--	**3SU1900-0AE16-0DC0**	0.100
Inscription in French				
Black/white (label/lettering)	Marche	--	**3SU1900-0AE16-0GA0**	0.070
	Arrêt	--	**3SU1900-0AE16-0GB0**	0.100
	Montée	--	**3SU1900-0AE16-0GC0**	0.100
	Descente	--	**3SU1900-0AE16-0GD0**	0.100
	En service	--	**3SU1900-0AE16-0GM0**	0.100
	Défaut	--	**3SU1900-0AE16-0GN0**	0.100
	Sous tension	--	**3SU1900-0AE16-0GS0**	0.100
	Manu Auto	--	**3SU1900-0AE16-0GT0**	0.050
	Marche Arrêt		**3SU1900-0AE16-0GU0**	0.080
With symbol				
Black/white (label/lettering)	O I	--	**3SU1900-0AE16-0QG0**	0.200
	→ ARROW DIRECTION TO RIGHT	5022 IEC	**3SU1900-0AE16-0QR0**	0.086

* You can order this quantity or a multiple thereof.

Options

Customized inscriptions

The labels can be inscribed with text and symbols not listed in the ordering data.

The default typeface used for inscriptions with text is Arial and the text is centered.

Up to 11 characters per line are possible.

Font height

Label size 12.5 mm × 27 mm, max. 3 lines:

Font height	1-line	4 mm
	2-line	3 mm
	3-line	1.75 mm

Label size 17.5 mm × 27 mm, max. 3 lines:

Font height	1- to 2-line	4 mm
	3-line	3 mm

Label size 27 mm × 27 mm, max. 5 lines:

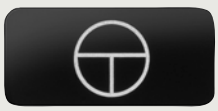
Font height	1- to 3-line	4 mm
	4-line	3.5 mm
	5-line	3 mm

Examples of customized inscriptions

Two-line inscription in upper/lower case (Q0Y)

Single-line inscription in upper case (Q1Y)

Three-line inscription in lower case (Q2Y)



Symbol number 5011 according to IEC 60417 (Q3Y)

Any symbol according to order form supplement (Q9Y)

Ordering notes

Append the following order codes to the article number:

- **Q0Y:** Text line(s) in upper/lower case, always upper case for beginning of line,
  e.g. Z1=Lift Z2=Lower
- **Q1Y:** Text line(s) in upper case,
  e.g. Z1=LIFT Z2=LOWER
- **Q2Y:** Text line(s) in lower case,
  e.g. Z1=lift off Z2=lower off
- **Q5Y:** Text line(s) in upper/lower case, all words begin with upper case letters,
  e.g. Z1=Lift Off Z2=Lower Off
- **Q3Y:** Symbol with number according to ISO 7000 or IEC 60417
- **Q9Y:** Inscription of choice, text or symbol, can only be ordered via SIRIUS ACT configurator with a Configuration Identification Number (CIN)

When ordering, specify the required inscription without spaces after Z=, Z1=, etc., in addition to the article number and order code (see ordering examples 1 to 3).

In the case of multi-line inscriptions, the text must be assigned to the respective line,
e.g. Z1=LIFT Z2=LOWER (see ordering example 1).

Symbols can also be ordered with numbers according to ISO 7000 or IEC 60417 (see ordering examples 2 and 3).

The SIRIUS ACT configurator must be used to select special inscriptions and symbols (see ordering examples 4). In this case a CIN (Configuration Identification Number) is generated for placement of future orders. It is then possible to place an order directly via the SIRIUS ACT configurator using the CIN (Mall shopping cart) or via the standard ordering channels.

Standard ordering channels:

- Configurator: www.siemens.com/sirius-act/configurator
- Industry Mall: www.siemens.com/industrymall

Ordering example 1

A label with 2 lines of text is required:

3SU1900-0AC16-0AZ0
Q1Y
Z1=LIFT
Z2=LOWER

Ordering example 2

A label inscribed with symbol No. 5011 according to IEC 60417 is required:

3SU1900-0AC16-0AZ0
Q3Y
Z=5011 IEC

Ordering example 3

A label inscribed with symbol No. 1118 according to ISO 7000 is required:

3SU1900-0AC16-0AZ0
Q3Y
Z=1118 ISO

Ordering example 4

An indicator light with customized inscription is required:

3SU1900-0AC16-0AZ0
Q9Y
CIN.....
(20-digit number generated from the SIRIUS ACT configurator)

2

Overview

The labeling plates in size 22 mm x 22 mm can be attached to enclosures with recesses for labels. There are versions in black with white print or silver-colored with black print.

Inscription

The inscription is in upper/lower case, all words begin with upper case letters. Graphic symbols, including those not listed in the catalog, are according to ISO 7000 or IEC 60417.

For customized inscriptions, see "Options", page 2/409.

Selection and ordering data

Multi-unit packaging, see page 2/360.

Color	Marking	Symbol No.	Article No.	Weight kg
Labeling plates 22 mm x 22 mm				
For self-inscription				
Black/white (label/lettering)	None	--	**3SU1900-0AF16-0AA0**	0.073
With customized inscription				
Black/white (label/lettering)	For inscriptions or symbols, see "Options", page 2/409.		**3SU1900-0AF16-0AZ0**	
Inscription in German				
Black/white (label/lettering)	Ein	--	**3SU1900-0AF16-0AB0**	0.001
	Aus	--	**3SU1900-0AF16-0AC0**	
	Auf	--	**3SU1900-0AF16-0AD0**	0.001
	Ab	--	**3SU1900-0AF16-0AE0**	0.001
	Vor	--	**3SU1900-0AF16-0AF0**	
	Zurück	--	**3SU1900-0AF16-0AG0**	0.002
	Rechts	--	**3SU1900-0AF16-0AH0**	0.001
	Links	--	**3SU1900-0AF16-0AJ0**	0.001
	Halt	--	**3SU1900-0AF16-0AK0**	
	Zu	--	**3SU1900-0AF16-0AL0**	0.001
	Schnell	--	**3SU1900-0AF16-0AM0**	0.001
	Langsam	--	**3SU1900-0AF16-0AN0**	
	Betrieb	--	**3SU1900-0AF16-0AP0**	0.002
	Störung	--	**3SU1900-0AF16-0AQ0**	0.001
	Einrichten	--	**3SU1900-0AF16-0AR0**	0.002
	NOT AUS	--	**3SU1900-0AF16-0AS0**	0.001
Inscription in English				
Black/white (label/lettering)	On	--	**3SU1900-0AF16-0DJ0**	
	Off	--	**3SU1900-0AF16-0DK0**	0.001
	Up	--	**3SU1900-0AF16-0DL0**	0.001
	Down	--	**3SU1900-0AF16-0DM0**	
	Forward	--	**3SU1900-0AF16-0DN0**	0.004
	Right	--	**3SU1900-0AF16-0DQ0**	0.001
	Left	--	**3SU1900-0AF16-0DR0**	
	Stop	--	**3SU1900-0AF16-0DS0**	0.001
	Start	--	**3SU1900-0AF16-0DT0**	0.001
	Reset	--	**3SU1900-0AF16-0DU0**	0.001
	Test	--	**3SU1900-0AF16-0DV0**	0.001
	Open	--	**3SU1900-0AF16-0DW0**	0.001
	Close	--	**3SU1900-0AF16-0DX0**	
	Running	--	**3SU1900-0AF16-0EB0**	0.001
	Fault	--	**3SU1900-0AF16-0EC0**	0.004
	Fast	--	**3SU1900-0AF16-0EE0**	0.001
	Slow	--	**3SU1900-0AF16-0EF0**	0.001
	EMERGENCY STOP	--	**3SU1900-0AF16-0DA0**	0.001


3SU1900-0AF16-0AA0

3SU1900-0AF16-0AB0

3SU1900-0AF16-0AP0

3SU1900-0AF16-0DM0

3SU1900-0AF16-0EC0

* You can order this quantity or a multiple thereof.

Multi-unit packaging, see page 2/360.

Labeling plates 22 mm x 22 mm

3SU1900-0AF16-0GA0

3SU1900-0AF16-0GB0


3SU1900-0AF16-0QQ0


3SU1900-0AF16-0RW0

Inscription in French

Color	Marking	Symbol No.	Article No.	Weight kg
Black/white (label/lettering)	Marche	--	**3SU1900-0AF16-0GA0**	0.001
	Arrêt	--	**3SU1900-0AF16-0GB0**	
	Montée	--	**3SU1900-0AF16-0GC0**	0.001
	Descente	--	**3SU1900-0AF16-0GD0**	0.001
	Retour	--	**3SU1900-0AF16-0GF0**	0.001
	Droite	--	**3SU1900-0AF16-0GG0**	0.001
	Gauche	--	**3SU1900-0AF16-0GH0**	0.003
	Ouvert	--	**3SU1900-0AF16-0GJ0**	0.001
	Fermé	--	**3SU1900-0AF16-0GK0**	0.001
	Rapide	--	**3SU1900-0AF16-0GL0**	0.001
	En service	--	**3SU1900-0AF16-0GM0**	0.003
	Défaut	--	**3SU1900-0AF16-0GN0**	
	Sous tension	--	**3SU1900-0AF16-0GS0**	
	Manu Auto	--	**3SU1900-0AF16-0GT0**	0.003
	Marche Arrêt	--	**3SU1900-0AF16-0GU0**	0.004
	Réarmement	--	**3SU1900-0AF16-0GV0**	
	Lent	--	**3SU1900-0AF16-0GW0**	0.004
	Arrêt d'urgence	--	**3SU1900-0AF16-0GQ0**	0.001

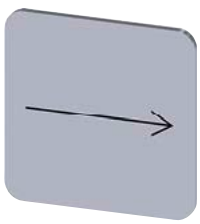
With symbol (ON/OFF)

Color	Marking	Symbol No.	Article No.	Weight kg
Black/white (label/lettering)	O	5008 IEC	**3SU1900-0AF16-0QA0**	0.001
	I	5007 IEC	**3SU1900-0AF16-0QB0**	
	II	--	**3SU1900-0AF16-0QC0**	0.002
	III	--	**3SU1900-0AF16-0QD0**	0.004
	O I	--	**3SU1900-0AF16-0QG0**	
	I O II	--	**3SU1900-0AF16-0QK0**	0.004
	I O (below each other)	--	**3SU1900-0AF16-0QP0**	0.001
	II O I (below each other)	--	**3SU1900-0AF16-0QQ0**	0.001

With symbol (graphic)

Color			Symbol No.	Article No.	Weight kg
Black/white (label/lettering)	→	ARROW DIRECTION TO RIGHT	5022 IEC	**3SU1900-0AF16-0QR0**	0.001
		PUMP	0134 ISO	**3SU1900-0AF16-0RD0**	0.004
		FAN	--	**3SU1900-0AF16-0RV0**	0.001
		COOLING	--	**3SU1900-0AF16-0RW0**	0.001
		ILLUMINATION	--	**3SU1900-0AF16-0RX0**	
		MOTOR	--	**3SU1900-0AF16-0RY0**	

* You can order this quantity or a multiple thereof.

Multi-unit packaging, see page 2/360.	Color	Marking	Symbol No.	Article No.	Weight kg
Labeling plates 22 mm x 22 mm					
 3SU1900-0AF81-0AA0	***For self-inscription***				
	Silver/black (label/lettering)	None	--	**3SU1900-0AF81-0AA0**	0.067
	With customized inscription				
	Silver/black (label/lettering)	For inscriptions or symbols, see "Options", page 2/409.		**3SU1900-0AF81-0AZ0**	
 3SU1900-0AF81-0AB0	***Inscription in German***				
	Silver/black (label/lettering)	Ein	--	**3SU1900-0AF81-0AB0**	0.004
		Aus	--	**3SU1900-0AF81-0AC0**	0.001
		Auf	--	**3SU1900-0AF81-0AD0**	0.001
		Ab	--	**3SU1900-0AF81-0AE0**	0.001
		Vor	--	**3SU1900-0AF81-0AF0**	0.001
		Zurück	--	**3SU1900-0AF81-0AG0**	0.002
		Rechts	--	**3SU1900-0AF81-0AH0**	
		Links	--	**3SU1900-0AF81-0AJ0**	0.004
		Halt	--	**3SU1900-0AF81-0AK0**	0.001
		Zu	--	**3SU1900-0AF81-0AL0**	0.002
		Schnell	--	**3SU1900-0AF81-0AM0**	0.002
		Langsam	--	**3SU1900-0AF81-0AN0**	
 3SU1900-0AF81-0DD0		Betrieb	--	**3SU1900-0AF81-0AP0**	0.001
		Störung	--	**3SU1900-0AF81-0AQ0**	
		Einrichten	--	**3SU1900-0AR0**	0.001
		NOT AUS	--	**3SU1900-0AS0**	
		NOT-HALT	--	**3SU1900-0AT0**	0.001
		Hand O Auto	--	**3SU1900-0DD0**	
 3SU1900-0AF81-0DU0	***Inscription in English***				
	Silver/black (label/lettering)	Stop	--	**3SU1900-0AF81-0DS0**	0.004
		Start	--	**3SU1900-0AF81-0DT0**	0.001
		Reset	--	**3SU1900-0DU0**	0.001
		Test	--	**3SU1900-0DV0**	0.001
		Open	--	**3SU1900-0DW0**	
 3SU1900-0AF81-0QK0	***With symbol (ON/OFF)***				
	Silver/black (label/lettering)	O	5008 IEC	**3SU1900-0AF81-0QA0**	0.004
		I	5007 IEC	**3SU1900-0AF81-0QB0**	0.001
		II	--	**3SU1900-0AF81-0QC0**	
		III	--	**3SU1900-0AF81-0QD0**	0.004
		O I	--	**3SU1900-0AF81-0QG0**	
		I O II	--	**3SU1900-0AF81-0QK0**	
		I O (below each other)	--	**3SU1900-0AF81-0QP0**	0.001
		II O I (below each other)	--	**3SU1900-0AF81-0QQ0**	
 3SU1900-0AF81-0QR0	***With symbol (graphic)***				
	Silver/black (label/lettering)	→ ARROW DIRECTION TO RIGHT	5022 IEC	**3SU1900-0AF81-0QR0**	

* You can order this quantity or a multiple thereof.

Options

Customized inscriptions

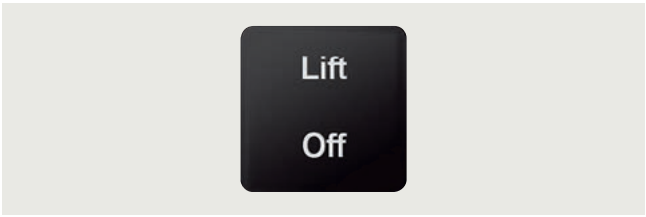
The labels can be inscribed with texts and symbols not listed in the ordering data.

The default typeface used for inscriptions with text is Arial and the text is centered.

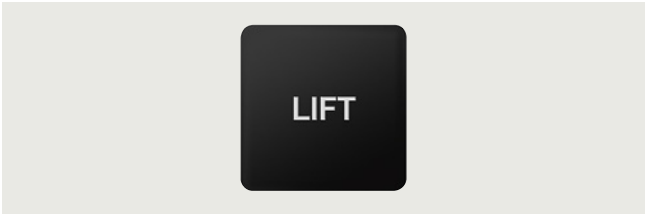
The font height is 4 mm (1- and 2-line) and 3.5 mm (3-line).

Up to 8 characters per line are possible.

Examples of customized inscriptions



Two-line inscription in upper/lower case (Q0Y)



Single-line inscription in upper case (Q1Y)

Backing plate for enclosures, customized inscription (Q2Y)

Symbol number 5011 according to IEC 60417 (Q3Y)

Any symbol according to order form supplement (Q9Y)

Ordering notes

Append the following order codes to the article number:

- **Q0Y:** Text line(s) in upper/lower case, always upper case for beginning of line,
  e.g. Z1=Lift Z2=Lower
- **Q1Y:** Text line(s) in upper case,
  e.g. Z1=LIFT Z2=LOWER
- **Q2Y:** Text line(s) in lower case,
  e.g. Z1=lift off Z2=lower off
- **Q5Y:** Text line(s) in upper/lower case, all words begin with upper case letters,
  e.g. Z1=Lift Off Z2=Lower Off
- **Q3Y:** Symbol with number according to ISO 7000 or IEC 60417
- **Q9Y:** Inscription of choice, text or symbol, can only be ordered via SIRIUS ACT configurator with a Configuration Identification Number (CIN)

When ordering, specify the required inscription without spaces after Z=, Z1=, etc., in addition to the article number and order code (see ordering examples 1 to 3).

In the case of multi-line inscriptions, the text must be assigned to the respective line,
e.g. Z1=LIFT Z2=LOWER (see ordering example 1).

Symbols can also be ordered with numbers according to ISO 7000 or IEC 60417 (see ordering example 2 and 3).

The SIRIUS ACT configurator must be used to select special inscriptions and symbols (see ordering example 4). In this case a CIN (Configuration Identification Number) is generated for placement of future orders. It is then possible to place an order directly via the SIRIUS ACT configurator using the CIN (Mall shopping cart) or via the standard ordering channels.

Standard ordering channels:

- Configurator: www.siemens.com/sirius-act/configurator
- Industry Mall: www.siemens.com/industrymall

Ordering example 1

A label with 2 lines of text is required:

3SU1900-0AF16-0AZ0
Q1Y
Z1=LIFT
Z2=LOWER

Ordering example 2

A label inscribed with symbol No. 5011 according to IEC 60417 is required:

3SU1900-0AF16-0AZ0
Q3Y
Z=5011 IEC

Ordering example 3

A label inscribed with symbol No. 1118 according to ISO 7000 is required:

3SU1900-0AF16-0AZ0
Q3Y
Z=1118 ISO

Ordering example 4

A label with customized inscription is required:

3SU1900-0AF16-0AZ0
Q9Y
CIN.....
(20-digit number generated from the SIRIUS ACT configurator)

2

Overview

More information

For the Label Designer software, see
www.siemens.com/sirius-label-designer

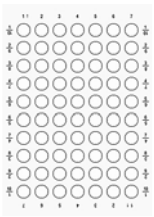
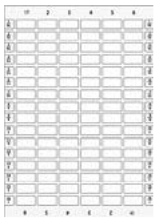
Label inscriptions

Using the *Label Designer* software, which can be downloaded from the internet, and the labeling plates for laser inscription you can create your own customized labels with a standard laser printer. The self-adhesive or snap-on labels can be stuck or snapped onto the corresponding label holders. Round labels are provided for inserting in illuminated pushbuttons and switches.

The labels are suitable for inscription with one to three lines of text or symbols.

For applications with more exacting requirements we recommend factory-printed labeling plates and insert labels (laser-printed or engraved depending on the type).

Selection and ordering data

	Fixing method	Height mm	Width mm	Article No.	Weight kg
Labels for printing – insert labels					
 3SU1900-0BH60-0AA0	Insert	--	--	**3SU1900-0BH60-0AA0**	0.029
Labels for printing – labeling plates					
 3SU1900-0BJ61-0AA0	Self-adhesive	12.5 17.5 27 22	27.5 27 27 22	**3SU1900-0BJ61-0AA0** **3SU1900-0BK61-0AA0** **3SU1900-0BL61-0AA0** **3SU1900-0BM61-0AA0**	0.033 0.034 0.050 0.035

* You can order this quantity or a multiple thereof.

Selection and ordering data

Multi-unit packaging, see page 2/360.	Color	Mounting diameter	Fixing method	Outer diameter	Marking	Article No.	Weight
		mm		mm			kg
EMERGENCY STOP backing plates (2 mm thick)							
 3SU1900-0BB31-0AT0	Yellow/black (label/ lettering)	22	None	45	None	**3SU1900-0BA31-0AA0**	0.002
					EMERGENCY OFF (Polish)	**3SU1900-0BA31-0ND0**	0.002
				60	NOT-HALT, EMERGENCY STOP, ARRÊT D'URGENCE, EMERGENZA (German, English, French, Italian)	**3SU1900-0BN31-0NC0**	0.004
				75	None	**3SU1900-0BB31-0AA0**	0.007
					NOT-AUS	**3SU1900-0BB31-0AS0**	0.007
					NOT-HALT	**3SU1900-0BB31-0AT0**	0.007
					EMERGENCY STOP	**3SU1900-0BB31-0DA0**	0.007
					EMERGENCY OFF (Polish)	**3SU1900-0BB31-0ND0**	0.007
	With customized inscription						
	Yellow/black (label/ lettering)	22	None	45	For inscriptions or symbols, see "Options", page 2/413.	**3SU1900-0BA31-0AZ0**	
				75		**3SU1900-0BB31-0AZ0**	
EMERGENCY STOP backing plates (5 mm thick), illuminated (24 V AC/DC)							
 3SU1901-0BD31-0AA0	Yellow/black (label/ lettering)	22	Self-adhesive	60	None	**3SU1901-0BD31-0AA0**	0.018
					NOT-AUS	**3SU1901-0BD31-0AS0**	0.018
					NOT-HALT	**3SU1901-0BD31-0AT0**	0.018
					EMERGENCY STOP	**3SU1901-0BD31-0DA0**	0.018
					NOT-HALT, EMERGENCY STOP, EMERGENZA, EMERGENCIA (German, English, Italian, Spanish)	**3SU1901-0BD31-0NB0**	0.018
	With customized inscription						
	Yellow/black (label/ lettering)	22	None	60	For inscriptions or symbols, see "Options", page 2/413.	**3SU1901-0BD31-0AZ0**	
EMERGENCY STOP backing plates (0.3 mm thick)							
 3SU1900-0BC31-0NB0	Yellow/black (label/ lettering)	22	Self-adhesive	75	None	**3SU1900-0BC31-0AA0**	0.002
					NOT-AUS	**3SU1900-0BC31-0AS0**	0.001
					NOT-HALT	**3SU1900-0BC31-0AT0**	0.001
					EMERGENCY STOP	**3SU1900-0BC31-0DA0**	0.001
					ARRÊT D'URGENCE	**3SU1900-0BC31-0GQ0**	0.001
					EMERGENZA	**3SU1900-0BC31-0JA0**	0.002
					Nodstop	**3SU1900-0BC31-0LA0**	0.002
					EMERGENCY OFF (Chinese)	**3SU1900-0BC31-0MA0**	0.001
					NOT-HALT, EMERGENCY STOP, EMERGENZA, EMERGENCIA (German, English, Italian, Spanish)	**3SU1900-0BC31-0NB0**	0.001
	With customized inscription						
	Yellow/black (label/ lettering)	22	Self-adhesive	75	For inscriptions or symbols, see "Options", page 2/413.	**3SU1900-0BC31-0AZ0**	
Labeling plates (1.2 mm thick) for potentiometers							
 3SU1900-0BG16-0RU0	Black/white (label/ lettering)	22	None	40	--	**3SU1900-0BG16-0AA0**	0.002
					SYMBOL: 0 ... 9	**3SU1900-0BG16-0RT0**	0.001
					SYMBOL: 0 … 10	**3SU1900-0BG16-0SA0**	0.002
					SYMBOL: Power up	**3SU1900-0BG16-0RU0**	0.001

*** You can order this quantity or a multiple thereof.**

Labels > Other labels

	Color	Mounting diameter	Label fastening method	Height	Width	Marking	Article No.	Weight
		mm		mm	mm			kg
Labeling plates (0.3 mm thick) for enclosures with EMERGENCY STOP without recess								
 3SU1900-0BE31-0AS0	Yellow/black (label/ lettering)	22	Self-adhesive	38	112	None NOT-AUS NOT-HALT	**3SU1900-0BE31-0AA0** **3SU1900-0BE31-0AS0** **3SU1900-0BE31-0AT0**	0.002 0.002 0.004
Labeling plates (0.3 mm thick) for enclosures with EMERGENCY STOP with recess								
3SU1900-0BF31-0AA0	Yellow/black (label/ lettering)	22	Self-adhesive	38	112	None	**3SU1900-0BF31-0AA0**	0.001
Device labeling plates for modules with front-plate mounting								
3SU1900-0AY61-0AA0	White/black (label/ lettering)	22	Insert	9.5	10.5	None	**3SU1900-0AY61-0AA0**	0.029

*** You can order this quantity or a multiple thereof.**

Options

Customized inscriptions

The labels can be inscribed with text not listed in the ordering data.

The EMERGENCY STOP backing plates can be divided into as many as four radial segments. Each segment can be custom-labeled.

The default typeface used for inscriptions with text is Arial and the text is centered.

EMERGENCY STOP backing plate 75 mm:

The font height is 5 mm.
With two radial segments, up to 20 characters are permissible.
With four radial segments, up to 10 characters are permissible.

EMERGENCY STOP backing plate 60 mm:

The font height is 4 mm.
With two radial segments, up to 16 characters are permissible.
With four radial segments, up to 8 characters are permissible.

EMERGENCY STOP backing plate 45 mm:

The font height is 4 mm.
With two radial segments, up to 10 characters are permissible.

Ordering notes

Append the following order codes to the article number:

- **Q0Y:** Segment(s) in upper/lower case, always upper case for beginning of segment, e.g. Z1=Not halt Z2=Emergency stop
- **Q1Y:** Segment(s) in upper case, e.g. Z1=NOT HALT Z2=EMERGENCY STOP
- **Q2Y:** Segment(s) in lower case, e.g. Z1=not halt Z2=emergency stop
- **Q5Y:** Segment(s) in upper/lower case, all words begin with upper case letters, e.g. Z1=Not Halt Z2=Emergency Stop
- **Q3Y:** Symbol with number according to ISO 7000 or IEC 60417
- **Q9Y:** Inscription of choice, text or symbol, can only be ordered via SIRIUS ACT configurator with a Configuration Identification Number (CIN)

When ordering, specify the required inscription without spaces after Z=, Z1=, etc., in addition to the article number and order code (see ordering examples 1 to 4).

Symbols can also be ordered with numbers according to ISO 7000 or IEC 60417 (see ordering examples 2 and 3).

The SIRIUS ACT configurator must be used to select special inscriptions and symbols (see ordering example 5). In this case a CIN (Configuration Identification Number) is generated for placement of future orders. It is then possible to place an order directly via the SIRIUS ACT configurator using the CIN (Mall shopping cart) or via the standard ordering channels.

Standard ordering channels:

- Configurator: www.siemens.com/sirius-act/configurator
- Industry Mall: www.siemens.com/industrymall

With ordering options Q0Y, Q1Y, Q2Y, Q3Y and Q5Y, a single-line inscription of two or four radial segments can be implemented. The text or symbol must be assigned to the respective radial segments as follows:

Ordering example 1, two radial segments

An EMERGENCY STOP backing plate,
diameter 75 mm, with two radial segments is required

3SU1900-0BB31-0AZ0
Q1Y
Z1=NOT
Z2=HALT

Ordering example 2, four radial segments

An EMERGENCY STOP backing plate,
diameter 75 mm, with four radial segments is required

3SU1900-0BB31-0AZ0
Q1Y
Z1=E-STOP
Z2=EMERGENCIA
Z3=NOT-HALT
Z4=EMERGENZA

Ordering example 3

An EMERGENCY STOP backing plate,
diameter 75 mm, with symbol No. 5011 according to IEC 60417 is required:

3SU1900-0BB31-0AZ0
Q3Y
Z=5011 IEC

Ordering example 4

An EMERGENCY STOP backing plate,
diameter 75 mm, with symbol No. 1118 according to ISO 7000 is required:

3SU1900-0BB31-0AZ0
Q3Y
Z=1118 ISO

Ordering example 5

An EMERGENCY STOP backing plate,
diameter 75 mm, with customized inscription is required:

3SU1900-0BB31-0AZ0
Q9Y
CIN.....
(20-digit number generated from the SIRIUS ACT configurator)

Protection/access protection

Overview

Protection and access protection are suitable for actuators and indicators with diameters 22 mm and 30 mm.

The protective collars cannot be used in conjunction with label holders or single frames.

Selection and ordering data

	Product designation Product version	Mounting diameter	Material	Color	Article No.	Weight
		mm				kg
Protective caps						
 3SU1900-0DA10-0AA0	**Sealable cap for pushbuttons, flat**	22	Plastic	Black Clear	**3SU1900-0DA10-0AA0** **3SU1900-0DA70-0AA0**	0.006 0.006
 3SU1900-0EL70-0AA0	**Sealable caps** for • Pushbuttons, raised • Pushbuttons with front ring, raised • Pushbuttons with front ring, raised, castellated	22	Plastic	Black Clear	**3SU1900-0EL10-0AA0** **3SU1900-0EL70-0AA0**	0.008 0.007
 3SU1960-0DA70-0AA0	**Sealable cap for pushbuttons, flat**	30	Plastic	Clear	**3SU1960-0DA70-0AA0**	0.012
 3SU1960-0EY70-0AA0	**Sealable caps for selector switches, short**	30	Plastic	Clear	**3SU1960-0EY70-0AA0**	0.025
 3SU1900-0DB70-0AA0	**Silicone protective caps for pushbuttons, flat**	22	Plastic	Clear	**3SU1900-0DB70-0AA0**	0.007

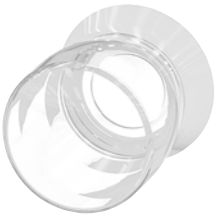
*** You can order this quantity or a multiple thereof.**

	Product designation Product version	Mounting diameter mm	Material	Color	Article No.	Weight kg
Protective caps						
 3SU1900-0ED70-0AA0	**Silicone-free protective caps for pushbuttons, flat**	22	Plastic	Clear	**3SU1900-0ED70-0AA0**	0.007
 3SU1900-0DC70-0AA0	**Silicone protective caps for pushbuttons, raised**	22	Plastic	Clear	**3SU1900-0DC70-0AA0**	0.050
 3SU1900-0EE70-0AA0	**Silicone-free protective caps for pushbuttons, raised**	22	Plastic	Clear	**3SU1900-0EE70-0AA0**	0.006
 3SU1900-0DD70-0AA0	**Silicone protective caps for selectors, short**	22	Plastic	Clear	**3SU1900-0DD70-0AA0**	0.009
 3SU1900-0EF70-0AA0	**Silicone-free protective caps for selectors, short**	22	Plastic	Clear	**3SU1900-0EF70-0AA0**	0.007
 3SU1900-0DE70-0AA0	**Silicone protective caps for mushroom pushbuttons, 40 mm**	22	Plastic	Clear	**3SU1900-0DE70-0AA0**	0.012

*** You can order this quantity or a multiple thereof.**

Protection/access protection

Multi-unit packaging, see page 2/360.

Product designation Product version	Mounting diameter mm	Material	Color	Article No.	Weight kg
Protective caps					
 3SU1900-0EG70-0AA0 **Silicone-free protective caps for mushroom pushbuttons, 40 mm**	22	Plastic	Clear	**3SU1900-0EG70-0AA0**	0.009
Silicone protective caps for EMERGENCY STOP, 30 mm	22	Plastic	Clear	**3SU1900-0EN70-0AA0**	0.031
 3SU1900-0DF70-0AA0 **Silicone protective caps for EMERGENCY STOP, 40 mm**	22	Plastic	Clear	**3SU1900-0DF70-0AA0**	0.018
 3SU1900-0DG70-0AA0 **Silicone protective caps for twin pushbuttons, flat**	22	Plastic	Clear	**3SU1900-0DG70-0AA0**	0.011
 3SU1900-0DH70-0AA0 **Silicone protective caps for twin pushbuttons, raised**	22	Plastic	Clear	**3SU1900-0DH70-0AA0**	0.011
 3SU1900-0EK70-0AA0 **Silicone-free protective caps for twin pushbuttons, raised**	22	Plastic	Clear	**3SU1900-0EK70-0AA0**	0.012
 3SU1900-0EB10-0AA0 **Dust caps for key-operated switches** For Siemens, BKS, RONIS and O.M.R.	22	Plastic	Clear	**3SU1900-0EB10-0AA0**	0.006
 3SU1900-0EM70-0AA0 **Dust caps for ID key-operated switches**	22	Plastic	Clear	**3SU1900-0EM70-0AA0**	0.003

* You can order this quantity or a multiple thereof.

	Product designation Product version	Mounting diameter	Material	Color	Article No.	Weight
		mm				kg
Protective collars						
 3SU1900-0DJ10-0AA0	**Sun collars for illuminated pushbuttons**	22	Plastic	Black	**3SU1900-0DJ10-0AA0**	0.004
 3SU1900-0DW10-0AA0	**360° protective collars for pushbuttons and selectors, short**	22	Plastic	Black	**3SU1900-0DW10-0AA0**	0.009
 3SU1950-0DK80-0AA0	**360° protective collars for pushbuttons** Visibility from the side	22	Metal	Silver	**3SU1950-0DK80-0AA0**	0.022
 3SU1950-0DL80-0AA0	**360° protective collar for mushroom pushbuttons** 40 mm, visibility from the side	22	Metal	Silver	**3SU1950-0DL80-0AA0**	0.039
 3SU1900-0DY30-0AA0	**Protective collars for EMERGENCY STOP mushroom pushbuttons** Without lock or with RONIS lock	22	Plastic	Yellow Gray	**3SU1900-0DY30-0AA0** **3SU1900-0DY80-0AA0**	0.035 0.033

*** You can order this quantity or a multiple thereof.**

Protection/access protection

2

Multi-unit packaging, see page 2/360.

Protective collars

	Product designation Product version	Mounting diameter mm	Material	Color	Article No.	Weight kg
 3SU1900-0JH30-0AA0	**Protective collars for EMERGENCY STOP mushroom pushbuttons** 30 and 40 mm, can be mounted in the top position	22	Plastic	Yellow	**3SU1900-0JH30-0AA0**	0.036
 3SU1950-0DX30-0AA0	**Protective collars for EMERGENCY STOP mushroom pushbuttons** Without lock or with RONIS lock, 40 mm, for 5 padlocks	22	Metal	Yellow Gray	**3SU1950-0DX30-0AA0** **3SU1950-0DX80-0AA0**	0.150 0.150
	Protective collars for EMERGENCY STOP mushroom pushbuttons 60 mm, for 3 padlocks	22	Plastic	Yellow	**3SU1900-0EX30-0AA0**	0.039
 3SU1900-0EA30-0AA0	**360° protective collars** for • Mushroom pushbuttons (30, 40 and 60 mm) • EMERGENCY STOP mushroom pushbuttons without lock (40 and 60 mm) • EMERGENCY STOP mushroom pushbuttons with RONIS lock (40 mm)	22	Plastic	Yellow	**3SU1900-0EA30-0AA0**	0.054
 3SU1900-0EC10-0AA0	**Protection for sensor switches**	22	Plastic	Black	**3SU1900-0EC10-0AA0**	0.115

* You can order this quantity or a multiple thereof.

Locking devices

	Type of product	Mounting diameter	Material	Color	Article No.	Weight
		mm				kg
 3SU1950-0DM80-0AA0	**Locking devices for pushbuttons** Flat, for raised front ring and raised, castellated front ring	22	Metal	Silver	**3SU1950-0DM80-0AA0**	0.051
 3SU1950-0DN80-0AA0	**Locking devices for pushbuttons** Raised	22	Metal	Silver	**3SU1950-0DN80-0AA0**	0.047
 3SU1950-0DP80-0AA0	**Locking devices for mushroom pushbuttons D30, D40**	22	Metal	Silver	**3SU1950-0DP80-0AA0**	
 3SU1950-0DQ80-0AA0	**Locking devices for selectors** Short/long actuator, in the left position	22	Metal	Silver	**3SU1950-0DQ80-0AA0**	0.057
 3SU1950-0DR80-0AA0	**Locking devices for selectors** Short/long actuator, in the center position	22	Metal	Silver	**3SU1950-0DR80-0AA0**	0.059
 3SU1950-0DS80-0AA0	**Locking devices for selectors** Short/long actuator, in the right position	22	Metal	Silver	**3SU1950-0DS80-0AA0**	0.056
 3SU1950-0DT80-0AA0	**Locking devices for selectors** Short/long actuator, window from center to right, blocked on left	22	Metal	Silver	**3SU1950-0DT80-0AA0**	0.055
 3SU1950-0DU80-0AA0	**Locking devices for selectors** Short/long actuator, window from center to left, blocked on right	22	Metal	Silver	**3SU1950-0DU80-0AA0**	
 3SU1950-0DV80-0AA0	**Locking device with cover**	22	Metal	Silver	**3SU1950-0DV80-0AA0**	0.043

*** You can order this quantity or a multiple thereof.**

Actuators

Selection and ordering data

Multi-unit packaging, see page 2/360.

Mounting diameter	Material	Color	Article No.	Weight
mm				kg
Sealing plugs[1]				
22	Plastic	Black	**3SU1900-0FA10-0AA0**	0.011
	Metal, shiny	Silver	**3SU1950-0FA80-0AA0**	0.041
30	Metal, matte	Sand gray	**3SU1960-0FA80-0AA0**	0.070


3SU1900-0FA10-0AA0


3SU1950-0FA80-0AA0

[1] The sealing plug is mounted with a holder.
Modules might already be mounted on the holder.

Type of product	Mounting diameter	Accessory material	Accessory color	Screw terminals ⊕ Article No.	Weight
	mm				kg
USB connections					
USB 3.0	22	Plastic	Black	**3SU1900-0GA10-0AA0**	0.027
		Metal, shiny	Silver	**3SU1950-0GA80-0AA0**	0.046
	30	Metal, matte	Sand gray	**3SU1960-0GA80-0AA0**	0.081
RJ45 connections					
RJ-45 Cat. 5e	22	Plastic	Black	**3SU1900-0GB10-0AA0**	0.025
		Metal, shiny	Silver	**3SU1950-0GB80-0AA0**	0.043
	30	Metal, matte	Sand gray	**3SU1960-0GB80-0AA0**	0.072



3SU1900-0GA10-0AA0



3SU1960-0GA80-0AA0



3SU1900-0GB10-0AA0



3SU1950-0GB80-0AA0

* You can order this quantity or a multiple thereof.

	Material	Color	Article No.	Weight kg
Buttons, flat[1]				
	For pushbuttons			
 3SU1900-0FT20-0AA0	Plastic	Black	**3SU1900-0FT10-0AA0**	0.090
		Red	**3SU1900-0FT20-0AA0**	0.060
		Yellow	**3SU1900-0FT30-0AA0**	
		Green	**3SU1900-0FT40-0AA0**	0.080
		Blue	**3SU1900-0FT50-0AA0**	0.066
		White	**3SU1900-0FT60-0AA0**	0.080
	For illuminated pushbuttons			
 3SU1901-0FT30-0AA0	Plastic	Amber	**3SU1901-0FT00-0AA0**	0.080
		Red	**3SU1901-0FT20-0AA0**	0.070
		Yellow	**3SU1901-0FT30-0AA0**	
		Green	**3SU1901-0FT40-0AA0**	
		Blue	**3SU1901-0FT50-0AA0**	0.071
		White	**3SU1901-0FT60-0AA0**	0.072
		Clear	**3SU1901-0FT70-0AA0**	0.073
Buttons, raised[1]				
	For pushbuttons			
 3SU1900-0FS30-0AA0	Plastic	Black	**3SU1900-0FS10-0AA0**	0.002
		Red	**3SU1900-0FS20-0AA0**	
		Yellow	**3SU1900-0FS30-0AA0**	
		Green	**3SU1900-0FS40-0AA0**	
	For illuminated pushbuttons			
 3SU1901-0FS40-0AA0	Plastic	Red	**3SU1901-0FS20-0AA0**	0.001
		Yellow	**3SU1901-0FS30-0AA0**	0.002
		Green	**3SU1901-0FS40-0AA0**	0.001
		Blue	**3SU1901-0FS50-0AA0**	0.002
		Clear	**3SU1901-0FS70-0AA0**	

[1] Buttons are not interchangeable between pushbuttons and illuminated pushbuttons with a raised front ring and with a raised, castellated front ring.

*** You can order this quantity or a multiple thereof.**

Actuators

	Material	Key number	Version of RFID coding	Color	Article No.	Weight kg
RONIS keys						
 3SU1950-0FB80-0AA0	Metal	SB30[1)] 455	--	Silver	**3SU1950-0FB80-0AA0** **3SU1950-0FC80-0AA0**	0.009 0.010
BKS keys						
 3SU1950-0FD80-0AA0	Metal	S1[1)]	--	Silver	**3SU1950-0FD80-0AA0**	0.010
O.M.R. keys						
 3SU1950-0FJ50-0AA0	Metal	73038 73037 73034 73033	--	Blue Red Black Yellow	**3SU1950-0FJ50-0AA0** **3SU1950-0FK20-0AA0** **3SU1950-0FL10-0AA0** **3SU1950-0FM30-0AA0**	0.008 0.013 0.008 0.014
Siemens keys						
 3SU1950-0FP80-0AA0	Metal	LSG1 SSG10[1)] VL5	--	Silver	**3SU1950-0FN80-0AA0** **3SU1950-0FP80-0AA0** **3SU1950-0FQ80-0AA0**	0.011 0.008
ID keys ID group individual						
 3SU1900-0FU60-0AA0	Plastic	--	Individually coded, programmable several times	White	**3SU1900-0FU60-0AA0**	0.006
ID keys						
 3SU1900-0FV40-0AA0	Plastic	--	ID group 1 ID group 2 ID group 3 ID group 4	Green Yellow Red Blue	**3SU1900-0FV40-0AA0** **3SU1900-0FW30-0AA0** **3SU1900-0FX20-0AA0** **3SU1900-0FY50-0AA0**	0.060 0.005 0.006 0.004

[1)] Also available with special lock. Supplement the Article No. with **"–Z"** and the order code **"Y04"** and specify the required lock in plain text. Additional price on request.

*** You can order this quantity or a multiple thereof.**

Overview

The accessories can be used for plastic and metal enclosures.

Selection and ordering data

	Type of product	Material	Color	Article No.	Weight kg
Metric cable glands					
 3SU1900-0HG10-0AA0	**M20 for round cable and enclosures** With 1 to 3 command points	Plastic	Black	**3SU1900-0HG10-0AA0**	0.017
	M25 for round cable and enclosure With 4 and 6 command points	Plastic	Black	**3SU1900-0HH10-0AA0**	0.021
	M20 for round cable and AS-i enclosure With 1 to 3 command points with 2-pole plug-in connector for AS-i module	Plastic	Black	**3SU1900-0JA10-0AA0**	0.024
	M25 for round cable and AS-i enclosure With 4 and 6 command points with 2-pole plug-in connector for AS-i module	Plastic	Black	**3SU1900-0JB10-0AA0**	0.020
	M20 for round cable and IO-Link enclosure With 1 to 3 command points with 10-pole plug-in connector for IO-Link	Plastic	Black	**3SU1900-0JC10-0AA0**	0.033
	M25 for round cable and IO-Link enclosure With 4 and 6 command points with 10-pole plug-in connector for IO-Link	Plastic	Black	**3SU1900-0JD10-0AA0**	0.038
	M20 for AS-i shaped cable and AS-i enclosure With 1 to 3 command points with 2-pole plug-in connector for AS-i module	Plastic	Black	**3SU1900-0HE10-0AA0**	0.046
	M25 for AS-i shaped cable and AS-i enclosure With 4 and 6 command points with 2-pole plug-in connector for AS-i module	Plastic	Black	**3SU1900-0HF10-0AA0**	0.056
Connection pieces					
 3SU1900-0JQ10-0AA0	**M20 and M25 cable entries** for connecting two enclosures	Plastic	Black	**3SU1900-0JQ10-0AA0**	0.050

*** You can order this quantity or a multiple thereof.**

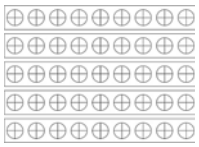
Enclosures

	Type of product	Material	Color	Insulation piercing method Article No.	Weight kg
Adapters for AS-i shaped cable					
 3SU1900-0HX10-0AA0	M20 cable entry	Plastic	Black	**3SU1900-0HX10-0AA0**	0.036
	M25 cable entry	Plastic	Black	**3SU1900-0HY10-0AA0**	0.045
Adapters for tab connection					
 3SU1900-0JJ10-0AA0	**Adapter, M12 plug** M20/M25 cable entry				
	4-pole	Plastic	Black	**3SU1900-0JJ10-0AA0**	0.013
	5-pole	Plastic	Black	**3SU1900-0JK10-0AA0**	
	8-pole	Plastic	Black	**3SU1900-0JL10-0AA0**	
 3SU1900-0JM10-0AA0	**Adapter, M12 socket** M20/M25 cable entry				
	4-pole	Plastic	Black	**3SU1900-0JM10-0AA0**	0.013
	5-pole	Plastic	Black	**3SU1900-0JN10-0AA0**	
	8-pole	Plastic	Black	**3SU1900-0JP10-0AA0**	
Adapters for enclosures with 1 command point					
 3SU1900-0JF10-0AA0	Between enclosure top and lower part, for installation of 2-pole or two 1-pole contact modules with front plate mounting. Not suitable for 3SU1801-1AA00-1AA1.	Plastic	Black	**3SU1900-0JF10-0AA0**	0.077
Adapters for modules with floor mounting					
 3SU1900-0JG10-0AA0	Without fixing screws	Plastic	Black	**3SU1900-0JG10-0AA0**	0.008
Enclosure cover monitoring[1)]					
 3SU1900-0HM10-0AA0	Module with extension plunger	Plastic	Black	**3SU1900-0HM10-0AA0**	0.006

[1)] In addition, a 3SU1400-2AA10-.BA0 contact module is required.

* You can order this quantity or a multiple thereof.

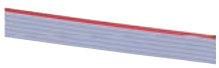
Selection and ordering data

	Product designation Type of product	Material	Color	Article No.	Weight kg
Miscellaneous accessories					
 3SU1900-0KA10-0AA0	**PCB carriers**	Plastic	Black	**3SU1900-0KA10-0AA0**	0.500
 3SU1900-0CK10-0AA0	**Pressure plates for selectors and locks**	Plastic	White	**3SU1900-0KC10-0AA0**	0.032
 3SU1900-0KF10-0AA0	**Drilling template for grid** 30 mm x 40 mm, horizontal	Plastic	Black	**3SU1900-0KF10-0AA0**	0.059
 3SU1900-0KG10-0AA0	**Extension plungers** For compensation of the distance between the pushbutton and the unlatching button of an overload relay	Plastic	Gray	**3SU1900-0KG10-0AA0**	0.008
 3SU1950-0JE80-0AA0	**Strut profile mounting adapters**	Metal	Sand gray	**3SU1950-0JE80-0AA0**	0.105
 3RK1901-3QA00	**Cable clip for cable adapters** For enclosure with AS-Interface shaped cable	Plastic	Black	**3RK1901-3QA00**	0.100

*** You can order this quantity or a multiple thereof.**

Miscellaneous accessories

Multi-unit packaging, see page 2/360.

Product designation Type of product	Material	Color	Article No.	Weight kg
Miscellaneous accessories				
 3SU1900-0KH80-0AA0				
Adapters for standard rail mounting	Plastic	Black	**3SU1900-0KH80-0AA0**	0.049
 3SU1950-0KJ80-0AA0				
Adapters for actuators and indicators with 30 mm diameter With front ring for flat mounting	Metal	Silver	**3SU1950-0KJ80-0AA0**	0.015
 3SU1950-0KB10-0AA0				
Adapters for 30.5 mm to 22.5 mm mounting hole (for 22 mm range)	Metal, shiny	Silver	**3SU1950-0KB10-0AA0**	0.031
	Metal, matte	Sand gray	**3SU1960-0KB10-0AA0**	
 3SU1910-0KK80-0AA0				
Grounding studs For grounding metal actuators for fitting in front plates made of non-conducting materials				
• For metal holders	Metal	Silver	**3SU1910-0KK80-0AA0**	40.000
• For universal holders for plastic and metal	Metal	Silver	**3SU1950-0KK80-0AA0**	0.060
 3SU1900-0KL10-0AA0				
Plugs for sensor switches, angled socket with screw terminal connection	Plastic	Black	**3SU1900-0KL10-0AA0**	0.017
 3SU1900-0KP80-0AA0				
Flat ribbon cable 7 cores				
• Length 5 m	Plastic	Gray	**3SU1900-0KQ80-0AA0**	0.063
• Length 10 m	Plastic	Gray	**3SU1900-0KP80-0AA0**	0.124

* You can order this quantity or a multiple thereof.

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Overview

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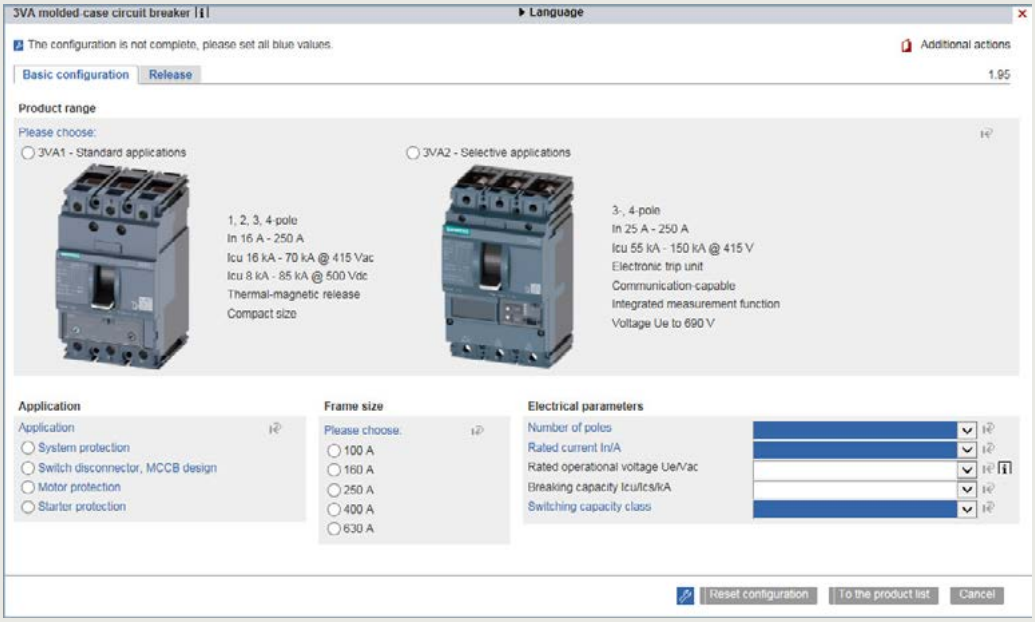
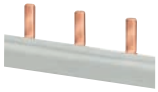
You can find our configurators at the following website:
www.siemens.com/lowvoltage/configurators



Overview

Devices		Page	Application	Standards
	**5SY Miniature circuit breakers**	3/4	For all applications from 0.3 A to 80 A with a rated breaking capacity of 10000 A and 15000 A acc. to EN 60898-1. Applications for universal current from 0.3 A to 63 A, version 25 kA, acc. to EN 60947-2.	EN 60898-1/-2 EN 60947-2 UL 1077 CSA 22.2 GB 10963.1/.2
	**5SY17 Circuit Breaker for Equipment**	3/14	Circuit Breaker for Equipment offer optimum protection for all applications in AC and DC control circuits in industrial applications and plant engineering. They protect solenoid valves, servo motors, signal lamps or even PLC inputs.	EN 61373 EN 45545-2 UL 1077 IEC 60934
	**5SL60 Miniature Circuit Breakers, 1+N in 1 MW**	3/15	For socket outlet and lighting circuits in all building installations where a switchable neutral conductor is required. The miniature circuit breaker 1+N saves space in the distribution board.	EN 60898-1
	**5SL6 COM miniature circuit breakers with communication and measuring function**	3/17	The new communication-capable MCB's record measured values and status information and transmit this data wirelessly to higher-level systems.	--
	**Additional components**	3/18	Auxiliary switches, fault signal contacts, shunt trips, undervoltage releases for higher system availability, RC units for personal safety and remote controlled mechanisms for remote switching.	
	**Busbars**	3/20	Busbars in 10 mm^2 and 16 mm^2 save space in the distribution board and time during mounting. Busbars in 18 mm^2 and 25 mm^2 acc. to UL 508 and CSA.	UL 508

1) See Catalog LV 10.

Introduction

Overview

Miniature circuit breakers are used to protect systems and installations in buildings and for industrial applications.

Used in industrial applications and plant engineering, miniature circuit breakers can be supplemented with additional components, such as auxiliary switches, fault signal contacts, shunt trips, undervoltage releases, remote controlled mechanisms, RC units, and arc fault detection devices.

The devices are approved for worldwide use according to IEC standards for power supply systems up to 250/440 V AC. 72 V DC per pole is permitted in DC systems.

For North America, there is an additional approval according to UL 1077 for use as "supplementary protectors" in systems up to 480/277 V AC. For use in ship building, the devices also have numerous certifications according to shipping classifications BV, DNV, GL and LRS.

Benefits

- Optional top or bottom infeed as the terminals are identical
- Clear and visible conductor connection in front of the rear busbar facilitates controls
- The conductor is easily inserted into the terminal thanks to the large and easily accessible wiring space

- Quick and easy manual removal of miniature circuit breakers from the busbar assembly, for example if connections need to be changed
- Time-saving replacement of parts as busbars no longer need to be freed from adjacent devices

- Double terminal chambers permit accommodation of 2 wires of different cross-sections.

- The 5SY miniature circuit breakers are ideal for the quick and easy mounting of auxiliary switches and fault signal contacts. Captive metal brackets on the additional components ensure the quick and easy mounting of devices on the miniature circuit breakers without the need for tools.

Technical specifications

				5SY6	5SY4	5SY5	5SY7	5SY8
Standards				EN 60898-1	EN 60898-1	EN 60898-2	EN 60898-1	EN 60947-2
Rated voltage U_n			V AC V DC	230/400 --	230/400 --	230/400 220/440/ 880[5)]	230/400 --	230/400 --
Operational voltage								
		Min.	V AC/DC/pole	24	24	24	24	24
Acc. to EN 60898-1/-2 and EN 60947-2		Max. Max.	V DC/pole V AC	72[4)] 250/440	72[4)] 250/440	250 250/440	72[4)] 250/440	72[4)] 250/440
Acc. to UL 1077 and CSA C22.2 No.235		Max.	V AC	480/277	480/277	--	480/277	480/277
		Max.	V DC	60	60[6)]	--	60[6)]	60[6)]
Breaking capacity[1)]								
• I_{cn} acc. to IEC/EN 60898-1			kA AC	6	10	10	15	--
• I_{cn} acc. to IEC/EN 60898-2			kA DC	10	10	10	15	--
• I_{cu} acc. to IEC/EN 60947-2			kA AC kA DC	30 ... 10[1)] 15	35 ... 10[1)] 15	35 ... 10[1)] 15	50 ... 15[1)] 15	70 ... 20[1)] 15
• Acc. to UL1077 and CSA C22.2 No.235			kA AC	5	5	--	5	5
Insulation coordination								
• Rated insulation voltage			V AC V DC/pole	250/440 --	--	250	--	--
• Rated impulse withstand voltage U_{imp}			kV AC	4				
Pollution degree for overvoltage category				3/III[3)]				
Rated frequency			Hz	50/60				
Touch protection	Acc. to EN 50274			Yes				
Handle end position, sealable				Yes				
Degree of protection	Acc. to EN 60529			IP20 with connected conductors, IP40 in the area of the handle with distribution cover				
CFC and silicone-free				Yes				
Mounting								
• Snap-on fixing system				Yes				
• Standard mounting rail and screw fixing				--				
Terminals		± screw (Pozidriv)		2				
• Tunnel terminals at both ends				--				
• Combined terminals at both ends				Yes				
• Terminal tightening torque			Nm lb-in	2.5 ... 3.5 max. 22 ... 26				
Conductor cross-sections								
• Solid and stranded			mm^2	0.75 ... 35				
• Finely stranded, with end sleeve			mm^2	0.75 ... 25				
• AWG conductors (Cu 60/75 °C $I_n \leq 40$ A; 60 °C $I_n > 40$ A)			AWG	14 ... 4				
Mains connection								
• AC				Any				
• DC				Any		[2)]	Any	
Mounting position				Any				
Service life On average, with rated load			Actuations Actuations	20000 10000, for 5SY5 at 40 A, 50 A and 63 A				
Ambient temperature			°C	-25 ... +55, max. 95% humidity				
Storage temperature			°C	-40 ... +75				
Resistance to climate	Acc. to IEC 60068-2-30			6 cycles				
Shock	Acc. to IEC 60068-2-27		m/s^2	150 at 11 ms half-sine				
Resistance to vibrations	Acc. to IEC 60068-2-6		m/s^2	50 at 25 ... 150 Hz and 60 at 35 Hz (4 s)				

1) For detailed information, see Configuration Manual "Miniature Circuit Breakers" (www.siemens.com/lowvoltage/manuals).

2) Ensure compliance with the specified polarity when connecting DC.

3) 5SY54.. 4-pole, degree of pollution 2 for overvoltage category II.

4) Exempt: C/D 0.3 A ... 0.5 A

5) 5SY54.. 4-pole 880 V is not a standardized voltage acc. to EN 60898-1, suitable for max. 1000 V DC if the four poles are connected in series.

6) Valid for 1-pole switching devices only.

5SY4, 10.000 A

Selection and ordering data

10000 / 3	I_n	Mounting width	Characteristic A	Characteristic B	Weight
	A	MW[1]	Article No.	Article No.	kg
Miniature circuit breakers 10000 A					
	**1P, 230/400 V AC**				
	0.5	1	**5SY4105-5**	--	0.167
	1		**5SY4101-5**	--	0.167
	1.6		**5SY4115-5**	--	0.166
	2		**5SY4102-5**	**5SY4102-6**	0.170
	3		**5SY4103-5**	--	0.160
	4		**5SY4104-5**	**5SY4104-6**	0.157
	6		**5SY4106-5**	**5SY4106-6**	0.153
	8		**5SY4108-5**	--	0.168
	10		**5SY4110-5**	**5SY4110-6**	0.152
	13		**5SY4113-5**	**5SY4113-6**	0.152
	16		**5SY4116-5**	**5SY4116-6**	0.153
	20		**5SY4120-5**	**5SY4120-6**	0.165
	25		**5SY4125-5**	**5SY4125-6**	0.163
	32		**5SY4132-5**	**5SY4132-6**	0.156
	40		**5SY4140-5**	**5SY4140-6**	0.167
	50		**5SY4150-5**	**5SY4150-6**	0.168
	63		**5SY4163-5**	**5SY4163-6**	0.175
	80		--	**5SY4180-6**	0.175
	**1P+N, 230 V AC**				
	1	2	**5SY4501-5**	--	0.326
	1.6		**5SY4515-5**	--	0.325
	2		**5SY4502-5**	--	0.323
	3		**5SY4503-5**	--	0.347
	4		**5SY4504-5**	--	0.321
	6		**5SY4506-5**	**5SY4506-6**	0.313
	8		**5SY4508-5**	--	0.318
	10		**5SY4510-5**	**5SY4510-6**	0.304
	13		**5SY4513-5**	**5SY4513-6**	0.306
	16		**5SY4516-5**	**5SY4516-6**	0.302
	20		**5SY4520-5**	**5SY4520-6**	0.310
	25		**5SY4525-5**	**5SY4525-6**	0.320
	32		**5SY4532-5**	**5SY4532-6**	0.322
	40		**5SY4540-5**	**5SY4540-6**	0.321
	50		**5SY4550-5**	**5SY4550-6**	0.319
	63		**5SY4563-5**	**5SY4563-6**	0.337
	**2P, 400 V AC**				
	0.5	2	**5SY4205-5**	--	0.328
	1		**5SY4201-5**	--	0.323
	1.6		**5SY4215-5**	--	0.323
	2		**5SY4202-5**	**5SY4202-6**	0.327
	3		**5SY4203-5**	--	0.327
	4		**5SY4204-5**	**5SY4204-6**	0.322
	6		**5SY4206-5**	**5SY4206-6**	0.306
	8		**5SY4208-5**	--	0.315
	10		**5SY4210-5**	**5SY4210-6**	0.304
	13		**5SY4213-5**	**5SY4213-6**	0.321
	16		**5SY4216-5**	**5SY4216-6**	0.304
	20		**5SY4220-5**	**5SY4220-6**	0.317
	25		**5SY4225-5**	**5SY4225-6**	0.323
	32		**5SY4232-5**	**5SY4232-6**	0.328
	40		**5SY4240-5**	**5SY4240-6**	0.321
	50		**5SY4250-5**	**5SY4250-6**	0.328
	63		**5SY4263-5**	**5SY4263-6**	0.338
	80		--	**5SY4280-6**	0.339

[1] 1 MW (modular width) = 18 mm.

* You can order this quantity or a multiple thereof.

Selection and ordering data (continued)

10000 / 3	I_n	Mounting width	Characteristic A	Characteristic B	Weight
	A	MW[1]	Article No.	Article No.	kg
Miniature circuit breakers 10000 A					
	**3P, 400 V AC**				
	0.5	3	**5SY4305-5**	**--**	0.480
	1		**5SY4301-5**	**--**	0.492
	1.6		**5SY4315-5**	**--**	0.478
	2		**5SY4302-5**	**--**	0.487
	3		**5SY4303-5**	**--**	0.489
	4		**5SY4304-5**	**--**	0.478
	6		**5SY4306-5**	**5SY4306-6**	0.461
	8		**5SY4308-5**	**--**	0.467
	10		**5SY4310-5**	**5SY4310-6**	0.439
	13		**5SY4313-5**	**5SY4313-6**	0.473
	16		**5SY4316-5**	**5SY4316-6**	0.462
	20		**5SY4320-5**	**5SY4320-6**	0.458
	25		**5SY4325-5**	**5SY4325-6**	0.469
	32		**5SY4332-5**	**5SY4332-6**	0.470
	40		**5SY4340-5**	**5SY4340-6**	0.485
	50		**5SY4350-5**	**5SY4350-6**	0.484
	63		**5SY4363-5**	**5SY4363-6**	0.501
	80		**--**	**5SY4380-6**	0.508
	**3P+N, 400 V AC**				
	1	4	**5SY4601-5**	**--**	0.650
	1.6		**5SY4615-5**	**--**	0.638
	2		**5SY4602-5**	**--**	0.636
	3		**5SY4603-5**	**--**	0.655
	4		**5SY4604-5**	**--**	0.632
	6		**5SY4606-5**	**5SY4606-6**	0.614
	8		**5SY4608-5**	**--**	0.619
	10		**5SY4610-5**	**5SY4610-6**	0.612
	13		**5SY4613-5**	**5SY4613-6**	0.614
	16		**5SY4616-5**	**5SY4616-6**	0.617
	20		**5SY4620-5**	**5SY4620-6**	0.611
	25		**5SY4625-5**	**5SY4625-6**	0.624
	32		**5SY4632-5**	**5SY4632-6**	0.631
	40		**5SY4640-5**	**5SY4640-6**	0.631
	50		**5SY4650-5**	**5SY4650-6**	0.645
	63		**5SY4663-5**	**5SY4663-6**	0.677
	**4P, 400 V AC**				
	1	4	**5SY4401-5**	**--**	0.649
	1.6		**5SY4415-5**	**--**	0.649
	2		**5SY4402-5**	**--**	0.638
	3		**5SY4403-5**	**--**	0.644
	4		**5SY4404-5**	**--**	0.634
	6		**5SY4406-5**	**5SY4406-6**	0.612
	8		**5SY4408-5**	**--**	0.622
	10		**5SY4410-5**	**5SY4410-6**	0.613
	13		**5SY4413-5**	**5SY4413-6**	0.617
	16		**5SY4416-5**	**5SY4416-6**	0.621
	20		**5SY4420-5**	**5SY4420-6**	0.610
	25		**5SY4425-5**	**5SY4425-6**	0.622
	32		**5SY4432-5**	**5SY4432-6**	0.633
	40		**5SY4440-5**	**5SY4440-6**	0.627
	50		**5SY4450-5**	**5SY4450-6**	0.650
	63		**5SY4463-5**	**5SY4463-6**	0.660
	80		**--**	**5SY4480-6**	0.669

[1] 1 MW (modular width) = 18 mm.

*** You can order this quantity or a multiple thereof.**

5SY4, 10.000 A

Selection and ordering data (continued)

10000 / 3	I_n	Mounting width	Characteristic C	Characteristic D	Weight
	A	MW[1]	Article No.	Article No.	kg
Miniature circuit breakers 10000 A					
	**1P, 230/400 V AC**				
	0.3	1	5SY4114-7	5SY4114-8	0.166
	0.5		5SY4105-7	5SY4105-8	0.166
	1		5SY4101-7	5SY4101-8	0.170
	1.6		5SY4115-7	5SY4115-8	0.162
	2		5SY4102-7	5SY4102-8	0.155
	3		5SY4103-7	5SY4103-8	0.152
	4		5SY4104-7	5SY4104-8	0.149
	5		5SY4111-7	--	0.160
	6		5SY4106-7	5SY4106-8	0.151
	8		5SY4108-7	5SY4108-8	0.155
	10		5SY4110-7	5SY4110-8	0.147
	13		5SY4113-7	5SY4113-8	0.155
	15		5SY4118-7	--	0.157
	16		5SY4116-7	5SY4116-8	0.147
	20		5SY4120-7	5SY4120-8	0.162
	25		5SY4125-7	5SY4125-8	0.163
	30		5SY4130-7	--	0.162
	32		5SY4132-7	5SY4132-8	0.167
	35		5SY4135-7	--	0.161
	40		5SY4140-7	5SY4140-8	0.166
	45		5SY4145-7	--	0.168
	50		5SY4150-7	5SY4150-8	0.164
	60		5SY4160-7	--	0.173
	63		5SY4163-7	5SY4163-8	0.166
	80		5SY4180-7	--	0.172
	**1P+N, 230 V AC**				
	0.3	2	5SY4514-7	5SY4514-8	0.324
	0.5		5SY4505-7	5SY4505-8	0.322
	1		5SY4501-7	5SY4501-8	0.319
	1.6		5SY4515-7	5SY4515-8	0.321
	2		5SY4502-7	5SY4502-8	0.317
	3		5SY4503-7	5SY4503-8	0.314
	4		5SY4504-7	5SY4504-8	0.315
	6		5SY4506-7	5SY4506-8	0.311
	8		5SY4508-7	5SY4508-8	0.302
	10		5SY4510-7	5SY4510-8	0.311
	13		5SY4513-7	5SY4513-8	0.301
	16		5SY4516-7	5SY4516-8	0.303
	20		5SY4520-7	5SY4520-8	0.315
	25		5SY4525-7	5SY4525-8	0.313
	32		5SY4532-7	5SY4532-8	0.323
	40		5SY4540-7	5SY4540-8	0.326
	50		5SY4550-7	5SY4550-8	0.322
	63		5SY4563-7	5SY4563-8	0.324
	80		5SY4580-7	--	0.341
	**2P, 400 V AC**				
	0.3	2	5SY4214-7	5SY4214-8	0.322
	0.5		5SY4205-7	5SY4205-8	0.323
	1		5SY4201-7	5SY4201-8	0.328
	1.6		5SY4215-7	5SY4215-8	0.317
	2		5SY4202-7	5SY4202-8	0.311
	3		5SY4203-7	5SY4203-8	0.307
	4		5SY4204-7	5SY4204-8	0.302
	5		5SY4211-7	--	0.313
	6		5SY4206-7	5SY4206-8	0.304
	8		5SY4208-7	5SY4208-8	0.309
	10		5SY4210-7	5SY4210-8	0.296
	13		5SY4213-7	5SY4213-8	0.309
	15		5SY4218-7	--	0.304
	16		5SY4216-7	5SY4216-8	0.295
	20		5SY4220-7	5SY4220-8	0.322
	25		5SY4225-7	5SY4225-8	0.322
	30		5SY4230-7	--	0.316
	32		5SY4232-7	5SY4232-8	0.330
	35		5SY4235-7	--	0.317
	40		5SY4240-7	5SY4240-8	0.322
	45		5SY4245-7	--	0.329
	50		5SY4250-7	5SY4250-8	0.320
	60		5SY4260-7	--	0.339
	63		5SY4263-7	5SY4263-8	0.325
	80		5SY4280-7	--	0.336

* You can order this quantity or a multiple thereof.

Selection and ordering data (continued)

10000 / 3	I_n	Mounting width	Characteristic C	Characteristic D	Weight
	A	MW[1]	Article No.	Article No.	kg
Miniature circuit breakers 10000 A					
	**3P, 400 V AC**				
	0.3	3	5SY4314-7	5SY4314-8	0.481
	0.5		5SY4305-7	5SY4305-8	0.484
	1		5SY4301-7	5SY4301-8	0.475
	1.6		5SY4315-7	5SY4315-8	0.468
	2		5SY4302-7	5SY4302-8	0.472
	3		5SY4303-7	5SY4303-8	0.467
	4		5SY4304-7	5SY4304-8	0.453
	5		5SY4311-7	--	0.464
	6		5SY4306-7	5SY4306-8	0.456
	8		5SY4308-7	5SY4308-8	0.449
	10		5SY4310-7	5SY4310-8	0.445
	13		5SY4313-7	5SY4313-8	0.447
	15		5SY4318-7	--	0.449
	16		5SY4316-7	5SY4316-8	0.445
	20		5SY4320-7	5SY4320-8	0.463
	25		5SY4325-7	5SY4325-8	0.464
	30		5SY4330-7	--	0.469
	32		5SY4332-7	5SY4332-8	0.474
	35		5SY4335-7	--	0.470
	40		5SY4340-7	5SY4340-8	0.487
	45		5SY4345-7	--	0.486
	50		5SY4350-7	5SY4350-8	0.487
	60		5SY4360-7	--	0.503
	63		5SY4363-7	5SY4363-8	0.478
	80		5SY4380-7	--	0.499
	**3P+N, 400 V AC**				
	0.3	4	5SY4614-7	5SY4614-8	0.634
	0.5		5SY4605-7	5SY4605-8	0.636
	1		5SY4601-7	5SY4601-8	0.632
	1.6		5SY4615-7	5SY4615-8	0.622
	2		5SY4602-7	5SY4602-8	0.623
	3		5SY4603-7	5SY4603-8	0.615
	4		5SY4604-7	5SY4604-8	0.605
	6		5SY4606-7	5SY4606-8	0.610
	8		5SY4608-7	5SY4608-8	0.595
	10		5SY4610-7	5SY4610-8	0.599
	13		5SY4613-7	5SY4613-8	0.600
	16		5SY4616-7	5SY4616-8	0.597
	20		5SY4620-7	5SY4620-8	0.621
	25		5SY4625-7	5SY4625-8	0.615
	32		5SY4632-7	5SY4632-8	0.633
	40		5SY4640-7	5SY4640-8	0.633
	50		5SY4650-7	5SY4650-8	0.635
	63		5SY4663-7	5SY4663-8	0.641
	80		5SY4680-7	--	0.664
	**4P, 400 V AC**				
	0.3	4	5SY4414-7	5SY4414-8	0.632
	0.5		5SY4405-7	5SY4405-8	0.633
	1		5SY4401-7	5SY4401-8	0.632
	1.6		5SY4415-7	5SY4415-8	0.623
	2		5SY4402-7	5SY4402-8	0.631
	3		5SY4403-7	5SY4403-8	0.616
	4		5SY4404-7	5SY4404-8	0.610
	6		5SY4406-7	5SY4406-8	0.605
	8		5SY4408-7	5SY4408-8	0.594
	10		5SY4410-7	5SY4410-8	0.592
	13		5SY4413-7	5SY4413-8	0.598
	16		5SY4416-7	5SY4416-8	0.603
	20		5SY4420-7	5SY4420-8	0.622
	25		5SY4425-7	5SY4425-8	0.630
	32		5SY4432-7	5SY4432-8	0.643
	40		5SY4440-7	5SY4440-8	0.642
	50		5SY4450-7	5SY4450-8	0.637
	63		5SY4463-7	5SY4463-8	0.647
	80		5SY4480-7	--	0.664

[1] 1 MW (modular width) = 18 mm.

5SY5, universal current, 10.000 A

Selection and ordering data

10000 / 3	I_n	Mounting width	Characteristic B Article No.	Characteristic C Article No.	Weight
	A	MW[1]			kg
Miniature circuit breakers 10.000 A, universal current					
	**1P, 230/400 V AC, 220 V DC**				
	0.3	1	--	5SY5114-7	0.171
	0.5		--	5SY5105-7	0.171
	1		--	5SY5101-7	0.169
	1.6		--	5SY5115-7	0.167
	2		5SY5102-6	5SY5102-7	0.171
	3		--	5SY5103-7	0.165
	4		5SY5104-6	5SY5104-7	0.167
	6		5SY5106-6	5SY5106-7	0.167
	8		--	5SY5108-7	0.164
	10		5SY5110-6	5SY5110-7	0.164
	13		5SY5113-6	5SY5113-7	0.168
	16		5SY5116-6	5SY5116-7	0.164
	20		5SY5120-6	5SY5120-7	0.167
	25		5SY5125-6	5SY5125-7	0.166
	32		5SY5132-6	5SY5132-7	0.168
	40		5SY5140-6	5SY5140-7	0.167
	50		5SY5150-6	5SY5150-7	0.172
	63		5SY5163-6	5SY5163-7	0.178
	**2P, 400 V AC 440 V DC**				
	0.3	2	--	5SY5214-7	0.330
	0.5		--	5SY5205-7	0.329
	1		--	5SY5201-7	0.326
	1.6		--	5SY5215-7	0.322
	2		--	5SY5202-7	0.321
	3		--	5SY5203-7	0.310
	4		--	5SY5204-7	0.310
	6		5SY5206-6	5SY5206-7	0.309
	8		--	5SY5208-7	0.314
	10		5SY5210-6	5SY5210-7	0.306
	13		5SY5213-6	5SY5213-7	0.322
	16		5SY5216-6	5SY5216-7	0.305
	20		5SY5220-6	5SY5220-7	0.320
	25		5SY5225-6	5SY5225-7	0.320
	32		5SY5232-6	5SY5232-7	0.321
	40		5SY5240-6	5SY5240-7	0.322
	50		5SY5250-6	5SY5250-7	0.333
	63		5SY5263-6	5SY5263-7	0.344
	**4P, 400 V AC, 880 V DC (max. 1000 V DC)**				
	0.3	1	--	5SY5414-7	0.653
	0.5		--	5SY5405-7	0.646
	1		--	5SY5401-7	0.634
	1.6		--	5SY5415-7	0.625
	2		--	5SY5402-7	0.648
	3		--	5SY5403-7	0.625
	4		--	5SY5404-7	0.623
	6		5SY5406-6	5SY5406-7	0.625
	8		--	5SY5408-7	0.611
	10		5SY5410-6	5SY5410-7	0.617
	13		5SY5413-6	5SY5413-7	0.630
	16		5SY5416-6	5SY5416-7	0.610
	20		5SY5420-6	5SY5420-7	0.629
	25		5SY5425-6	5SY5425-7	0.626
	32		5SY5432-6	5SY5432-7	0.629
	40		5SY5440-6	5SY5440-7	0.631
	50		5SY5450-6	5SY5450-7	0.651
	63		5SY5463-6	5SY5463-7	0.667

[1] 1 MW (modular width) = 18 mm.

Note:

The 5ST3600 or 5ST3630 busbars enable simple wiring of 4-pole miniature circuit breakers see page 3/22.

For application examples, see Configuration Manual "Miniature Circuit Breakers" at: www.siemens.com/lowvoltage/manuals.

* You can order this quantity or a multiple thereof.

Selection and ordering data

15000	I_n	Mounting width	Characteristic B Article No.	Weight
	A	MW[1]		kg
Miniature circuit breakers 15.000 A				
	**1P, 230/400 V AC**			
	6	1	**5SY7106-6**	0.166
	10		**5SY7110-6**	0.159
	13		**5SY7113-6**	0.162
	16		**5SY7116-6**	0.166
	20		**5SY7120-6**	0.161
	25		**5SY7125-6**	0.163
	32		**5SY7132-6**	0.165
	40		**5SY7140-6**	0.165
	50		**5SY7150-6**	0.170
	63		**5SY7163-6**	0.173
	**1P+N, 230 V AC**			
	6	2	**5SY7506-6**	0.314
	10		**5SY7510-6**	0.313
	13		**5SY7513-6**	0.318
	16		**5SY7516-6**	0.315
	20		**5SY7520-6**	0.310
	25		**5SY7525-6**	0.316
	32		**5SY7532-6**	0.321
	40		**5SY7540-6**	0.322
	50		**5SY7550-6**	0.328
	63		**5SY7563-6**	0.340
	**2P, 400 V AC**			
	6	2	**5SY7206-6**	0.312
	10		**5SY7210-6**	0.311
	13		**5SY7213-6**	0.313
	16		**5SY7216-6**	0.314
	20		**5SY7220-6**	0.310
	25		**5SY7225-6**	0.317
	32		**5SY7232-6**	0.321
	40		**5SY7240-6**	0.322
	50		**5SY7250-6**	0.328
	63		**5SY7263-6**	0.339
	**3P, 400 V AC**			
	6	3	**5SY7306-6**	0.463
	10		**5SY7310-6**	0.458
	13		**5SY7313-6**	0.467
	16		**5SY7316-6**	0.465
	20		**5SY7320-6**	0.461
	25		**5SY7325-6**	0.469
	32		**5SY7332-6**	0.476
	40		**5SY7340-6**	0.474
	50		**5SY7350-6**	0.486
	63		**5SY7363-6**	0.503
	**3P+N, 400 V AC**			
	6	4	**5SY7606-6**	0.632
	10		**5SY7610-6**	0.591
	13		**5SY7613-6**	0.622
	16		**5SY7616-6**	0.624
	20		**5SY7620-6**	0.614
	25		**5SY7625-6**	0.617
	32		**5SY7632-6**	0.634
	40		**5SY7640-6**	0.637
	50		**5SY7650-6**	0.648
	63		**5SY7663-6**	0.669
	**4P, 400 V AC**			
	6	4	**5SY7406-6**	0.621
	10		**5SY7410-6**	0.610
	13		**5SY7413-6**	0.616
	16		**5SY7416-6**	0.616
	20		**5SY7420-6**	0.613
	25		**5SY7425-6**	0.630
	32		**5SY7432-6**	0.633
	40		**5SY7440-6**	0.635
	50		**5SY7450-6**	0.647
	63		**5SY7463-6**	0.671

[1] 1 MW (modular width) = 18 mm.

*** You can order this quantity or a multiple thereof.**

5SY7, 15.000 A

Selection and ordering data (continued)

15000

I_n	Mounting width	Characteristic C	Characteristic D	Weight
		Article No.	Article No.	
A	MW[1]			kg
Miniature circuit breakers 15.000 A				
1P, 230/400 V AC				
0.3	1	5SY7114-7	5SY7114-8	0.164
0.5		5SY7105-7	5SY7105-8	0.165
1		5SY7101-7	5SY7101-8	0.164
1.6		5SY7115-7	5SY7115-8	0.163
2		5SY7102-7	5SY7102-8	0.162
3		5SY7103-7	5SY7103-8	0.161
4		5SY7104-7	5SY7104-8	0.159
6		5SY7106-7	5SY7106-8	0.160
8		5SY7108-7	5SY7108-8	0.156
10		5SY7110-7	5SY7110-8	0.157
13		5SY7113-7	5SY7113-8	0.159
16		5SY7116-7	5SY7116-8	0.156
20		5SY7120-7	5SY7120-8	0.165
25		5SY7125-7	5SY7125-8	0.163
32		5SY7132-7	5SY7132-8	0.165
40		5SY7140-7	5SY7140-8	0.165
50		5SY7150-7	5SY7150-8	0.171
63		5SY7163-7	5SY7163-8	0.165
1P+N, 230 V AC				
0.3	2	5SY7514-7	5SY7514-8	0.323
0.5		5SY7505-7	5SY7505-8	0.312
1		5SY7501-7	5SY7501-8	0.319
1.6		5SY7515-7	5SY7515-8	0.319
2		5SY7502-7	5SY7502-8	0.319
3		5SY7503-7	5SY7503-8	0.313
4		5SY7504-7	5SY7504-8	0.308
6		5SY7506-7	5SY7506-8	0.310
8		5SY7508-7	5SY7508-8	0.302
10		5SY7510-7	5SY7510-8	0.303
13		5SY7513-7	5SY7513-8	0.304
16		5SY7516-7	5SY7516-8	0.307
20		5SY7520-7	5SY7520-8	0.320
25		5SY7525-7	5SY7525-8	0.313
32		5SY7532-7	5SY7532-8	0.326
40		5SY7540-7	5SY7540-8	0.323
50		5SY7550-7	5SY7550-8	0.324
63		5SY7563-7	5SY7563-8	0.325
2P, 400 V AC				
0.3	2	5SY7214-7	5SY7214-8	0.322
0.5		5SY7205-7	5SY7205-8	0.325
1		5SY7201-7	5SY7201-8	0.321
1.6		5SY7215-7	5SY7215-8	0.330
2		5SY7202-7	5SY7202-8	0.318
3		5SY7203-7	5SY7203-8	0.313
4		5SY7204-7	5SY7204-8	0.307
6		5SY7206-7	5SY7206-8	0.313
8		5SY7208-7	5SY7208-8	0.302
10		5SY7210-7	5SY7210-8	0.301
13		5SY7213-7	5SY7213-8	0.302
16		5SY7216-7	5SY7216-8	0.304
20		5SY7220-7	5SY7220-8	0.316
25		5SY7225-7	5SY7225-8	0.318
32		5SY7232-7	5SY7232-8	0.323
40		5SY7240-7	5SY7240-8	0.330
50		5SY7250-7	5SY7250-8	0.323
63		5SY7263-7	5SY7263-8	0.332

[1] 1 MW (modular width) = 18 mm.

* You can order this quantity or a multiple thereof.

Selection and ordering data (continued)

15000	I_n	Mounting width	Characteristic C	Characteristic D	Weight
	A	MW[1]	Article No.	Article No.	kg
Miniature circuit breakers 15.000 A					
	**3P, 400 V AC**				
	0.3	3	5SY7314-7	5SY7314-8	0.479
	0.5		5SY7305-7	5SY7305-8	0.480
	1		5SY7301-7	5SY7301-8	0.477
	1.6		5SY7315-7	5SY7315-8	0.470
	2		5SY7302-7	5SY7302-8	0.471
	3		5SY7303-7	5SY7303-8	0.460
	4		5SY7304-7	5SY7304-8	0.452
	6		5SY7306-7	5SY7306-8	0.458
	8		5SY7308-7	5SY7308-8	0.447
	10		5SY7310-7	5SY7310-8	0.449
	13		5SY7313-7	5SY7313-8	0.450
	16		5SY7316-7	5SY7316-8	0.451
	20		5SY7320-7	5SY7320-8	0.473
	25		5SY7325-7	5SY7325-8	0.469
	32		5SY7332-7	5SY7332-8	0.480
	40		5SY7340-7	5SY7340-8	0.478
	50		5SY7350-7	5SY7350-8	0.484
	63		5SY7363-7	5SY7363-8	0.492
	**3P+N, 400 V AC**				
	0.3	4	5SY7614-7	5SY7614-8	0.660
	0.5		5SY7605-7	5SY7605-8	0.660
	1		5SY7601-7	5SY7601-8	0.660
	1.6		5SY7615-7	5SY7615-8	0.660
	2		5SY7602-7	5SY7602-8	0.624
	3		5SY7603-7	5SY7603-8	0.660
	4		5SY7604-7	5SY7604-8	0.606
	6		5SY7606-7	5SY7606-8	0.610
	8		5SY7608-7	5SY7608-8	0.594
	10		5SY7610-7	5SY7610-8	0.593
	13		5SY7613-7	5SY7613-8	0.599
	16		5SY7616-7	5SY7616-8	0.595
	20		5SY7620-7	5SY7620-8	0.617
	25		5SY7625-7	5SY7625-8	0.621
	32		5SY7632-7	5SY7632-8	0.642
	40		5SY7640-7	5SY7640-8	0.645
	50		5SY7650-7	5SY7650-8	0.660
	63		5SY7663-7	5SY7663-8	0.648
	**4P, 400 V AC**				
	0.3	4	5SY7414-7	5SY7414-8	0.635
	0.5		5SY7405-7	5SY7405-8	0.655
	1		5SY7401-7	5SY7401-8	0.629
	1.6		5SY7415-7	5SY7415-8	0.660
	2		5SY7402-7	5SY7402-8	0.624
	3		5SY7403-7	5SY7403-8	0.616
	4		5SY7404-7	5SY7404-8	0.606
	6		5SY7406-7	5SY7406-8	0.610
	8		5SY7408-7	5SY7408-8	0.593
	10		5SY7410-7	5SY7410-8	0.602
	13		5SY7413-7	5SY7413-8	0.597
	16		5SY7416-7	5SY7416-8	0.598
	20		5SY7420-7	5SY7420-8	0.621
	25		5SY7425-7	5SY7425-8	0.622
	32		5SY7432-7	5SY7432-8	0.634
	40		5SY7440-7	5SY7440-8	0.635
	50		5SY7450-7	5SY7450-8	0.638
	63		5SY7463-7	5SY7463-8	0.654

[1] 1 MW (modular width) = 18 mm.

5SY17 Circuit Breaker for Equipment

Selection and ordering data

	I_n	Mounting width	Characteristic F1 (quick)	Characteristic F2 (slow)	
			Article No.	**Article No.**	Weight
	A	MW[1]			kg
Protection Device					
	1P+AS				
	0,5	1	**5SY1705-2**	**5SY1705-4**	0.107
	1		**5SY1701-2**	**5SY1701-4**	0.121
	2		**5SY1702-2**	**5SY1702-4**	0.122
	4		**5SY1704-2**	**5SY1704-4**	0.115
	6		**5SY1706-2**	**5SY1706-4**	0.122
	8		**5SY1708-2**	**5SY1708-4**	
	10		**5SY1710-2**	**5SY1710-4**	0.122
	16		**5SY1716-2**	**5SY17164-**	0.123

[1] 1 MW (modular width) = 18 mm.

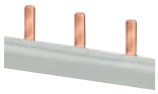
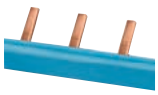
* You can order this quantity or a multiple thereof.

Selection and ordering data

6000 / 3	I_n A	Mounting width MW[1)]	Characteristic B Article No.	Characteristic C Article No.	Weight kg
Miniature circuit breakers, compact, 1+N (1P+N), 230 V AC					
	**N pole, right**				
	2	1	--	**5SL6002-7**	0.121
	4		--	**5SL6004-7**	0.121
	6		**5SL6006-6**	**5SL6006-7**	0.120
	8		--	**5SL6008-7**	0.121
	10		**5SL6010-6**	**5SL6010-7**	0.121
	13		**5SL6013-6**	**5SL6013-7**	0.112
	16		**5SL6016-6**	**5SL6016-7**	0.113
	20		**5SL6020-6**	**5SL6020-7**	0.122
	25		**5SL6025-6**	**5SL6025-7**	0.126
	32		**5SL6032-6**	**5SL6032-7**	0.151
	40		**5SL6040-6**	**5SL6040-7**	0.150
	**N pole, left**				
	2	1	--	**5SL6002-7KL**	0.121
	4		--	**5SL6004-7KL**	0.120
	6		--	**5SL6006-7KL**	0.119
	8		--	**5SL6008-7KL**	0.121
	10		--	**5SL6010-7KL**	0.120
	13		--	**5SL6013-7KL**	0.118
	16		--	**5SL6016-7KL**	0.118
	20		--	**5SL6020-7KL**	0.118
	25		--	**5SL6025-7KL**	0.126
	32		--	**5SL6032-7KL**	0.149
	40		--	**5SL6040-7KL**	0.149

[1)] 1 MW (modular width) = 18 mm.

5SL60, 6000 A

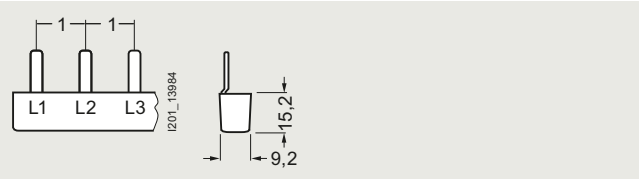
	Version	Pin spacing	Length	Article No.	Weight
		MW[1]	mm		kg
5ST37 busbar system, 10 mm², for 1+N miniature circuit breakers in 1 MW of the compact range, can be cut, with end caps					
	**Single-phase, 12 MW** For 12 MCBs 1+N, gray	1	216	**5ST3762**	0.033
	For 12 MCBs 1+N, blue		216	**5ST3763**	0.034
End caps for 5ST376 busbars					
	1 set comprises a right and a left cap				
	Gray			**5ST3766**	0.001
	Blue			**5ST3767**	0.001
5ST36 busbar systems, 10 mm², for miniature circuit breakers, fixed lengths, cannot be cut, fully insulated					
	**Three-phase** For 6 MCBs 1+N For 9 MCBs 1+N For 12 MCBs 1+N	1	102 257.5 210	**5ST3613** **5ST3614** **5ST3615**	0.033 0.055 0.078

[1] 1 MW (modular width) = 18 mm.

Dimensional drawings

5ST36
Pin spacing in MW

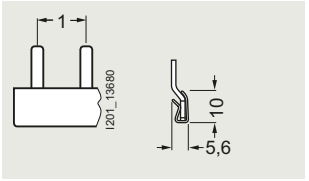
Dimensions of side view in mm (approx.).



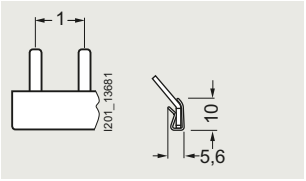
5ST3613
5ST3614
5ST3615

5ST37
Pin spacing in MW

Dimensions of side view in mm (approx.).



5ST3762
5ST3764



5ST3763
5ST3765

Selection and ordering data

I_n A	Mounting width MW[1]	Charakteristik B Article No.	Charakteristik C Article No.	Weight kg
1P+N 6 kA compact miniature circuit breakers				
 **1P+N (N pole right) 230 V AC**				
2	1	**5SL6002-6MC**	**5SL6002-7MC**	0.135
4		**5SL6004-6MC**	**5SL6004-7MC**	0.137
6		**5SL6006-6MC**	**5SL6006-7MC**	0.137
8		**--**	**5SL6008-7MC**	
10		**5SL6010-6MC**	**5SL6010-7MC**	0.137
13		**5SL6013-6MC**	**5SL6013-7MC**	0.137
16		**5SL6016-6MC**	**5SL6016-7MC**	0.138
20		**5SL6020-6MC**	**5SL6020-7MC**	0.137
25		**5SL6025-6MC**	**5SL6025-7MC**	0.137
32		**5SL6032-6MC**	**5SL6032-7MC**	0.137

[1] 1 MW (modular width) = 18 mm.

Note:

Please note the country-specific radio licenses of the products in SIOS:
www.siemens.com/lowvoltage/certificates (109801197)

3

*** You can order this quantity or a multiple thereof.**

3

Technical specifications

			Auxiliary switches (AS)		Fault signal contacts (FC)
			5ST3010, 5ST3010-2 5ST3011, 5ST3011-2 5ST3012, 5ST3012-2	**5ST3013[1], 5ST3013-2[2] 5ST3014[1], 5ST3014-2[2] 5ST3015[1], 5ST3015-2[2]**	**5ST3020, 5ST3020-2 5ST3021, 5ST3021-2 5ST3022, 5ST3022-2**
Standards			IEC/EN 62019; IEC/EN 60947-5-1; UL 1077; CSA C22.2 No. 235		
Short-circuit protection			• < 500 A: 5SL B6/C6 miniature circuit breakers • Up to 1 kA: 5SY B6/C6 miniature circuit breakers or fuse gG 6 A		
Contact load					
• Min.			50 mA, 24 V	1 mA/5 V DC	50 mA, 24 V
• Max.			--	[1] = 100 mA/30 V DC [2] = 50 mA/30 V DC	--
• Acc. to IEC/EN 62019 and 60947-5-1:					
- 400 V AC, AC-14, NO		A	2	--	2
- 230 V AC, AC-14, NO		A	6	--	6
- 400 V AC, AC-13, NC		A	2	--	2
- 230 V AC, AC-13, NC		A	6	--	6
• Acc. to IEC/EN 62019 (acc. to IEC/EN 60947-5-1):					
- 220 V DC, DC-13, NO + NC		A	1 (0.5)	--	1 (0.5)
- 110 V DC, DC-13, NO + NC		A	1 (0.75)	--	1 (0.75)
- 60 V DC, DC-13, NO + NC		A	3 (1.5)	--	3 (1.5)
- 24 V DC, DC-13, NO + NC		A	6 (3)	--	6 (3)
Service life, on average, with rated load			20000 actuations	20000 actuations	20000 actuations
Conductor cross-sections		mm^2	0.5 ... 2.5	0.5 ... 2.5	0.5 ... 2.5
		AWG	22 ... 14	22 ... 14	22 ... 14
Terminals					
• Terminal tightening torque		Nm	0.5	0.5	0.5
		lb-in	4.5	4.5	4.5
Rated frequency		Hz	50/60		
Mounting position			Any	Any	Any
Ambient temperature		°C	-25 ... +55	-25 ... +55	-25 ... +55
Storage temperature		°C	-40 ... +75	-40 ... +75	-40 ... +75
Resistance to climate	Acc. to IEC 60068-2-30	Cycles	28		
Shock	Acc. to IEC 60068-2-27	m/s	50 at 11 ms half-sine		
Resistance to vibrations	Acc. to IEC 60068-2-6	m/s^2	50 at 10 ... 150 Hz		

			Undervoltage releases (UR)	Shunt trips (ST)	
			5ST304.	**5ST3030**	**5ST3031**
Standards			EN 60947-1		
Rated voltages U_n		V AC	230	110 ... 415	24 ... 48
		V DC	24, 110	110	24 ... 48
• Operating range U_n			0.85 ... 1.1 x U_n	0.7 ... 1.1 x U_n	
• Rated frequency f_n		Hz	--	50 ... 60	
Response limits: Tripping			< 0.35 ... 0.7 × U_n	--	
Short-circuit protection			Miniature circuit breakers B/C 6 A or fuse gG 6 A		
Minimum contact load			50 mA, 24 V	50 mA, 24 V	
Tripping operations			max. 2000	max. 2000	
Service life, on average, with rated load			20000 actuations	20000 actuations	
Conductor cross-sections		mm^2	0.5 ... 2.5	0.5 ... 2.5	
		AWG	22 ... 14	22 ... 14	
Terminals					
• Terminal tightening torque		Nm	0.8	0.8	
		lb-in	6.8	6.8	
Mounting position			Any	Any	
Ambient temperature		°C	-25 ... +55	-25 ... +55	
Storage temperature		°C	-40 ... +75	-40 ... +75	
Resistance to climate	Acc. to IEC 60068-2-30	Cycles	28		
Shock	Acc. to IEC 60068-2-27	m/s	50 at 11 ms half-sine		
Resistance to vibrations	Acc. to IEC 60068-2-6	m/s^2	50 at 10 ... 150 Hz		
Switching frequency			--		
Switching duration		s	--		
Minimum command duration		s	--		
Rated power dissipation		VA	--		
Rated frequency		Hz	50/60		
Behavior in the event of control voltage failure			--		

Selection and ordering data

	Version	Rated voltage	Mounting width	Article No.	Weight
		V	MW[1]		kg
Auxiliary switches/fault signal contacts					
	**Auxiliary switches (AS)**				
	For 5SL, 5SY, 5SP, 5TL1 miniature circuit breakers 5SU1 RCBOs, for 5SV residual current protective device and 5TE8 switches				
	1 NO + 1 NC		0.5	**5ST3010**	0.056
	For low power			**5ST3013**	0.061
	For low power (with diode)			**5ST3013-0XX01**	0.063
	2 NO			**5ST3011**	0.063
	For low power			**5ST3014**	0.060
	2 NC			**5ST3012**	0.065
	For low power			**5ST3015**	0.064
	**Auxiliary switches (AS) with TEST button**				
	For 5SL, 5SY, 5SP, 5TL1 miniature circuit breakers 5SU1, 5TL1 RCBOs for 5SV residual current protective device and 5TE8 switches				
	1 NO + 1 NC		0.5	**5ST3010-2**	0.066
	For low power			**5ST3013-2**	0.069
	2 NO			**5ST3011-2**	0.068
	For low power			**5ST3014-2**	0.065
	2 NC			**5ST3012-2**	0.071
	For low power			**5ST3015-2**	0.071
	**Auxiliary switches (AS) acc. to UL 489**				
	For 5SL, 5SY, 5SP miniature circuit breakers, 5SU1 RCBOs, for 5SV residual current protective devices and 5TE8 switches (for 5SU1 the 5ST3805-1 handle coupler is required)				
	1 NO + 1 NC		0.5	**5ST3010-0HG**	0.061
	2 NO			**5ST3011-0HG**	0.086
	2 NC			**5ST3012-0HG**	0.085
	**Fault signal contacts (FC)**				
	For 5SL, 5SY, 5SP miniature circuit breakers 5SU1 RCBOs, for 5SV residual current protective device				
	1 NO + 1 NC		0.5	**5ST3020**	0.065
	2 NO			**5ST3021**	0.066
	2 NC			**5ST3022**	0.066
	**Fault signal contacts (FC) with TEST and ACKNOWLEDGE button**				
	For 5SL, 5SY, 5SP miniature circuit breakers 5SU1 RCBOs, for 5SV residual current protective device				
	1 NO + 1 NC		0.5	**5ST3020-2**	0.071
	2 NO			**5ST3021-2**	0.071
	2 NC			**5ST3022-2**	0.067
	**Undervoltage releases (UR)**				
	For 5SL4, 5SY, 5SP miniature circuit breakers, 5SU1 RCBOs, for 5SV residual current protective devices, but not for 5SY60.. and 5SL6 miniature circuit breakers				
	With integrated auxiliary switch				
		230 AC	1	**5ST3040**	0.115
		110 DC		**5ST3041**	0.109
		24 DC		**5ST3042**	0.110
	Without integrated auxiliary switch				
		230 AC	1	**5ST3043**	0.102
		110 DC		**5ST3044**	0.095
		24 DC		**5ST3045**	0.095
	**Shunt trips (ST)**				
	For 5SL4, 5SY, 5SP miniature circuit breakers, 5SU1 RCBOs, for 5SV residual current protective devices, but not for 5SY60.. and 5SL6 miniature circuit breakers				
		110 ... 415 V AC	1	**5ST3030**	0.098
		24 ... 48 V AC/DC	1	**5ST3031**	0.098

[1] 1 MW (modular width) = 18 mm.

5ST standard busbars

Overview

The busbar system with pin-type connections can be used for all 5SL6, 5SJ6 ...-.KS and 5SY miniature circuit breakers with or without mounted auxiliary switch (AS) or fault signal contact (FC).

Busbars in 10 mm^2 and 16 mm^2 versions are available.

With bars that can be cut to length, the 5ST37 busbar system can be tailored to any requirements.

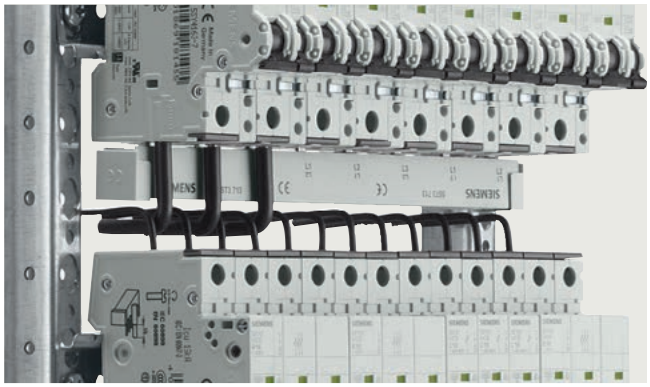
The extremely flexible 5ST36 busbar system with fixed lengths also enables installation in any length as the busbars can be overlapped.

There is no further need for time-consuming tasks, such as cutting, cutting to length, deburring, cleaning of cut surfaces and mounting of end caps.

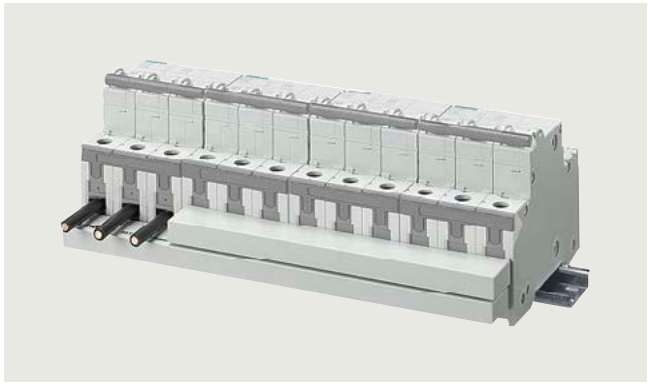
Any free pins on the busbars can be made safe by covering with touch protection.

3

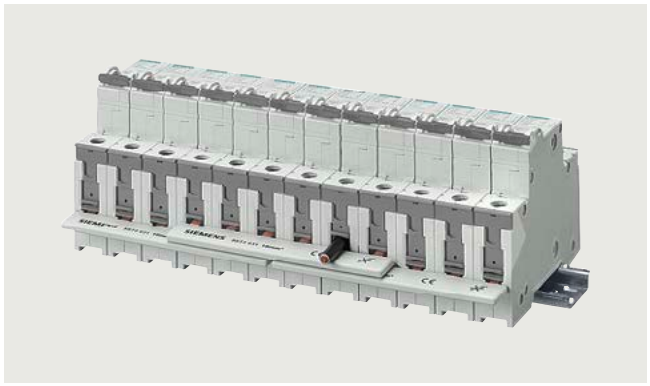
Benefits



- Between the rows of devices, the busbar, which is located at the bottom and behind the conductor, provides an optimum wiring space with easy view of the inserted conductor. This enables easy control of connections.



- The ability to overlap when mounting the busbars enables a cross-section enlargement of up to 32 mm^2 using the respective components, 10 mm^2 and 16 mm^2.



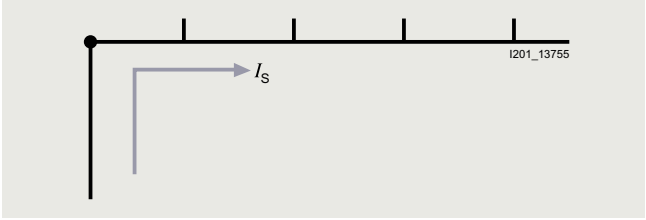
- By overlapping the busbars with fixed lengths, it is possible to achieve device combinations with any number of devices.

- The fact that the connection of the conductor is always clearly visible facilitates cable entry of all pole types and considerably reduces mounting times.

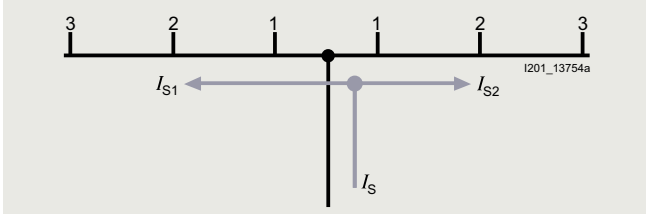
Technical specifications

			5ST3
Standards			EN 60439-1 (VDE 0660-500): 2005-01
Busbar material			SF-Cu F 24
Partition material			Plastic, Cycoloy 3600 heat-resistant over 90 °C flame-retardant and self-extinguishing, dioxin and halogen-free
Rated operational voltage U_c		V AC	400
Rated current I_n			
• Cross-section 10 mm^2		A	63
• Cross-section 16 mm^2		A	80
Rated impulse withstand voltage U_{imp}		kV	4
Test pulse voltage (1.2/50)		kV	6.2
Rated conditional short-circuit current I_{cc}		kA	25
Resistance to climate			
• Constant atmosphere	Acc. to DIN 50015		23/83; 40/92; 55/20
• Humid heat	Acc. to IEC 60068-2-30		28 cycles
Insulation coordination			
• Overvoltage category			III
• Pollution degree			2
Maximum busbar current I_S per phase			
• Infeed at the start of the busbar			
- Cross-section 10 mm^2		A	63
- Cross-section 16 mm^2		A	80
• Infeed at the center of the busbar			
- Cross-section 10 mm^2		A	100
- Cross-section 16 mm^2		A	130

Infeed at the start or end of the busbar



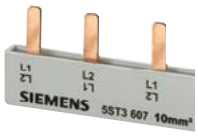
Infeed along the busbar or midpoint infeed



The sum of the outgoing current per branch (1, 2, 3 ... n) must not be greater than the max. busbar current I_S/phase.

5ST standard busbars

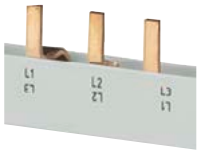
Selection and ordering data

	Version	Pin spacing	Length	Article No.	Weight
		MW[1]	mm		kg
5ST36 busbar systems, 10 mm², for miniature circuit breakers, fixed lengths, cannot be cut, fully insulated					
	**Single-phase**				
	For 2 MCBs 1P	1	33	**5ST3600**	0.008
	For 6 MCBs 1P		105	**5ST3601**	0.021
	For 12 MCBs 1P		210	**5ST3602**	0.048
	Single-phase, for MCBs with AS or FC				
	For 2 MCBs 1P	1.5	40	**5ST3603**	0.010
	For 6 MCBs 1P		156.5	**5ST3604**	0.032
	For 9 MCBs 1P		237	**5ST3605**	0.051
	**Two-phase**				
	For 2 MCBs 2P	1	75.5	**5ST3606**	0.019
	For 3 MCBs 2P		105	**5ST3607**	0.028
	For 6 MCBs 2P		210	**5ST3608**	0.061
	Three-phase				
	For 2 MCBs 3P	1	102	**5ST3613**	0.033
	For 3 MCBs 3P		157.5	**5ST3614**	0.055
	For 4 MCBs 3P		210	**5ST3615**	0.078
	Three-phase, for MCBs with AS or FC				
	For 2 MCBs 3P	1+1+1.5	115	**5ST3616**	0.038
	For 4 MCBs 3P		237	**5ST3617**	0.090
	For 6 MCBs 1P	1.5	125	**5ST3618**	0.046
	For 9 MCBs 1P		229	**5ST3620**	0.079
	Three-phase				
	For 1 RCCB 4P N right and 8 MCBs 1P	1	210	**5ST3624**	0.079
	For 1 RCCB 4P N left and 8 MCBs 1P	1	192	**5ST3667**	0.070
	Four-phase				
	For 2 MCBs 4P or 3P+N	1	145	**5ST3621**	0.053
	For 3 MCBs 4P or 3P+N		215	**5ST3622**	0.092
	For 6 MCBs 2P or 1P+N		215	**5ST3623**	0.087
5ST36 busbars, 16 mm², for miniature circuit breakers, fixed lengths, cannot be cut, fully insulated					
	**Single-phase**				
	For 2 MCBs 1P	1	33	**5ST3630**	0.009
	For 6 MCBs 1P		105	**5ST3631**	0.026
	For 12 MCBs 1P		210	**5ST3632**	0.053
	Single-phase, for MCBs with AS or FC				
	For 2 MCBs 1P	1.5	40	**5ST3633**	0.011
	For 6 MCBs 1P		156.5	**5ST3634**	0.036
	For 9 MCBs 1P		237	**5ST3635**	0.055
	**Two-phase**				
	For 2 MCBs 2P	1	75.5	**5ST3636**	0.026
	For 3 MCBs 2P		105	**5ST3637**	0.042
	For 6 MCBs 2P		210	**5ST3638**	0.089
	Two-phase, for MCBs with AS or FC				
	For 2 MCBs 2P	1 + 1.5	75.5	**5ST3640**	0.029
	For 3 MCBs 2P		120.5	**5ST3641**	0.047
	For 5 MCBs 2P		210	**5ST3642**	0.086

[1] 1 MW (modular width) = 18 mm.

* You can order this quantity or a multiple thereof.

Selection and ordering data (continued)

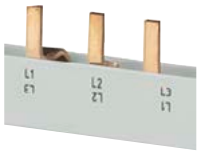
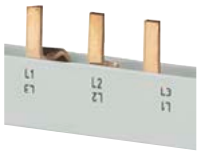
	Version	Pin spacing	Length	Article No.	Weight
		MW[1]	mm		kg
5ST36 busbars, 16 mm², for miniature circuit breakers, fixed lengths, cannot be cut, fully insulated					
	Three-phase				
	For 2 MCBs 3P	1	102.5	**5ST3643**	0.048
	For 3 MCBs 3P		157.5	**5ST3644**	0.082
	For 4 MCBs 3P		210	**5ST3645**	0.113
	Three-phase, for MCBs with AS or FC				
	For 2 MCBs 3P	1+1+1.5	115	**5ST3646**	0.054
	For 4 MCBs 3P		237	**5ST3647**	0.130
	For 6 MCBs 1P	1.5	156	**5ST3648**	0.067
	For 9 MCBs 1P		245	**5ST3650**	0.111
	Three-phase				
	For 1 RCCB 4P N right and 8 MCBs 1P	1	210	**5ST3654**	0.113
	For 1 RCCB 4P N left and 8 MCBs 1P	1	210	**5ST3668**	0.100
	Four-phase				
	For 2 MCBs 4P or 3P+N	1		**5ST3651**	0.079
	For 3 MCBs 4P or 3P+N			**5ST3652**	0.136
	For 6 MCBs 2P or 1P+N			**5ST3653**	0.126
Touch protection					
	For free connections, yellow (RAL 1004) 5 x 1 pin			**5ST3655**	0.008
	10 mm²				
	20 × 5ST3613 + 10 × 5ST3614 + 50 × 5ST3615 + 50 × 5ST3655			**5ST3656**	5.348
	16 mm²				
	20 × 5ST3643 + 10 × 5ST3644 + 50 × 5ST3645 + 50 × 5ST3655			**5ST3657**	6.632
5ST37 busbar system, 10 mm², 12 MW for miniature circuit breakers, can be cut, with end caps					
	**Single-phase, angled**				
	For 12 MCBs 1P	1	214	**5ST3730**	0.033
	For 9 MCBs 1P with AS or FC	1.5		**5ST3732**	0.030
	Two-phase				
	For 6 MCBs 2P	1		**5ST3734**	0.071
	For 4 MCBs 2P with AS or FC	1+1.5		**5ST3736**	0.071
	Three-phase				
	For 4 MCBs 3P	1		**5ST3738**	0.086
	For 3 MCBs 3P with AS or FC	1+1+1.5		**5ST3741**	0.075
	For 3 MCBs 1P with AS or FC	1.5		**5ST3743**	0.075
	Four-phase				
	For 3 MCBs 4P or 3P+N	1		**5ST3745**	0.110
5ST37 busbar system, 10 mm², 56 MW for miniature circuit breakers, can be cut, without end caps					
	**Single-phase, angled**				
	For MCBs 1P	1	1016	**5ST3731**	0.153
	For MCBs 1P with AS or FC	1.5		**5ST3733**	0.157
	Two-phase				
	For MCBs 1P and UR or AR	2		**5ST3735-2**	0.304
	For MCBs 2P	1		**5ST3735**	0.343
	For MCBs 2P with AS or FC	1+1.5		**5ST3737**	0.327
	Three-phase				
	For MCBs 3P	1		**5ST3740**	0.430
	For MCBs 3P with AS or FC	1+1+1.5		**5ST3742**	0.421
	For MCBs 1P with AS or FC	1.5		**5ST3744**	0.380
	Four-phase				
	For MCBs 4P or 3P+N	1		**5ST3746**	0.600
	For MCBs 2P with AS or FC and RCBOs 1P+N with AS or FC	1+1.5		**5ST3746-2**	0.505

[1] 1 MW (modular width) = 18 mm.

*** You can order this quantity or a multiple thereof.**

5ST standard busbars

Selection and ordering data (continued)

	Version	Pin spacing MW[1]	Length mm	Article No.	Weight kg
5ST37 busbar system, 16 mm², 12 MW for miniature circuit breakers, can be cut, with end caps					
	**Single-phase, angled**				
	For MCBs 1P	1	214	**5ST3700**	0.042
	For MCBs 1P with AS or FC	1.5		**5ST3702**	0.040
	Two-phase				
	For MCBs 2P	1		**5ST3704**	0.096
	For MCBs 2P with AS or FC	1+1.5		**5ST3706**	0.094
	Three-phase				
	For MCBs 3P	1		**5ST3708**	0.118
	For MCBs 3P with AS or FC	1+1+1.5		**5ST3711**	0.100
	For MCBs 1P with AS or FC	1.5		**5ST3713**	0.102
	Four-phase				
	For MCBs 4P or 3P+N	1		**5ST3715**	0.150
5ST37 busbar system, 16 mm², 56 MW for miniature circuit breakers, can be cut, without end caps					
	Single-phase, angled				
	For MCBs 1P	1	1016	**5ST3701**	0.201
	For MCBs 1P with AS or FC	1.5		**5ST3703**	0.185
	**Two-phase**				
	For MCBs 2P	1		**5ST3705**	0.452
	For MCBs 2P with AS or FC	1+1.5		**5ST3707**	0.454
	Three-phase				
	For MCBs 3P	1		**5ST3710**	0.601
	For MCBs 3P with AS or FC	1+1+1.5		**5ST3712**	0.570
	For MCBs 1P with AS or FC	1.5		**5ST3714**	0.540
	Four-phase				
	For MCBs 4P or 3P+N	1		**5ST3716**	0.798
5ST37 busbar system, 10 mm², 56 MW can be cut, without end caps, with touch protection					
	Four-phase				
	For MCBs 2P and RCBOs 1P+N	1	1000	**5ST3770-2**	0.578
5ST37 busbar system, 16 mm², 56 MW can be cut, without end caps, with touch protection					
	Four-phase				
	For MCBs 2P and RCBOs 1P+N	1	1000	**5ST3770-3**	0.770
5ST37 busbar system, 10 mm², 16 MW can be cut, with end caps, with touch protection					
	Four-phase				
	For RCCBs 4P, N right and 6 MCBs 1P+N	1	292	**5ST3770-4**	0.153
5ST37 busbar system, 16 mm², 16 MW can be cut, with end caps, with touch protection					
	Four-phase				
	For RCCBs 4P, N right and 6 MCBs 1P+N	1	292	**5ST3770-5**	0.203
End caps for 5ST37, can be cut					
	For single-phase busbars			**5ST3748**	
	For two-phase and three-phase busbars			**5ST3750**	0.001
	For four-phase busbars			**5ST3718**	0.002
Terminals for 5ST36 and 5ST37 busbars					
	**Terminals for conductors up to 25 mm²**				
	• With cable entry in the center			**5ST3768-3**	0.014
	• With cable entry on the left			**5ST3768-4**	0.013
	• With cable entry on the right			**5ST3768-5**	0.014
	Terminals for conductors up to 50 mm²				
	• With cable entry in the center			**5ST3760-3**	0.023
	• With cable entry on the left			**5ST3760-4**	0.021
	• With cable entry on the right			**5ST3760-5**	0.023
	Note				
	The terminals are not suitable for 5ST376.				

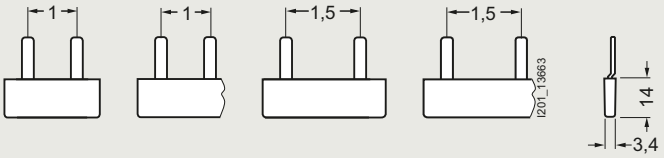
[1] 1 MW (modular width) = 18 mm.

* You can order this quantity or a multiple thereof.

Dimensional drawings

5ST36
Pin spacing in MW (modular width; 1 MW = 18 mm)

Dimensions of side view in mm (approx.)

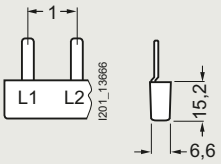


5ST3600
5ST3630

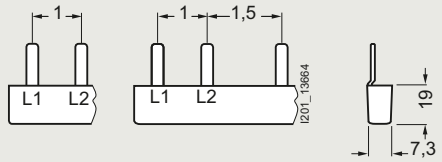
5ST3601
5ST3602
5ST3631
5ST3632

5ST3603
5ST3633

5ST3604
5ST3605
5ST3634
5ST3635

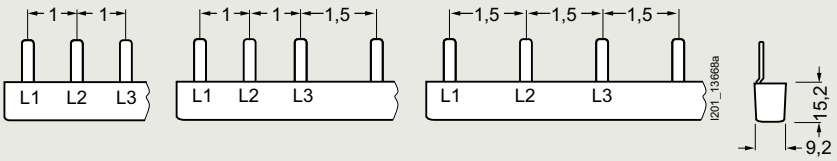


5ST3606
5ST3607
5ST3608



5ST3636
5ST3637
5ST3638

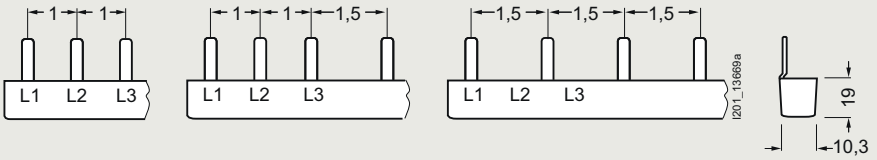
5ST3640
5ST3641
5ST3642



5ST3613
5ST3614
5ST3615
5ST3667

5ST3616
5ST3617

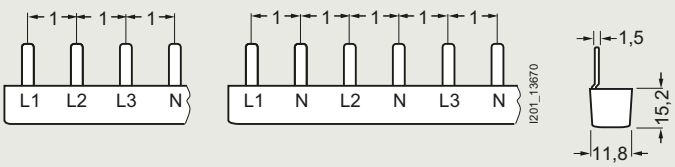
5ST3618
5ST3620



5ST3643
5ST3644
5ST3645
5ST3668

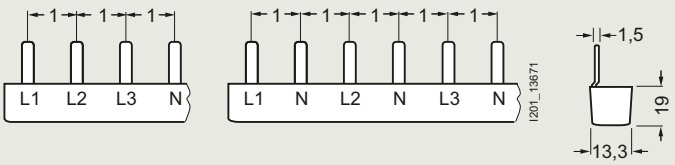
5ST3646
5ST3647

5ST3648
5ST3650



5ST3621
5ST3622

5ST3623



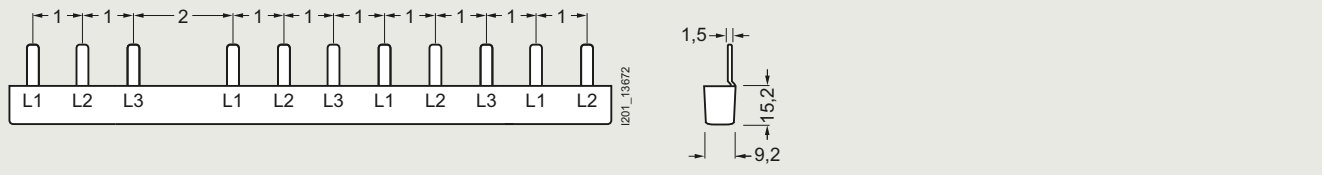
5ST3651
5ST3652

5ST3653

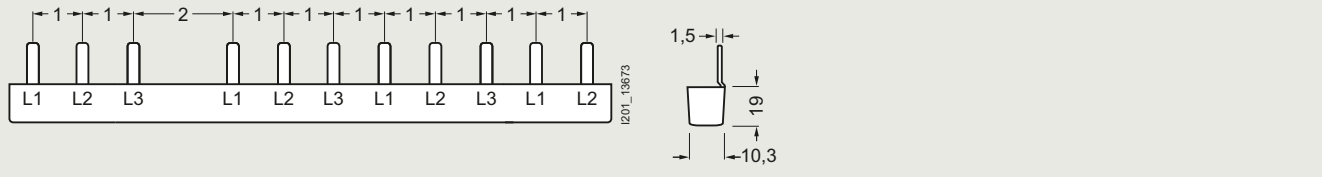
3

Dimensional drawings (continued)

5ST36
Pin spacing in MW (modular width; 1 MW = 18 mm)
Dimensions of side view in mm (approx.)

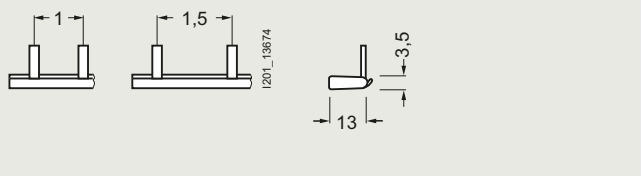


5ST3624



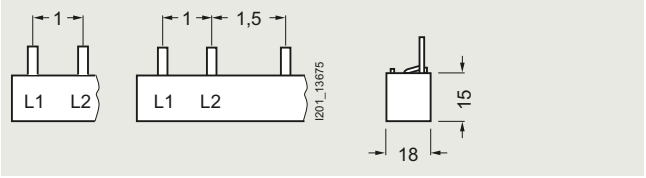
5ST3654

5ST37
Pin spacing in MW (modular width; 1 MW = 18 mm)
Dimensions of side view in mm (approx.)



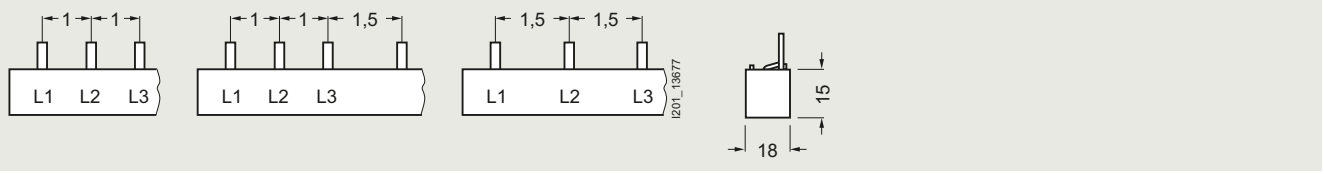
5ST3700
5ST3701
5ST3730
5ST3731
Single-phase

5ST3702
5ST3703
5ST3732
5ST3733
Single-phase



5ST3704
5ST3705
5ST3734
5ST3735
Two-phase

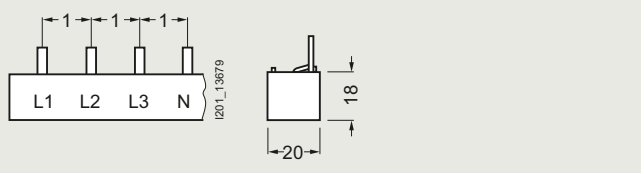
5ST3706
5ST3707
5ST3736
5ST3737
Two-phase



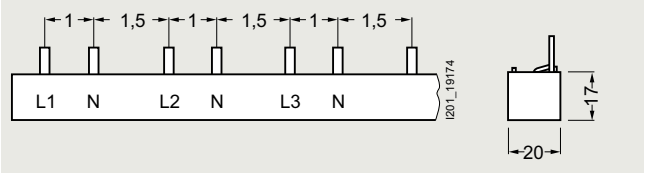
5ST3708
5ST3710
5ST3738
5ST3740

5ST3711
5ST3712
5ST3741
5ST3742

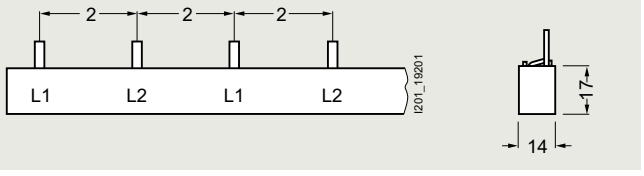
5ST3713
5ST3714
5ST3743
5ST3744



5ST3715
5ST3716
5ST3745
5ST3746



5ST3746-2

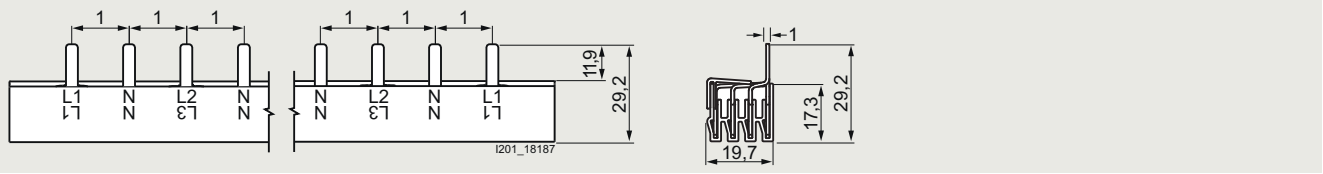


5ST3735-2

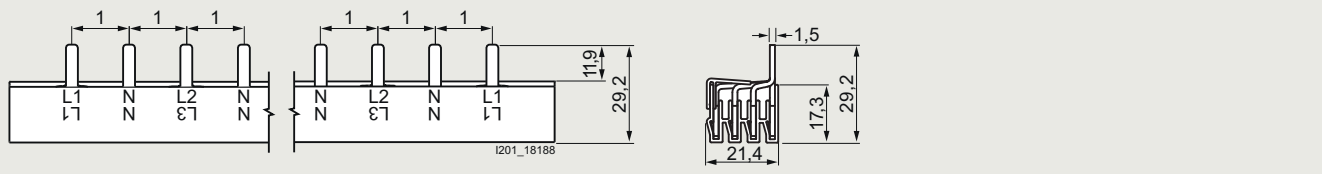
Dimensional drawings (continued)

5ST37
Pin spacing in MW (modular width; 1 MW = 18 mm)

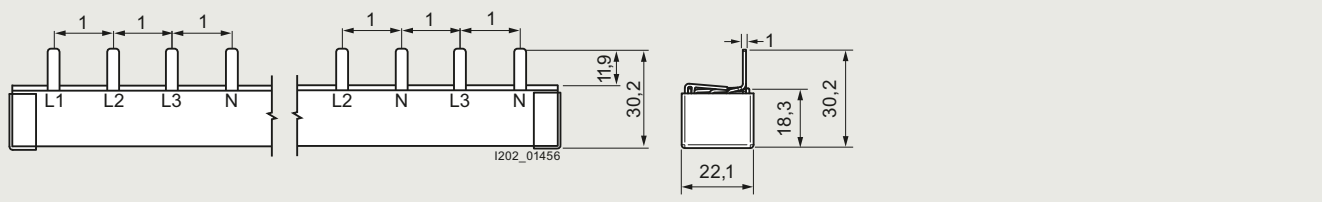
Dimensions of side view in mm (approx.)



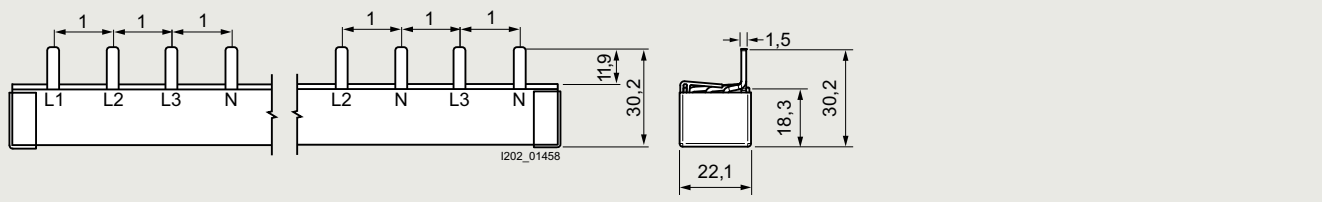
5ST3770-2



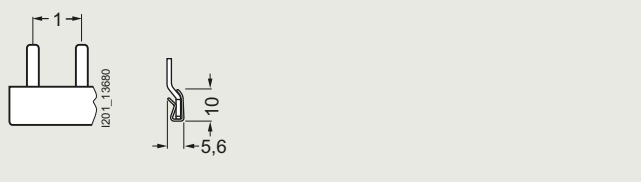
5ST3770-3



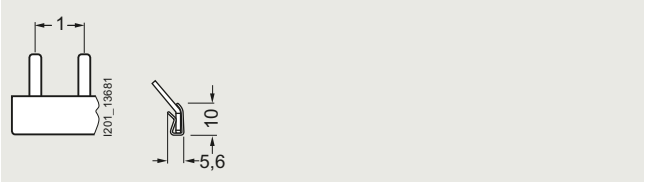
5ST3770-4



5ST3770-5



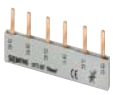
5ST3762
5ST3764



5ST3763
5ST3765

3

Overview

Devices		Page	Application	Standards	Used in		
					Non-residential buildings	Residential buildings	Industry
	**5SV RCCBs**	3/30	Personnel, material and fire protection, as well as protection against direct contact. SIGRES with active condensation protection for use in harsh environments. Super resistant and selective versions	IEC/EN 61008 ÖVE EN 61008 ÖVE/ÖNORM E 8601 IEC/EN 62423	✓	✓	✓
	**SIQUENCE 5SV3/5SU1 universal current-sensitive RCCBs, type B and type B+**	3/39	SIQUENCE, the technology of universal current-sensitive residual current protective devices	VDE 0664-100 VDE 0664-200 VDE V 0664-110	✓	--	✓
	**Additional components**	3/40	Remote controlled mechanisms, auxiliary switches for all residual current operated circuit breakers Leakage current measurement device for fault locating and optimum selection of RCCBs	IEC/EN 62019	✓	--	✓
	**5SM2 RC units**	[1]	The freely selectable combination of RC units with miniature circuit breakers permits the flexible configuration of RCBO combinations	IEC/EN 61009	✓	--	✓
	**5SU1 RCBOs**	[1]	The ideal protection combination for all electrical circuits due to the compact device versions of RCCBs and miniature circuit breakers in a single device	IEC/EN 61009	✓	✓	✓
	**5SM6 AFD units**	3/50	Enhanced fire protection through the detection and isolation of arcing faults	IEC/EN 62606	✓	✓	--
	**5ST busbars for modular installation devices**	[1]	Busbars in 10 mm^2 and 16 mm^2 save space in the distribution board and time during mounting	--	✓	✓	✓
	**Accessories**	[1]	Locking devices, covers – everything you need for mounting	--	✓	✓	✓

[1] See Catalog LV 10.

Overview (continued)

SIGRES

SIGRES RCCBs were developed for use in harsh ambient conditions, such as swimming baths as protection against chlorine and ozone, in the agricultural sector (ammonia), on building sites and in the chemical industry (nitrogen oxide, sulfur dioxide, solvents), in the food processing industry (hydrogen sulfide) and in unheated rooms (dampness). The patented active condensation protection requires a continuous power supply and bottom infeed if the RCCB is switched off.

When used in ambient conditions as defined in product standard EN 61008-1, the operation interval for pressing the test button can be extended to once a year.

Super resistant K

Super resistant (short-time delayed) RCCBs meet the maximum permissible break times for instantaneous devices. However, by implementing a short-time delay they prevent unnecessary tripping operations, and thus plant faults, when pulse-shaped leakage currents occur – as is the case when capacitors are switched on.

Selective S

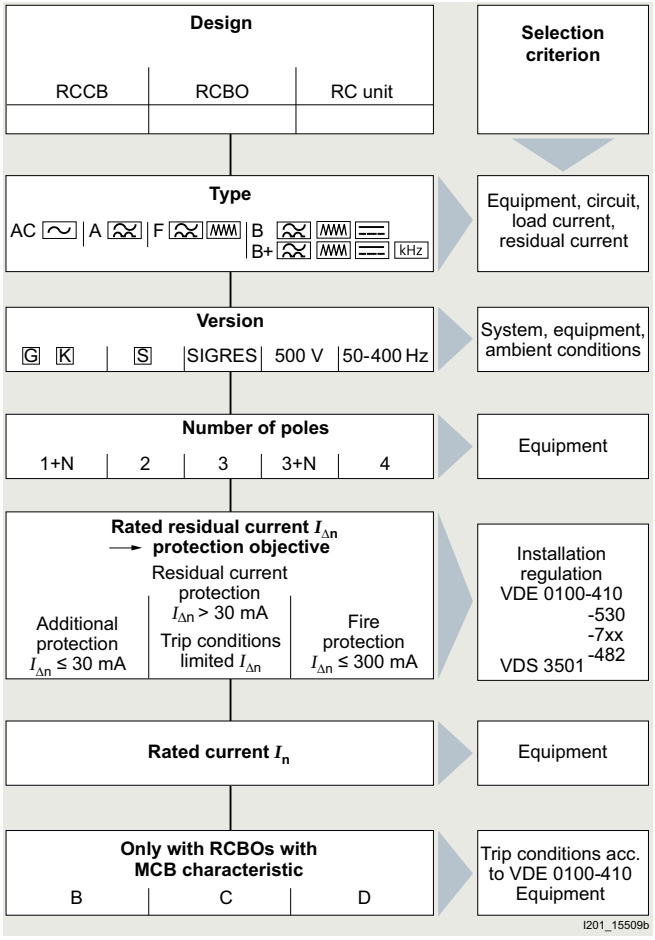
Can be used as upstream group switch for selective tripping contrary to downstream, instantaneous or short-time delayed RCCBs.

Short-time delayed G

If installations/equipment whose inadvertent tripping could lead to personal injury or material damage (such as freezers, computers) are protected by residual current protective devices, the tripping time of these devices must be at least 10 ms as defined according to ÖVE/ÖNORM E 8001-1.

Note:

You will find further information on the subject of residual current protective devices in the technology primer "Residual Current Protective Devices", Article No.: E10003-E38-2B-G0090 and in the Configuration Manual Residual Current Protective Devices/ Arc Fault Detection Devices (AFDDs) (www.siemens.com/lowvoltage/manuals).



Selection aid for finding the appropriate residual current protective device

Overview

RCCBs are used in all systems up to 240/415 V AC. Devices of type AC trip in the event of sinusoidal AC residual currents, type A also trips in the event of pulsating DC residual currents.

In addition, RCCBs type F also detect residual currents with mixed frequencies up to 1 kHz.

RCCBs with a rated residual current of maximum 30 mA are used for personnel, material and fire protection, as well as for protection against direct contact. RCCBs with a rated residual current of 10 mA are primarily used in areas that represent an increased risk for personnel.

Since the introduction of DIN VDE 0100-410, all socket outlet current circuits up to 20 A must also be fitted with residual current protective devices with a rated residual current of max. 30 mA. This also applies to outdoor electrical circuits up to 32 A for the connection of portable equipment.

Devices with a rated residual current of maximum 300 mA are used as preventive fire protection in case of insulation faults. RCCBs with a rated residual current of 100 mA are primarily used in European countries outside Germany.

Benefits

- Instantaneous residual current operated circuit breakers with the N connection on the left or right-hand side enable simple bus mounting with standard pin busbars with miniature circuit breakers installed on the right-hand side.
- Instantaneous type A devices have a surge current withstand capability with current waveform 8/20 µs of more than 1 kA, super resistant devices of more than 3 kA and selective devices of more than 5 kA. This ensures safe operation.
- SIGRES has an extremely long service life due to patented active condensation protection, and identical dimensions enable the quick and easy replacement of existing instantaneous RCCBs.
- Super resistant devices increase system availability, as unnecessary tripping is prevented in power supply systems with short-time glitches.
- Selective RCCBs increase system availability as a staggered tripping time enables the selective tripping of RCCBs connected in series in the event of a fault.
- Auxiliary switches, fault signal contacts, undervoltage releases and shunt trips are also available as additional components.
- By means of internal contacts, effective touch protection is provided when grasping and manually operating the latching slide.
- To facilitate entry of pin busbars with connection cables up to 35 mm^2, the devices are equipped with rectangular terminals for the accommodation of funnel-shaped cable entries.
- By means of standardized clearances of the terminals in modular width dimensions, the RCCBs and MCBs can be optionally connected to busbars on the top or on the bottom.

Technical specifications

			Instantaneous	SIGRES	Super resistant	Selective
Standards			IEC/EN 61008-1 (VDE 0664-10); IEC/EN 61008-2-1 (VDE 0664-11); IEC/EN 61543 (VDE 0664-30); IEC/EN 62423 (VDE 0664-40)			
Surge current withstand capability						
• Type A with current waveform 8/20 µs	Acc. to EN 60060-2 (VDE 0432-2)	kA	> 1		> 3	> 5
• Type F with current waveform 8/20 µs	Acc. to EN 60060-2 (VDE 0432-2)	kA	--	--	> 3	--
Minimum operational voltage for test function operation						
• 30-mA devices		V AC	195			
• Non-30-mA devices		V AC	100			
• 24-V devices		V AC	20			
Test cycles			1/2 year	1 year	1/2 year	
Insulation coordination • Overvoltage category			III			
Pollution degree			2			
Terminal conductor cross-sections						
• 1-wire						
- Solid (≤ 10 mm^2) / stranded (≥ 16 mm^2)		mm^2	0.75 ... 35			
- Finely stranded with non-insulated end sleeve		mm^2	0.75 ... 25			
- Finely stranded with insulated end sleeve		mm^2	0.75 ... 25			
- Finely stranded without end sleeve		mm^2	1 ... 35			
• 2-wire, same cross-section, same conductor type						
- Solid (≤ 10 mm^2) / stranded (≥ 16 mm^2)		mm^2	0.75 ... 10			
- Finely stranded with non-insulated end sleeve		mm^2	0.75 ... 4			
- Finely stranded with insulated end sleeve		mm^2	0.75 ... 4			
- Finely stranded without end sleeve		mm^2	1 ... 4			
• 1-wire + busbar (pin thickness 1.5 mm)						
- Solid (≤ 10 mm^2) / stranded (≥ 16 mm^2)		mm^2	10 ... 25			
- Finely stranded with non-insulated end sleeve		mm^2	6 ... 25			
- Finely stranded with insulated end sleeve		mm^2	6 ... 16			
Terminal tightening torque						
• Up to I_n = 80 A		Nm	2.5			
• At I_n = 100 A, 125 A		Nm	3.0 ... 3.5			
Mains connection			Optionally top or bottom (top for the SIGRES function to also be effective in the deactivated state)			
Rated frequency		Hz	50	50	50/60	50/60
Mounting position (on a standard mounting rail)			Any			
Degree of protection	Acc. to EN 60529 (VDE 0470-1)		IP20, if the distribution board is installed, with connected conductors			
Touch protection	Acc. to EN 50274 (VDE 0660-514)		Finger and back-of-hand safe			
Service life	Average number of operating cycles Test cycle acc. to IEC/EN 61008		> 10000			
Storage temperature		°C	-40 ... +75			
Ambient temperature		°C	-25 ... +45, marked with -25			
Resistance to climate	Acc. to IEC 60068-2-30		28 cycles (55 °C; 95% rel. air humidity)			
CFC and silicone-free			Yes			

Selection and ordering data

(Type A)	Rated residual current	Rated current	Max. permissible short-circuit back-up fuse	Mounting width	Article No.	Weight
	$I_{\Delta n}$	I_n	10000			
	mA	A	A	MW[1]		kg
RCCBs, type A, instantaneous						
	1P+N; 230 V AC					
	N connection, right					
	10	16	63	2	**5SV3111-6**	0.199
	30	16	63	2	**5SV3311-6**	0.188
		Bulk packaging 36 units			**5SV3311-6GV01**	0.192
		25	63		**5SV3312-6**	0.187
		Bulk packaging 36 units			**5SV3312-6GV01**	0.193
		40	63		**5SV3314-6**	0.188
		Bulk packaging 36 units			**5SV3314-6GV01**	0.193
		40[2]	63		**5SV3314-6LA**	0.212
		63	80		**5SV3316-6**	0.219
		80			**5SV3317-6**	0.216
	100	25	63	2	**5SV3412-6**	0.182
		40			**5SV3414-6**	0.181
		63	80		**5SV3416-6**	0.198
		80			**5SV3417-6**	0.208
	300	25	63	2	**5SV3612-6**	0.187
		40			**5SV3614-6**	0.188
		63	80		**5SV3616-6**	0.202
		80			**5SV3617-6**	0.193
	3P+N; 400 V AC					
	N connection, right					
	30	25	80	4	**5SV3342-6**	0.317
		Bulk packaging 18 units			**5SV3342-6GV01**	0.334
		40	80		**5SV3344-6**	0.317
		Bulk packaging 18 units			**5SV3344-6GV01**	0.333
		40[2]	80		**5SV3344-6LA**	0.374
		63	100		**5SV3346-6**	0.374
		Bulk packaging 18 units			**5SV3346-6GV01**	0.400
		63[2]	80		**5SV3346-6LA**	0.370
		80	100		**5SV3347-6**	0.384
	100	25	80	4	**5SV3442-6**	0.339
		40			**5SV3444-6**	0.339
		40[2]	80		**5SV3444-6LA**	0.341
		63	100		**5SV3446-6**	0.341
		63[2]	100		**5SV3446-6LA**	0.340
		80			**5SV3447-6**	0.341
	300	25	80	4	**5SV3642-6**	0.305
		40			**5SV3644-6**	0.306
		63	100		**5SV3646-6**	0.336
		80			**5SV3647-6**	0.358
	500	25	80	4	**5SV3742-6**	0.336
		40			**5SV3744-6**	0.338
		63	100		**5SV3746-6**	0.337
		Bulk packaging 18 units			**5SV3746-6GV01**	0.375
		80			**5SV3747-6**	0.336
	1P+N; 230 V AC					
	N connection, left					
	10	16	63	2	**5SV3111-6KL**	0.198
	30	16	63	2	**5SV3311-6KL**	0.188
		25			**5SV3312-6KL**	0.187
		40			**5SV3314-6KL**	0.192
		63	80		**5SV3316-6KL**	0.212
		80			**5SV3317-6KL**	0.223
	100	25	63	2	**5SV3412-6KL**	0.197
		40			**5SV3414-6KL**	0.182
		63	80		**5SV3416-6KL**	0.206
		80			**5SV3417-6KL**	0.207
	300	25	63	2	**5SV3612-6KL**	0.175
		40			**5SV3614-6KL**	0.180
		63	80		**5SV3616-6KL**	0.194
		80			**5SV3617-6KL**	0.200

[1] 1 MW (modular width) = 18 mm.

[2] Thermal overload protection according to ÖVE/ÖNORM E 8001 possible up to rated current of the RCCB (40 A, 63 A).

* You can order this quantity or a multiple thereof.

Selection and ordering data (continued)

(Type A)	Rated residual current	Rated current	Max. permissible short-circuit back-up fuse	Mounting width	Article No.	Weight
	$I_{\Delta n}$	I_n	10000			
	mA	A	A	MW[1]		kg
	**3P+N; 400 V AC**					
	N connection, left					
	30	25	80	4	**5SV3342-6KL**	0.316
		40			**5SV3344-6KL**	0.317
		63	80		**5SV3346-6KL**	0.373
		80			**5SV3347-6KL**	0.372
	300	25	80	4	**5SV3642-6KL**	0.304
		40			**5SV3644-6KL**	0.305
		63			**5SV3646-6KL**	0.336
		80			**5SV3647-6KL**	0.336
	500	63	80	4	**5SV3746-6KL**	0.338

[1] 1 MW (modular width) = 18 mm.

*** You can order this quantity or a multiple thereof.**

3

Selection and ordering data (continued)

(Type A)	Rated residual current	Rated current	Max. permissible short-circuit back-up fuse	Mounting width	Article No.	Weight
ÖVE	$I_{\Delta n}$	I_n	10000			
	mA	A	A	MW[1]		kg
RCCBs, type A, short-time delayed G						
	**2P, 125 ... 230 V AC**					
	N connection, right					
	30	40[2]	63	2	**5SV3314-6LA01**	0.214
	**4P, 230 ... 400 V AC**					
	N connection, right					
	30	40	100	4	**5SV3344-6LB01**	0.376
		40[2]			**5SV3344-6LA01**	0.376
		63			**5SV3346-6LB01**	0.378
		63[2]			**5SV3346-6LA01**	0.377
	100	40	100	4	**5SV3444-6LB01**	0.378
		40[2]			**5SV3444-6LA01**	0.377
		63			**5SV3446-6LB01**	0.376
		63[2]			**5SV3446-6LA01**	0.377
RCCBs, type A, super resistant K						
	**1P+N; 230 V AC**					
	N connection, right					
	30	25	63	2	**5SV3312-6KK01**	0.215
		40			**5SV3314-6KK01**	0.213
		63	80		**5SV3316-6KK01**	0.213
		80			**5SV3317-6KK01**	0.225
	300	25	63	2	**5SV3612-6KK01**	0.204
		40			**5SV3614-6KK01**	0.204
		63	80		**5SV3616-6KK01**	0.216
		80			**5SV3617-6KK01**	0.215
	**3P+N; 400 V AC**					
	N connection, right					
	30	25	100	4	**5SV3342-6KK01**	0.375
		40			**5SV3344-6KK01**	0.377
		63			**5SV3346-6KK01**	0.377
		80			**5SV3347-6KK01**	0.374
	300	25	100	4	**5SV3642-6KK01**	0.375
		40			**5SV3644-6KK01**	0.377
		63			**5SV3646-6KK01**	0.376
		80			**5SV3647-6KK01**	0.374
RCCBs, type A, selective S						
	**1P+N; 230 V AC**					
	N connection, right					
	100	63	80	2	**5SV3416-8**	0.213
	300	25	63	2	**5SV3612-8**	0.205
		40			**5SV3614-8**	0.204
		63	80		**5SV3616-8**	0.204
		80			**5SV3617-8**	0.207

[1] 1 MW (modular width) = 18 mm.

[2] Thermal overload protection according to ÖVE/ÖNORM E 8001 possible up to rated current of the RCCB (40 A, 63 A).

* You can order this quantity or a multiple thereof.

Selection and ordering data (continued)

(Type A)	Rated residual current	Rated current	Max. permissible short-circuit back-up fuse	Mounting width	Article No.	Weight
ÖVE	$I_{\Delta n}$	I_n	10000			
	mA	A	A	MW[1]		kg
	**3P+N; 400 V AC**					
	N connection, right					
	100	40	100	4	**5SV3444-8**	0.378
		40[1]			**5SV3444-8LA**	0.376
		63			**5SV3446-8**	0.378
		63[1]			**5SV3446-8LA**	0.377
	300	25	100	4	**5SV3642-8**	0.377
		40			**5SV3644-8**	0.379
		40[1]			**5SV3644-8LA**	0.376
		63			**5SV3646-8**	0.378
		63[1]			**5SV3646-8LA**	0.378
		80			**5SV3647-8**	0.378
	1000	63	100	4	**5SV3846-8**	0.378
	**1P+N; 230 V AC**					
	N connection, left					
	300	40	63	2	**5SV3614-8KL**	0.216
		63	80		**5SV3616-8KL**	0.216
	**3P+N; 400 V AC**					
	N connection, left					
	300	63	80	4	**5SV3646-8KL**	0.377
RCCBs, type A, SIGRES, instantaneous						
	**1P+N; 230 V AC**					
	N connection, right					
	30	16	63	2	**5SV3311-6KK12**	0.212
		25			**5SV3312-6KK12**	0.211
		40			**5SV3314-6KK12**	0.213
		63	80		**5SV3316-6KK12**	0.224
	**3P+N; 400 V AC**					
	N connection, right					
	30	25	100	4	**5SV3342-6KK12**	0.374
		40			**5SV3344-6KK12**	0.372
		63			**5SV3346-6KK12**	0.372
		80			**5SV3347-6KK12**	0.373
	300	25	100	4	**5SV3642-6KK12**	0.335
		40			**5SV3644-6KK12**	0.336
		63			**5SV3646-6KK12**	0.336
		80			**5SV3647-6KK12**	0.366
RCCBs, type A, SIGRES, selective S						
	**3P+N; 400 V AC**					
	N connection, right					
	300	63	100	4	**5SV3646-8KK12**	0.394

1) 1 MW (modular width) = 18 mm.

2) Thermal overload protection according to ÖVE/ÖNORM E 8001 possible up to rated current of the RCCB (40 A, 63 A).

*** You can order this quantity or a multiple thereof.**

3

Selection and ordering data (continued)

	Rated residual current	Rated current	Max. permissible short-circuit back-up fuse	Mounting width	Article No.	Weight
	$I_{\Delta n}$	I_n	10000			
	mA	A	A	MW[1]		kg
RCCBs, type F, super resistant K						
	**1P + N; 230 V AC**					
	N connection, right					
	30	25	63	2	**5SV3312-3**	0.213
		40			**5SV3314-3**	0.214
		63	80		**5SV3316-3**	0.224
		80			**5SV3317-3**	0.220
	300	25	63	2	**5SV3612-3**	0.204
		40			**5SV3614-3**	0.205
		63	80		**5SV3616-3**	0.214
		80			**5SV3617-3**	0.205
	**3P + N; 400 V AC**					
	N connection, right 100					
	30	25	100	4	**5SV3342-3**	0.375
		40			**5SV3344-3**	0.376
		63			**5SV3346-3**	0.373
		80			**5SV3347-3**	0.402
	300	25	100	4	**5SV3642-3**	0.373
		40			**5SV3644-3**	0.375
		63			**5SV3646-3**	0.374
		80			**5SV3647-3**	0.376
RCCBs, type F, selective S						
	**1P + N; 230 V AC**					
	N connection, right					
	300	40	63	2	**5SV3614-7**	0.215
		80	80		**5SV3617-7**	0.211
	**3P + N; 400 V AC**					
	N connection, right					
	300	40	100	4	**5SV3644-7**	0.377
		80			**5SV3647-7**	0.377

[1] 1 MW (modular width) = 18 mm.

* You can order this quantity or a multiple thereof.

Selection and ordering data (continued)

(Type A)	Rated residual current	Rated current	Max. permissible short-circuit back-up fuse	Mounting width	Article No.	Weight
	$I_{\Delta n}$	I_n	10000			
	mA	A	A	MW[1]		kg
RCCBs, type A, instantaneous						
	**1P+N; 24 ... 125 V AC**					
	N connection, right					
	30	16	63	2	**5SV3311-6KK13**	0.192
		25		2	**5SV3312-6KK13**	0.191
		40		2	**5SV3314-6KK13**	0.191
		63	80	2	**5SV3316-6KK13**	0.221
	**3P+N; 500 V AC**					
	N connection, right					
	30	25	63	4	**5SV3352-6**	0.372
		40		4	**5SV3354-6**	0.372
		63		4	**5SV3356-6**	0.373
		80	80	4	**5SV3357-6**	0.399
	300	25	63	4	**5SV3652-6**	0.338
		40		4	**5SV3654-6**	0.335
		63		4	**5SV3656-6**	0.338
		80	80	4	**5SV3657-6**	0.351
	3P+N; 230 V AC; 400 Hz					
	N connection, right					
	30	25	80	4	**5SV3342-6KK03**	0.380
		40		4	**5SV3344-6KK03**	0.377

[1] 1 MW (modular width) = 18 mm.

*** You can order this quantity or a multiple thereof.**

5SV1 electromechanic RCBOs

Overview

Residual current circuit breakers with overload protection combine residual current detection, short circuit and overcurrent protection in one device, thus enabling combined electric-shock and line protection. The protection devices enhance reliable operation and system availability, simplifying planning.

The new 5SV1 is the first electromechanic (voltage independent) RCD on the IEC market in only one modular width. In combination with the 5SM6 AFD unit, preventive fire protection is thus possible in a total of only 2 modular widths.

Selection and ordering data

I_n	Characteristic B	Characteristic C	
	Article No.	Article No.	Weight
A			kg
5SV1 RCBO 4.5 kA in only 1 MW			
Type A, 30 mA			
2	--	5SV1313-7KK02	0.134
4	--	5SV1313-7KK04	0.134
6	5SV1313-6KK06	5SV1313-7KK06	0.130
10	5SV1313-6KK10	5SV1313-7KK10	0.130
13	5SV1313-6KK13	5SV1313-7KK13	0.132
16	5SV1313-6KK16	5SV1313-7KK16	0.129
Type AC, 30 mA			
2	--	5SV1313-1KK02	0.131
4	--	5SV1313-1KK04	0.135
6	--	5SV1313-1KK06	0.129
10	--	5SV1313-1KK10	0.131
13	--	5SV1313-1KK13	0.133
16	--	5SV1313-1KK16	0.129
5SV1 RCBO 6 kA in only 1 MW			
Type A, 30 mA			
2	--	5SV1316-7KK02	0.132
4	--	5SV1316-7KK04	0.132
6	5SV1316-6KK06	5SV1316-7KK06	0.131
10	5SV1316-6KK10	5SV1316-7KK10	0.131
13	5SV1316-6KK13	5SV1316-7KK13	0.129
16	5SV1316-6KK16	5SV1316-7KK16	0.129
Type AC, 30 mA			
2	--	5SV1316-1KK02	0.132
4	--	5SV1316-1KK04	0.132
6	5SV1316-0KK06	5SV1316-1KK06	0.129
10	5SV1316-0KK10	5SV1316-1KK10	0.131
13	5SV1316-0KK13	5SV1316-1KK13	0.133
16	5SV1316-0KK16	5SV1316-1KK16	0.128

* You can order this quantity or a multiple thereof.

Selection and ordering data

(Type B/type B+)	Rated residual current	Rated current	Max. permissible short-circuit back-up fuse	Mounting width	Article No.	Weight
	$I_{\Delta n}$	I_n	10000			
	mA	A	A	MW[1]		kg
SIQUENCE RCCBs, type B, super resistant K						
	**1P+N; 230 V AC; 50 ... 60 Hz**					
	30	16	100	4	**5SV3321-4**	0.378
		25			**5SV3322-4**	0.377
		40			**5SV3324-4**	0.378
		63			**5SV3326-4**	0.380
	300	16	100	4	**5SV3621-4**	0.377
		25			**5SV3622-4**	0.379
		40			**5SV3624-4**	0.377
		63			**5SV3626-4**	0.380
	**3P+N; 230 ... 400 V AC; 50 ... 60 Hz**					
	30	25	100	4	**5SV3342-4**	0.450
		40			**5SV3344-4**	0.449
		63			**5SV3346-4**	0.447
		80			**5SV3347-4**	0.451
	300	25	100	4	**5SV3642-4**	0.449
		40			**5SV3644-4**	0.452
		63			**5SV3646-4**	0.451
		80			**5SV3647-4**	0.454
	500	25	100	4	**5SV3742-4**	0.453
		40			**5SV3744-4**	0.454
		63			**5SV3746-4**	0.451
		80			**5SV3747-4**	0.456
SIQUENCE RCCBs, type B, selective S						
	**3P+N; 230 ... 400 V AC; 50 ... 60 Hz**					
	300	63	100	4	**5SV3646-5**	0.453
		80			**5SV3647-5**	0.454
	500	63	100	4	**5SV3746-5**	0.453
		80			**5SV3747-5**	0.454
SIQUENCE RCCBs, type B+, super resistant K						
	**3P+N; 230 ... 400 V AC; 50 ... 60 Hz**					
	30	25	100	4	**5SV3342-4KK14**	0.453
		40			**5SV3344-4KK14**	0.449
		63			**5SV3346-4KK14**	0.452
		80			**5SV3347-4KK14**	0.454
	300	25	100	4	**5SV3642-4KK14**	0.455
		40			**5SV3644-4KK14**	0.454
		63			**5SV3646-4KK14**	0.449
		80			**5SV3647-4KK14**	0.451
SIQUENCE RCCBs, type B+, selective S						
	**3P+N; 230 ... 400 V AC; 50 ... 60 Hz**					
	300	63	100	4	**5SV3646-5KK14**	0.450
		80			**5SV3647-5KK14**	0.455

[1] 1 MW (modular width) = 18 mm.

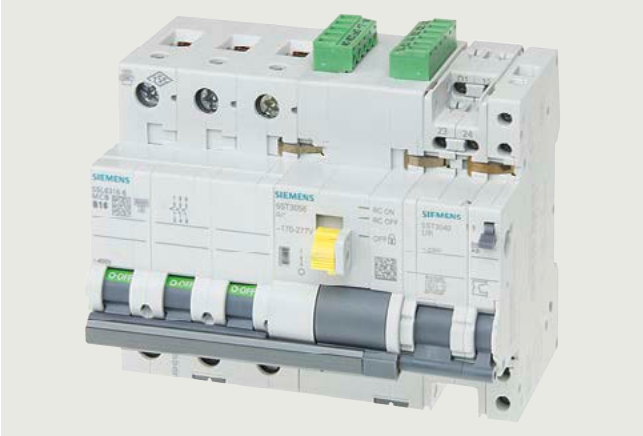
*** You can order this quantity or a multiple thereof.**

Benefits

Can be universally retrofitted with all additional components

- Captive metal brackets on the additional components ensure the quick and easy mounting of devices without the need for tools.
- Fault signal contacts with TEST and RESET button enable simple testing of auxiliary circuits and, in the event of a fault, acknowledgement of the fault over the RESET button without the need to switch the RCCBs.
- The auxiliary switches with TEST button enable simple manual testing of control circuits during operation of the entire installation without the need to switch the RCCBs.
- Bus systems, such as *instabus* KNX, AS-Interface bus or PROFIBUS, can be integrated in the communication over binary inputs
- The leakage current measurement device enables the systematic selection of the rated residual current, thus preventing inadvertent tripping of an RCCB.

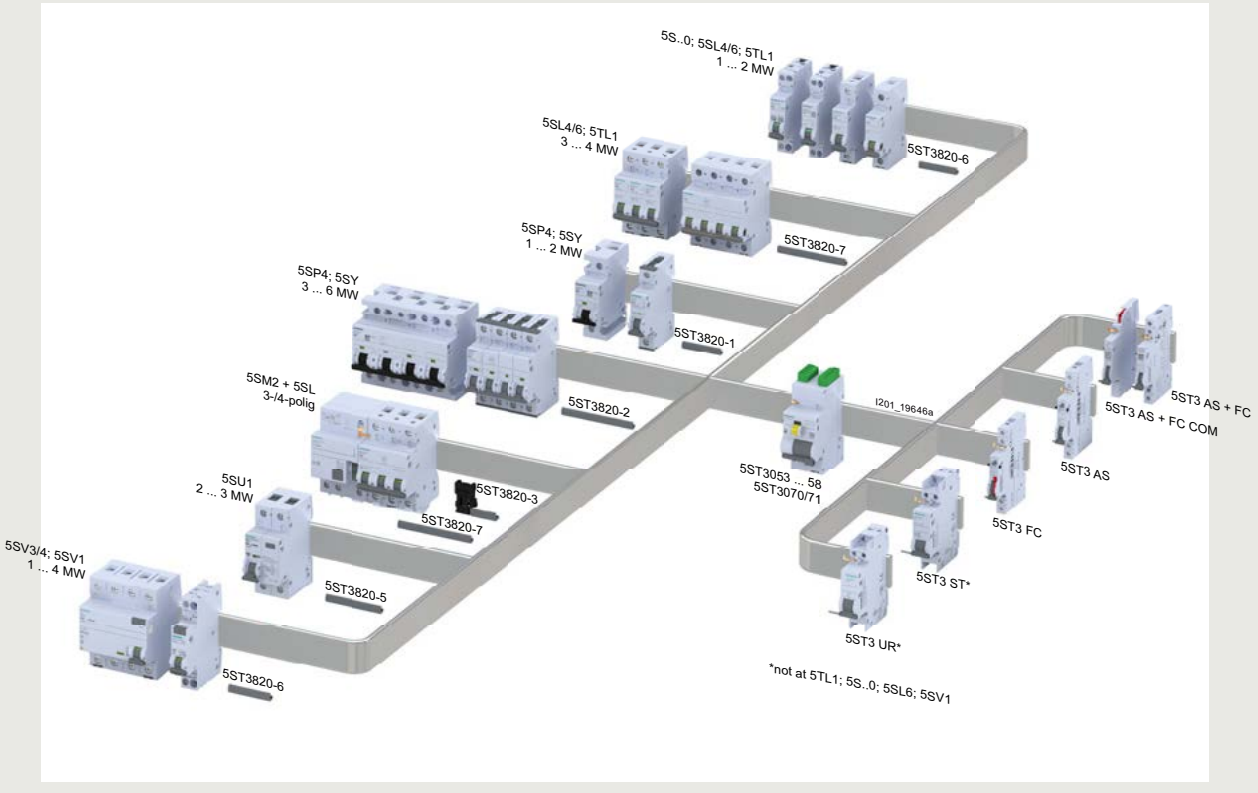
Remote controlled mechanisms



- Remote controlled mechanisms with ARD and Power have integrated auxiliary switches and fault signal contacts.
- More 5ST3... additional components, such as AS, FC, ST and UR, can be added to the right-hand side of the remote controlled mechanism in line with the Siemens mounting concept.
- The remote controlled mechanisms with ARD and Power have an LED display on the front of the device to show the switching state and for diagnostics.
- The 5ST3070 remote controlled mechanism has an extended temperature range from -40 °C to +70 °C

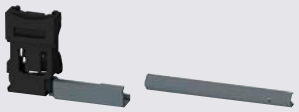
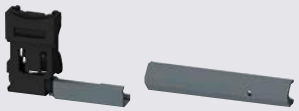
Benefits

Portfolio overview



Benefits

Combination options remote controlled mechanism – adapter – mount-on device

	Mounting width	
	MW[1]	**RC mech. Power (2 MW) 5ST3070 / 5ST3071, 12 V - 30 V AC, 12 V - 48 V DC**
5SL4/6 5TL1 5SV1 	1 - 2 MW	 Adapter 5ST3820-6
5SY4/5/6/7/8 5SY60 	1 - 2 MW	 Adapter 5ST3820-1
5SL4/6 5TL1 	3 - 4 MW	 Adapter 5ST3820-7
5SY4/5/6/7/8 	3 - 4 MW	 Adapter 5ST3820-2
5SU1 	2 MW, 3 MW	 Adapter 5ST3820-5
5SV3 	--	 Adapter 5ST3820-6
5SM2 + 5SL, 2-pole 		 Adapter 5ST3820-3 add. 5ST3820-7
5SM2 + 5SY 2-pole 		 Adapter 5ST3820-3 add. 5ST3820-1
5SM2 + 5SL,3-4-pole 		 Adapter 5ST3820-3 add. 5ST3820-7
5SM2 + 5SY 		 Adapter 5ST3820-3 add. 5ST3820-2

[1] 1 MW (modular width) = 18 mm.

3

Technical specifications

		Remote controlled mechanisms Power with extended function	
			
		5ST3070	**5ST3071**
Standards			
Rated voltages U_n	V AC	12 ... 30	170 ... 277
	V DC	12 ... 48	77 ... 286
• Rated frequency f_n	Hz		
Rated power dissipation	VA		
Module width	mm		
Ambient temperature	°C	-40 ... +70	
Storage temperature	°C	-40 ... +70	
Degree of protection			
Pollution degree for overvoltage category		3/II	3/II
Service life, on average, with rated load			
Conductor cross-sections	mm^2 AWG		
Terminal tightening torque	Nm lb-in		
Cable length in the control circuit	m		
Number of remote switching operations/min.			
Number of automatic reclose attempts		--	
Sliding selector with locking device			
Integrated auxiliary switches			
Integrated fault signal contact			
Possible device combinations			

Selection and ordering data

	Version	Rated voltage	Mounting width	Article No.	Weight
			MW[1]		kg
	**Remote controlled mechanisms (RC mech.)**				
	• Remote controlled mechanisms with extended function	12 ... 30 V AC 12 ... 48 V DC	2	**5ST3070**	0.229
		170 ... 277 V AC 77 ... 286 V DC	2	**5ST3071**	0.243
	Note				
	Matching adapters must be ordered separately.				
	**Accessories for remote controlled mechanisms**				
	• Adapters for 5SY MCBs				
	- 1-2-pole			**5ST3820-1**	0.009
	- 3-4-pole			**5ST3820-2**	0.011
	• Adapters for 5SM2 RC units			**5ST3820-3**	0.013
	• Adapters for 5SU1 RCBOs			**5ST3820-5**	0.010
	• Adapters for 5SL MCBs				
	- 1-2-pole, 5SV3 residual current switches			**5ST3820-6**	0.013
	- 3-4-pole			**5ST3820-7**	0.011
	• Adapters for 5TL1 ON/OFF switches				
	- 3-4-pole			**5ST3821-1**	0.009

[1] 1 MW (modular width) = 18 mm.

3

Technical specifications

			Undervoltage releases (UR)	Shunt trips (ST)	
			5ST304.	5ST3030	5ST3031
Standards			EN 60947-1		
Rated voltages U_n		V AC	230	110 ... 415	24 ... 48
		V DC	24, 110	110	24 ... 48
• Operating range U_n			0.85 ... 1.1 x U_n	0.7 ... 1.1 x U_n	
• Rated frequency f_n		Hz	--	50 ... 60	
Response limits					
• Tripping			< 0.35 ... 0.7 × U_n	--	
Short-circuit protection			Miniature circuit breakers B/C 6 A or fuse gG 6 A		
Minimum contact load			50 mA, 24 V	50 mA, 24 V	
Tripping operations			max. 2000	max. 2000	
Service life, on average, with rated load			20000 actuations	20000 actuations	
Conductor cross-sections		mm^2 AWG	0.5 ... 2.5 22 ... 14	0.5 ... 2.5 22 ... 14	
Terminals					
• Terminal tightening torque		Nm lb-in	0.8 6.8	0.8 6.8	
Mounting position			Any	Any	
Ambient temperature		°C	-25 ... +55	-25 ... +55	
Storage temperature		°C	-40 ... +75	-40 ... +75	
Resistance to climate	Acc. to IEC 60068-2-30	Cycles	28		
Shock	Acc. to IEC 60068-2-27	m/s	50 at 11 ms half-sine		
Resistance to vibrations	Acc. to IEC 60068-2-6	m/s^2	50 at 10 ... 150 Hz		

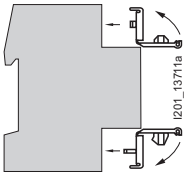
Selection and ordering data

	Version	Mounting width	Article No.	Weight
		MW[1]		kg
	**Auxiliary switches (AS)**			
	For 5SM3 residual current protective devices, 100 ... 125 A, 3P+N			
	1 NO + 1 NC	0.5	**5SW3330**	0.064
	**Auxiliary switches (AS)**			
	For 5SL, 5SY, 5SP miniature circuit breakers, 5SU1 RCBOs, for 5SV residual current protective devices and 5TE8 switches (for 5SU1 the 5ST3805-1 handle coupler is required)			
	1 NO + 1 NC	0.5	**5ST3010**	0.056
	- For low power		**5ST3013**	0.061
	- For low power (with diode)		**5ST3013-0XX01**	0.063
	2 NO		**5ST3011**	0.063
	- For low power		**5ST3014**	0.060
	2 NC		**5ST3012**	0.065
	- For low power		**5ST3015**	0.064
	1 CO		**5ST3016**	0.051
			5ST1010-0FP	0.056
	**Auxiliary switches (AS) with TEST button**			
	For 5SL, 5SY, 5SP miniature circuit breakers, 5SU1 RCBOs, for 5SV residual current protective devices and 5TE8 switches (for 5SU1 the 5ST3805-1 handle coupler is required)			
	1 NO + 1 NC		**5ST3010-2**	0.066
	- For low power		**5ST3013-2**	0.069
	2 NO		**5ST3011-2**	0.068
	- For low power		**5ST3014-2**	0.065
	2 NC		**5ST3012-2**	0.071
	- For low power		**5ST3015-2**	0.071
	**Auxiliary switches and fault signal contacts (AS+FC)**			
	1 CO (AS) + 1 CO (FC)	0.5	**5ST3062**	0.069
	5ST3 COM (AS+FC)		**5ST3062-0MC**	0.047
	**Fault signal contacts (FC)**			
	For 5SL, 5SY, 5SP miniature circuit breakers, 5SU1 RCBOs, and for 5SV residual current protective devices (for 5SU1 the 5ST3805-1 handle coupler is required)			
	1 NO + 1 NC	0.5	**5ST3020**	0.065
	2 NO		**5ST3021**	0.066
	2 NC		**5ST3022**	0.066
	**Fault signal contacts (FC) with TEST and ACKNOWLEDGE button**			
	For 5SL, 5SY, 5SP miniature circuit breakers, 5SU1 RCBOs, and for 5SV residual current protective devices (for 5SU1 the 5ST3805-1 handle coupler is required)			
	1 NO + 1 NC	0.5	**5ST3020-2**	0.071
	2 NO		**5ST3021-2**	0.071
	2 NC		**5ST3022-2**	0.067

[1] 1 MW (modular width) = 18 mm.

3

Selection and ordering data (continued)

	Version	Rated voltage	Mounting width	Article No.	Weight
		V	MW[1]		kg
	**Undervoltage releases (UR)**				
	For 5SY, 5SP miniature circuit breakers, 5SV residual current protective devices and 5SU1 RCBOs (for 5SU1 the 5ST3805-1 handle coupler is required)				
	With integrated auxiliary switch	230 AC	1	**5ST3040**	0.115
		110 DC		**5ST3041**	0.109
		24 DC		**5ST3042**	0.110
	Without integrated auxiliary switch	230 AC	1	**5ST3043**	0.102
		110 DC		**5ST3044**	0.095
		24 DC		**5ST3045**	0.095
	**Remote controlled (RC) mechanisms**				
	Basic	12 ... 30 V AC, 12 ... 48 V DC		**5ST3053**	0.191
		177 ... 270 V AC		**5ST3054**	0.235
	Power	12 ... 30 V AC, 12 ... 48 V DC		**5ST3055**	0.235
		177 ... 270 V AC		**5ST3056**	0.241
	Power with ARD	12 ... 30 V AC, 12 ... 48 V DC		**5ST3057**	0.230
		177 ... 270 V AC		**5ST3058**	0.242
	Power with extended function	12 ... 30 V AC, 12 ... 48 V DC		**5ST3070**	0.229
		177 ... 270 V AC		**5ST3071**	0.243
	**Shunt trips (ST)**				
	For 5SY, 5SP miniature circuit breakers, 5SV residual current protective devices and 5SU1 RCBOs (for 5SU1 the 5ST3805-1 handle coupler is required)				
		110 ... 415 V AC	1	**5ST3030**	0.098
		24 ... 48 V AC/DC	1	**5ST3031**	0.098
		12 V DC		**5ST3031-0XX01**	0.100
	**Covers for connection terminals**				
	For 5SM3 RCCBs up to 80 A, sealable (2 units in plastic bag)				
			2	**5SW3010**	0.012
			4	**5SW3008**	0.015
	**Handle locking devices**				
	• For 5SV RCCBs • For padlock with 3 ... 6 mm shackle			**5ST3806**	0.004
	**Padlocks**				
	For 5SW3303 locking device			**5ST3802**	0.033

[1] 1 MW (modular width) = 18 mm.

Selection and ordering data

(Type A)	Rated residual current	Rated current	Mounting width	Tripping characteristic B	Tripping characteristic C	Weight
	$I_{\Delta n}$	I_n				
	mA	A	MW[1]	Article No.	Article No.	kg
RCBOs, type A, instantaneous						
	**1P+N; 230 V AC**					
	4 500 / 3					
	N connection, right					
	30	6	2	--	**5SU1353-7KK06**	0.286
		8		--	**5SU1353-7KK08**	0.272
		10		--	**5SU1353-7KK10**	0.271
		13		--	**5SU1353-7KK13**	0.270
		16		--	**5SU1353-7KK16**	0.270
		20		--	**5SU1353-7KK20**	0.280
		25		--	**5SU1353-7KK25**	0.281
		32		--	**5SU1353-7KK32**	0.285
		40		--	**5SU1353-7KK40**	0.285
	300	6	2	--	**5SU1653-7KK06**	0.268
		10		--	**5SU1653-7KK10**	0.266
		13		--	**5SU1653-7KK13**	0.292
		16		--	**5SU1653-7KK16**	0.268
		20		--	**5SU1653-7KK20**	0.276
		25		--	**5SU1653-7KK25**	0.279
		32		--	**5SU1653-7KK32**	0.279
		40		--	**5SU1653-7KK40**	0.280
	N connection, left					
	30	6	2	--	**5SU1353-7KL06**	0.276
		10		--	**5SU1353-7KL10**	0.284
		16		--	**5SU1353-7KL16**	0.278
		20		--	**5SU1353-7KL20**	0.298
		25		--	**5SU1353-7KL25**	0.288
		32		--	**5SU1353-7KL32**	0.296
		40		--	**5SU1353-7KL40**	0.294

[1] 1 MW (modular width) = 18 mm.

*** You can order this quantity or a multiple thereof.**

Selection and ordering data (continued)

(Type A)	Rated residual current $I_{\Delta n}$	Rated current I_n	Mounting width	Tripping characteristic B Article No.	Tripping characteristic C Article No.	Weight
	mA	A	MW[1]			kg
RCBOs, type A, instantaneous						
	**1P+N; 230 V AC** 6 000 3					
	N connection, right					
	30	6	2	**5SU1356-6KK06**	**5SU1356-7KK06**	0.272
		8		--	**5SU1356-7KK08**	0.271
		10		**5SU1356-6KK10**	**5SU1356-7KK10**	0.271
	Bulk packaging 36 units			**5SU1356-6GV10**	**5SU1356-7GV10**	0.277
		13		**5SU1356-6KK13**	**5SU1356-7KK13**	0.273
		16		**5SU1356-6KK16**	**5SU1356-7KK16**	0.267
	Bulk packaging 36 units			**5SU1356-6GV16**	**5SU1356-7GV16**	0.274
		20		**5SU1356-6KK20**	**5SU1356-7KK20**	0.281
		25		**5SU1356-6KK25**	**5SU1356-7KK25**	0.280
		32		**5SU1356-6KK32**	**5SU1356-7KK32**	0.284
		40		**5SU1356-6KK40**	**5SU1356-7KK40**	0.284
	300	6	2	**5SU1656-6KK06**	**5SU1656-7KK06**	0.267
		10		**5SU1656-6KK10**	**5SU1656-7KK10**	0.268
		13		**5SU1656-6KK13**	**5SU1656-7KK13**	0.273
		16		**5SU1656-6KK16**	**5SU1656-7KK16**	0.267
		20		**5SU1656-6KK20**	**5SU1656-7KK20**	0.276
		25		**5SU1656-6KK25**	**5SU1656-7KK25**	0.278
		32		**5SU1656-6KK32**	**5SU1656-7KK32**	0.277
		40		**5SU1656-6KK40**	**5SU1656-7KK40**	0.277
	**1P+N; 230 V AC** 10 000 3					
	10	6	2	**5SU1154-6KK06**	**5SU1154-7KK06**	0.275
		10		**5SU1154-6KK10**	**5SU1154-7KK10**	0.274
		13		**5SU1154-6KK13**	**5SU1154-7KK13**	0.282
		16		**5SU1154-6KK16**	**5SU1154-7KK16**	0.274
	30	6	2	**5SU1354-6KK06**	**5SU1354-7KK06**	0.274
		8		--	**5SU1354-7KK08**	0.273
		10		**5SU1354-6KK10**	**5SU1354-7KK10**	0.272
	Bulk packaging 36 units			**5SU1354-6GV10**	**5SU1354-7GV10**	0.278
		13		**5SU1354-6KK13**	**5SU1354-7KK13**	0.277
		16		**5SU1354-6KK16**	**5SU1354-7KK16**	0.274
	Bulk packaging 36 units			**5SU1354-6GV16**	**5SU1354-7GV16**	0.276
		20		**5SU1354-6KK20**	**5SU1354-7KK20**	0.277
		25		**5SU1354-6KK25**	**5SU1354-7KK25**	0.276
		32		**5SU1354-6KK32**	**5SU1354-7KK32**	0.282
		40		**5SU1354-6KK40**	**5SU1354-7KK40**	0.280
	300	6	2	**5SU1654-6KK06**	**5SU1654-7KK06**	0.272
		10		**5SU1654-6KK10**	**5SU1654-7KK10**	0.272
		13		**5SU1654-6KK13**	**5SU1654-7KK13**	0.274
		16		**5SU1654-6KK16**	**5SU1654-7KK16**	0.271
		20		**5SU1654-6KK20**	**5SU1654-7KK20**	0.273
		25		**5SU1654-6KK25**	**5SU1654-7KK25**	0.274
		32		**5SU1654-6KK32**	**5SU1654-7KK32**	0.273
		40		**5SU1654-6KK40**	**5SU1654-7KK40**	0.275
	**2P, 230 V AC** 10 000 3					
	30	6	3	**5SU1324-6FA06**	**5SU1324-7FA06**	0.401
		10		**5SU1324-6FA10**	**5SU1324-7FA10**	0.405
		13		**5SU1324-6FA13**	**5SU1324-7FA13**	0.413
		16		**5SU1324-6FA16**	**5SU1324-7FA16**	0.404
		20		**5SU1324-6FA20**	**5SU1324-7FA20**	0.412
		25		**5SU1324-6FA25**	**5SU1324-7FA25**	0.410
		32		**5SU1324-6FA32**	**5SU1324-7FA32**	0.417
		40		**5SU1324-6FA40**	**5SU1324-7FA40**	0.420

[1] 1 MW (modular width) = 18 mm.

* You can order this quantity or a multiple thereof.

Selection and ordering data (continued)

(Type A)	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	Mounting width MW[1)]	Tripping characteristic B Article No.	Tripping characteristic C Article No.	Weight kg
	**2P, 110 V AC** 10 000 3					
	30	6	3	**5SU1324-6KX06**	**5SU1324-7KX06**	0.403
		10		**5SU1324-6KX10**	**5SU1324-7KX10**	0.401
		13		**5SU1324-6KX13**	**5SU1324-7KX13**	0.413
		16		**5SU1324-6KX16**	**5SU1324-7KX16**	0.403
		20		**5SU1324-6KX20**	**5SU1324-7KX20**	0.411
		25		**5SU1324-6KX25**	**5SU1324-7KX25**	0.418
		32		**5SU1324-6KX32**	**5SU1324-7KX32**	0.417
		40		**5SU1324-6KX40**	**5SU1324-7KX40**	0.416
	**2P, 400 V AC** 10 000					
	30	125	6.5	**5SU1324-6KK82**	**5SU1324-7KK82**	1.212
	300	125		**5SU1624-6KK82**	**5SU1624-7KK82**	1.106
	**4P, 400 V AC** 10 000					
	30	125	11	**5SU1344-6KK82**	**5SU1344-7KK82**	2.022
	300	125		**5SU1644-6KK82**	**5SU1644-7KK82**	2.029
RCBOs, type A, short-time delayed G, super resistant K						
	**1P+N; 230 V AC** 10 000 3					
	30	10	2	**5SU1354-6LB10**	**5SU1354-7LB10**	0.275
		13		**5SU1354-6LB13**	**5SU1354-7LB13**	0.278
		16		**5SU1354-6LB16**	**5SU1354-7LB16**	0.273
		20		**5SU1354-6LB20**	**5SU1354-7LB20**	0.277
		25		**5SU1354-6LB25**	**5SU1354-7LB25**	0.286
		32		**5SU1354-6LB32**	**5SU1354-7LB32**	0.282
		40		**5SU1354-6LB40**	**5SU1354-7LB40**	0.287
RCBOs, type A, selective S						
	**2P, 400 V AC** 10 000					
	300	125	6.5	**5SU1624-6WK82**	**5SU1624-7WK82**	1.155
	**4P, 400 V AC** 10 000					
	300	125	11	**5SU1644-6WK82**	**5SU1644-7WK82**	2.031
	1000	125		**5SU1844-6WK82**	**5SU1844-7WK82**	2.010
RCBOs, type F, super resistant						
	**1P+N; 230 V AC** 10 000 3					
	30	6	2	**5SU1354-3KK06**	**5SU1354-4KK06**	0.275
		10		**5SU1354-3KK10**	**5SU1354-4KK10**	0.275
		13		**5SU1354-3KK13**	**5SU1354-4KK13**	0.278
		16		**5SU1354-3KK16**	**5SU1354-4KK16**	0.271
		20		**5SU1354-3KK20**	**5SU1354-4KK20**	0.278
		25		**5SU1354-3KK25**	**5SU1354-4KK25**	0.277
		32		**5SU1354-3KK32**	**5SU1354-4KK32**	0.283
		40		**5SU1354-3KK40**	**5SU1354-4KK40**	0.293

1) 1 MW (modular width) = 18 mm.

*** You can order this quantity or a multiple thereof.**

3

Overview

5SM6 arc fault detection devices, AFDDs

5SV6 AFDDs with integrated MCB in only 1 MW

Characteristics

The Siemens portfolio of protective devices has been proving itself in the field for many years. This range of fuses, miniature circuit breakers and residual current protective devices has now been expanded to include AFDDs (arc fault detection devices). These AFDDs detect arcing faults caused by serial faults or loose contacts or as a result of insulation faults that enable contact between phase conductors or between phase and protective conductors. They therefore offer extremely effective protection against fires started by electrical faults.

Generally speaking, arcing faults in the circuit can result from damage to cables and other insulations and from contamination. Insulation faults result, for example, from vibrations, thermal expansion and contraction, mechanical loads and aging.

A distinction is made between 3 types of arcing faults:

Serial arcing faults

These are caused by breaks in the conductor or when a loose contact is in the circuit in series with the load. As the current flow in such cases is always lower than the operational load current, miniature circuit breakers and residual current protective devices are unable to detect such faults and initiate tripping.

The AFDD is specially designed to detect the specific characteristics of these arcing faults, and it reliably disconnects the affected circuit as soon as the limit values are exceeded.

Parallel arcing faults between phase conductor/neutral conductor or phase conductor/phase conductor

These are caused by electric arcs resulting from damage to the insulation that permits contact between the two conductors. In this case, the level of current is determined by the impedances in the circuit. Depending on the rated current of the overcurrent protection device (for instance a miniature circuit breaker), this can be disconnected. However, if the impedance in the circuit is too high to reach the trip current of the overcurrent protection device, no tripping takes place. AFDDs disconnect the currents of arcing faults upwards of 2.5 A, thus providing reliable protection in the case of such faults.

Parallel arcing faults between phase conductor/protective conductor

Arcing faults against the protective conductor are reliably detected and shut down by residual current protective devices. Residual current protective devices with rated residual currents up to max. 300 mA have already been providing effective fire protection in such cases for many years. AFDDs also detect these arcing faults and provide adequate fire protection where no residual current protective device is implemented.

Preventing undesired tripping operations

Electric arcs and high-frequency signals occur during normal operation in networks with multiple electrical loads (e.g. electric motors, light switches, dimmers). The AFDD must not break the circuit in such cases.

Thanks to the sophisticated detection logic of our AFDDs, they are able to clearly distinguish between normal operational interference signals and hazardous arcing faults.

Product versions

Modern electrical devices and the rising number of communication and multimedia devices lead to a higher current loading in the electrical installation of buildings – in new buildings as well as in the modernization of existing buildings. In case of faults, there is above all the danger of electric fires, in addition to electric shock or the destruction of electrical systems.
With SENTRON components, Siemens offers secure protection in electrical installations.

5SM6 arc fault detection devices, AFDDs

Siemens offers four product versions which can be used in various combinations with a range of 1MW/2MW wide miniature circuit breakers and/or RCBOs up to 16 A or 40 A rated current.

This simplifies product selection and reduces inventory, while enabling coverage of every conceivable application. It also means that our tried and tested protective devices (MCBs, RCBOs) can be combined with the new functionality provided by arc fault protection. In particular, the version with RCBOs offers a protective device that provides comprehensive personnel, short-circuit, overload and fire protection in a single device.

The 5SM6 AFDDs can be connected easily and quickly. The miniature circuit breakers or RCBOs can be mounted quickly and simply by just snapping them onto the mounting rail without the need for tools. For a fast and reliable power supply, the infeed can be implemented via a busbar assembly.

The version with a compact RCBO (5SV1) in 1 MW is a space-saving alternative that is ideal for retrofitting.

Whether auxiliary switch or fault signal contact – the AFDDs can be combined at random with the versatile range of additional components from the familiar portfolio of 5SY miniature circuit breakers and 5SU1 RCBOs.

This also enables connection to a higher-level I&C system.

*** You can order this quantity or a multiple thereof.**

Overview (continued)

5SV6 AFDDs with integrated MCB in only 1 MW

Arc fault detection devices detect serial and parallel arcing faults and provide protection from electrical fires. According to DIN VDE 0100-420, they are mandated for use in many areas of application.

Thanks to the width identical to the MCB, the 5SV6 AFDD with integrated MCB is not only easily installable in new buildings, it also features straight-forward retrofitting in existing buildings. This provides an enhanced protection function without additional space requirement. The standards-compliant extension of the electrical installation for protection against electrical fires is thus quickly possible at any time.

Benefits

- 50% space saving
- Easy retrofitting
- Increased system availability
- New busbar concept
- 1000 V ISO testing without removing conductors

Status displays and self tests

In order to facilitate fault locating in the event of tripping, AFDDs have a display with 5 LEDs that provide information on the cause of tripping (serial/parallel arcing faults, overvoltage). The sophisticated detection electronics system also automatically checks the functionality of the AFDD. If the self-monitoring process detects a fault, the AFDD switches off and displays the corresponding indication.

Integrated overvoltage protection

Depending on the load distribution in the three-phase current system, an interruption on the infeed side of the neutral conductor may cause a shift of the neutral point and thus an increase in voltage between the phase conductor and the neutral conductor. This increase in voltage can damage the loads or present a fire risk due to overloaded components.

In order to ensure all-round protection, the AFDDs are fitted with an overvoltage release that disconnects when the voltage between phase conductor and neutral conductor exceeds 275 V, thus isolating downstream loads from the hazardous line voltage.

Technical specifications

			5SM6	5SV6
Standards			IEC/EN 62606	
Versions			2-pole	
Rated voltage U_n		V	230	
Rated current I_n		A	Up to 16/40	6 ... 32
Rated frequency		Hz	50	
Mains connection			Bottom	On two sides
Tripping in the event of overvoltage		V	> 275; for 5SV6 > 285 V	
Degree of protection	Acc. to EN 60529 (VDE 0470-1)		IP20, with connected conductors	
Touch protection	Acc. to EN 50274 (VDE 0660-514)		Finger and back-of-hand safe	
Terminal tightening torque		Nm	2.0 ... 2.5	
Terminal/conductor cross-sections • Solid and stranded • Finely stranded with end sleeve		 mm^2 mm^2	 0.75 ... 16 0.75 ... 10	
Overvoltage category			III	
Mounting position			Any	
Service life	Average number of switching cycles		> 10000	
Ambient temperature		°C	-25 ... +40	
Storage temperature		°C	-40 ... +75	
Resistance to climate	Acc. to IEC 60068-2-30		28 cycles (55 °C; 95% rel. air humidity)	
Pollution degree			2	
CFC and silicone-free			Yes	
Power loss		W	0.6	

5SM6 / 5SV6 arc fault detection devices (AFDDs)

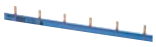
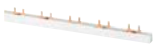
Selection and ordering data

	Version	Rated current I_n	Mounting width	Article No.	Weight
		A	MW[1]		kg
AFD units					
	2-pole; 230 V AC; 50 Hz				
	• for 5SY60 miniature circuit breakers (1 MW)	Up to 16	1	**5SM6011-2**	0.097
		Up to 40	1	**5SM6014-2**	0.098
	• for 5SU1.5 (2 MW) RCBOs, 5SU1 ... FA (3 MW) RCBOs, 5SY/5SL4 (2 MW) miniature circuit breakers, but not suitable for 5SY5, 5SY8, 5SY60	Up to 16	1	**5SM6021-2**	0.103
		Up to 40	1	**5SM6024-2**	0.103

	I_n	Characteristic B Article No.	Characteristic C Article No.	Weight
	A			kg
5SV6 AFDDs with integrated MCB 6 kA in only 1 MW				
	2-pole; 230 V AC; 50 Hz			
	6	**5SV6016-6KK06**	**5SV6016-7KK06**	0.133
	10	**5SV6016-6KK10**	**5SV6016-7KK10**	0.135
	13	**5SV6016-6KK13**	**5SV6016-7KK13**	0.130
	16	**5SV6016-6KK16**	**5SV6016-7KK16**	0.130
	20	**5SV6016-6KK20**	**5SV6016-7KK20**	0.133
	25	**5SV6016-6KK25**	**5SV6016-7KK25**	0.139
	32	**5SV6016-6KK32**	**5SV6016-7KK32**	0.139
	40	**5SV6016-6KK40**	**5SV6016-7KK40**	0.142
5SV6 AFDDs with integrated MCB 6 kA in only 1 MW, with pigtail				
	2-pole; 230 V AC; 50 Hz			
	6	**5SV6016-6KP06**	**5SV6016-7KP06**	0.189
	10	**5SV6016-6KP10**	**5SV6016-7KP10**	0.190
	13	**5SV6016-6KP13**	**5SV6016-7KP13**	0.189
	16	**5SV6016-6KP16**	**5SV6016-7KP16**	0.189
	20	**5SV6016-6KP20**	**5SV6016-7KP20**	0.203
	25	**5SV6016-6KP25**	**5SV6016-7KP25**	0.160
	32	**5SV6016-6KP32**	**5SV6016-7KP32**	0.211
	40	**5SV6016-6KP40**	**5SV6016-7KP40**	0.211
5SV6 AFDDs with integrated MCB 6 kA in only 1 MW, with pigtail				
	1P+N; 230 V AC; 50 Hz			
	6	**5SV6016-6MC06**	**5SV6016-7MC06**	0.138
	10	**5SV6016-6MC10**	**5SV6016-7MC10**	0.139
	13	**5SV6016-6MC13**	**5SV6016-7MC13**	0.138
	16	**5SV6016-6MC16**	**5SV6016-7MC16**	0.137
	20	**5SV6016-6MC20**	**5SV6016-7MC20**	0.138
	25	**5SV6016-6MC25**	**5SV6016-7MC25**	0.145
	32	**5SV6016-6MC32**	**5SV6016-7MC32**	0.145

[1] 1 MW (modular width) = 18 mm.

Selection and ordering data (continued)

	Version	Pin spacing MW[1]	Length mm	Article No.	Weight kg
Pin busbars for AFDDs (1+N)					
	10 mm², can be cut				
	**Single-phase, for 5SM601.-.**				
	Insulation, gray	2	962	**5ST3764-1**	0.145
	**Single-phase, for 5SM601.-.**				
	Insulation, blue, not angled	2	962	**5ST3765-2**	0.138
	Insulation, blue, angled	2	962	**5ST3765-1**	0.145
	**3-pole, for combination with MCB (1 WM/2 WM)**				
	Insulation, gray	2	1032	**5ST3740-1**	0.420
	**2-pole (1+N), for combination with RCBO (2 MW)**				
	Insulation, gray	1+2	996	**5ST3735-1**	0.350
	**4-pole (3+N), for combination with RCBO (2 MW)**				
	Insulation, gray	1+2	926	**5ST3746-1**	0.505
	10 mm², fixed length, cannot be cut				
	**3-pole, for 5SM601.-.**				
	Insulation, gray	2	216	**5ST3615-1**	0.056
	16 mm², fixed length, cannot be cut				
	**Two-phase, for 5SV3 (1P+N) and 5SM601.-.**				
	Insulation, gray	2	216	**5ST3772**	0.093

[1] 1 MW (modular width) = 18 mm.

	Version	Pin spacing MW[1]	Article No.	Weight kg
Pin busbars for AFDDs				
	10 mm²			
	3P+N 12x Compact[2]	12 MW	**5ST3673-0**	0.133
	1P+N 12x Compact[2]	12 MW	**5ST3674-0**	0.106
	3P+N 6x AFD + 6x Compact[2]	12 MW	**5ST3675-0**	0.099
	1P+N 6x AFD + 6x Compact[2]	12 MW	**5ST3676-0**	0.084
	1 x RCCB 3P+N + 8x Compact[2]	12 MW	**5ST3783-0**	0.133
	3P+N Compact[2]+ AS 1000 mm		**5ST3777-0**	0.635
	1P+N AFD + Compact[2]+ AS 1000 mm		**5ST3780-0**	0.392
	3P+N Compact[2] 1000 mm		**5ST3773-0**	0.679
	1P+N Compact[2] 1000 mm		**5ST3774-0**	0.512
	3P+N AFD + Compact[2] 1000 mm		**5ST3775-0**	0.580
	1P+N AFD + Compact[2] 1000 mm		**5ST3776-0**	0.412
	1P+N Compact[2] + AS 1000 mm		**5ST3778-0**	0.440
	1 x RCCB 3P+N + 8x Compact[2] (N left)	12 MW	**5ST3783-0KL**	0.126
	16 mm²			
	1 x RCCB 1P+N + 10x Compact[2]	12 MW	**5ST3784-0**	0.098
	1 x RCCB 1P+N + 10x Compact[2] (N left)	12 MW	**5ST3784-0KL**	0.106
	1 x RCCB 1P+N + 5x AFD + Compact[2]	12 MW	**5ST3685-0**	0.094
	End cap for listed busbar that can be cut to length		**5ST3788-0**	0.002

[1] 1 MW (modular width) = 18 mm.

[2] Compact = 5SV1 / 5SV6 / 5S..0 compact devices.

Note:

All 5ST37.. busbars can be cut to length.

Overview

Basic units[1)]

5SD74 lightning arresters, type 1

5SD74 combination surge arresters, type 1 + type 2

5SD74 surge arresters, type 1 + type 2 + type 3 for 40 mm busbar system

5SD74 combination surge arresters, type 1/type 2

5SD74 surge arresters, type 2 (standard design)

5SD74 surge arresters, type 3

Spare part plugs[1)]

N-PE

L-N, L-PEN (type 1)

L-PEN

1) See Catalog LV 10.

Selection and ordering data

	Size	I_n	U_n	Mounting width	Non-insulated grip lugs Article No.	Insulated grip lugs Article No.	Weight
		A	V/AC V DC	mm			kg
LV HRC fuse links with combination alarm, operational class gG							
	000	10	500/ 250	21	**3NA7803**	**3NA6803**	0.130
		16			**3NA7805**	**3NA6805**	0.128
		20			**3NA7807**	**3NA6807**	0.129
		25			**3NA7810**	**3NA6810**	0.132
		32			**3NA7812**	**3NA6812**	0.130
		35			**3NA7814**	**3NA6814**	0.130
		40			**3NA7817**	**3NA6817**	0.132
		50			**3NA7820**	**3NA6820**	0.131
		63			**3NA7822**	**3NA6822**	0.132
		80			**3NA7824**	**3NA6824**	0.131
		100			**3NA7830**	**3NA6830**	0.132
	00	80	500/ 250	30	**3NA7824-7**	**3NA6824-7**	0.202
		100			**3NA7830-7**	**3NA6830-7**	0.202
		125			**3NA7832**	**3NA6832**	0.196
		160			**3NA7836**	**3NA6836**	0.202
	1	16	500/ 440	30	**3NA7105**	**3NA6105**	0.286
		20			**3NA7107**	**3NA6107**	0.287
		25			**3NA7110**	**3NA6110**	0.282
		35			**3NA7114**	**3NA6114**	0.289
		40			**3NA7117**	**3NA6117**	0.284
		50			**3NA7120**	**3NA6120**	0.282
		63			**3NA7122**	**3NA6122**	0.287
		80			**3NA7124**	**3NA6124**	0.288
		100			**3NA7130**	**3NA6130**	0.290
		125			**3NA7132**	**3NA6132**	0.288
		160			**3NA7136**	**3NA6136**	0.287
		200		47.2	**3NA7140**	**3NA6140**	0.447
		224			**3NA7142**	**3NA6142**	0.443
		250			**3NA7144**	**3NA6144**	0.450
	2	35	500/ 440	47.2	**3NA7214**	**3NA6214**	0.463
		50			**3NA7220**	**3NA6220**	0.463
		63			**3NA7222**	**3NA6222**	0.465
		80			**3NA7224**	**3NA6224**	0.459
		100			**3NA7230**	**3NA6230**	0.462
		125			**3NA7232**	**3NA6232**	0.463
		160			**3NA7236**	**3NA6236**	0.464
		200			**3NA7240**	**3NA6240**	0.470
		224			**3NA7242**	**3NA6242**	0.464
		250			**3NA7244**	**3NA6244**	0.466
		300		57.8	--	**3NA6250**	0.658
		315			**3NA7252**	**3NA6252**	0.658
		355			--	**3NA6254**	0.664
		400			**3NA7260**	**3NA6260**	0.661

*** You can order this quantity or a multiple thereof.**

3

Selection and ordering data (continued)

	Size	I_n	U_n	Mounting width	Non-insulated grip lugs Article No.	Weight
		A	V AC/V DC	mm		kg
LV HRC fuse links with front indicator, operational class gG						
	000	10		21	**3NA3803**	0.130
		16			**3NA3805**	0.129
		20			**3NA3807**	0.129
		25			**3NA3810**	0.129
		32			**3NA3812**	0.130
		35			**3NA3814**	0.129
		40			**3NA3817**	0.129
		50			**3NA3820**	0.129
		63			**3NA3822**	0.129
		80			**3NA3824**	0.130
		100			**3NA3830**	0.129
	00	35	500/250	30	**3NA3814-7**	0.202
		50			**3NA3820-7**	0.200
		63			**3NA3822-7**	0.198
		80			**3NA3824-7**	0.199
		100			**3NA3830-7**	0.201
		125			**3NA3832**	0.200
		160			**3NA3836**	0.200
	1	16	500/440	30	**3NA3105**	0.289
		20			**3NA3107**	0.283
		25			**3NA3110**	0.288
		35			**3NA3114**	0.288
		40			**3NA3117**	0.289
		50			**3NA3120**	0.285
		63			**3NA3122**	0.288
		80			**3NA3124**	0.289
		100			**3NA3130**	0.286
		125			**3NA3132**	0.290
		160			**3NA3136**	0.289
		200		47.2	**3NA3140**	0.440
		224			**3NA3142**	0.433
		250			**3NA3144**	0.442
LV HRC fuse links with front indicator, operational class gG						
	2	35	500/440	47.2	**3NA3214**	0.462
		50			**3NA3220**	0.462
		63			**3NA3222**	0.446
		80			**3NA3224**	0.453
		100			**3NA3230**	0.458
		125			**3NA3232**	0.448
		160			**3NA3236**	0.451
		200			**3NA3240**	0.461
		224			**3NA3242**	0.457
		250			**3NA3244**	0.460
		300		57.8	**3NA3250**	0.657
		315			**3NA3252**	0.656
		355			**3NA3254**	0.654
		400			**3NA3260**	0.654
	3	315	500/440	57.8	**3NA3352**	0.657
		400			**3NA3360**	0.671
		500			**3NA3365**	0.969
		630			**3NA3372**	0.970

* You can order this quantity or a multiple thereof.

Selection and ordering data

	Size	I_n A	Version	Article No.	Weight kg
LV HRC fuse bases					
	Made of molded plastic, for standard rail mounting or screw fixing				
	**000/00**	160	1P With flat terminals, screw	**3NH3051**	0.139
	Made of ceramic for screw fixing				
	000/00	160	1P With flat terminals, screw	**3NH3030**	0.217
			3P (incl. two partitions) With flat terminals	**3NH4030**	0.709
	Made of ceramic for screw fixing				
	**1**	250	1P With flat terminals	**3NH3230**	0.760
	Ceramic supports on base plate for screw fixing				
	**1**	250	3P (incl. two partitions) With flat terminals	**3NH4230**	2.090
	Made of ceramic for screw fixing				
	**2**	400	1P With flat terminals	**3NH3330**	0.809
	Made of ceramic for screw fixing				
	**3**	630	1P With flat terminals	**3NH3430**	1.070

*** You can order this quantity or a multiple thereof.**

Selection and ordering data (continued)

	Size	I_n A	Version	Article No.	Weight kg
LV HRC fuse bases with swivel mechanism					
	With flat terminals[1]				
	**000/00**	160	1P With screw fixing for mounting plate	**3NH7030**	0.419
	1	250	1P With screw fixing for mounting plate	**3NH7230**	1.090
	**LV HRC protective covers for LV HRC fuse bases**				
	As touch protection for contact pieces				
	000/00			**3NX3105**	0.011
	0			**3NX3114**	0.013
	1			**3NX3106**	0.027
	2			**3NX3107**	0.034
	3			**3NX3108**	0.032
	**LV HRC partitions for LV HRC fuse bases**				
	As intermediate phase and end barrier				
			Type		
	000/00		3NH30/3NH4 0	**3NX2023**	0.025
	0		3NH31	**3NX2030**	0.039
	1		3NH32	**3NX2024**	0.043
	2		3NH33	**3NX2025**	0.065
	3		3NH34	**3NX2026**	0.073
	**LV HRC protective covers**				
	000/00		1P and 3P	**3NX3115**	0.045
	**000/00**		When using fuse links with non-insulated grip lugs	**3NX3116**	0.016

[1] Size 000/00 with additionally enclosed saddle-type terminals

* You can order this quantity or a multiple thereof.

Selection and ordering data

	Rated current I_u	Size	Article No.	Weight
	A			kg
For 45 mm cover level				
	***Basic units***			
	Flat terminals			
	160	00	**3NP1133-1CA10**	0.801
	Box terminals			
	100[1]	000	**3NP1123-1CA20**	0.533
	160	00	**3NP1133-1CA20**	0.829
For 70 mm cover level				
	***Basic units***			
	Flat terminals			
	250	1	**3NP1143-1DA10**	2.750
	400	2	**3NP1153-1DA10**	3.729
	630	3	**3NP1163-1DA10**	4.539
	Box terminals			
	250	1	**3NP1143-1DA20**	2.924
	400	2	**3NP1153-1DA20**	4.401
	630	3	**3NP1163-1DA20**	5.150
With reach-around protection suitable for Siemens 8US busbar systems and Rittal 40 mm busbar system without base[1]				
	***Basic units***			
	Flat terminals			
	160	00	**3NP1133-1BB10**	1.092
	Box terminals			
	100[2]	000	**3NP1123-1BB20**	0.934
	160	00	**3NP1133-1BB20**	1.101
With reach-around protection suitable for Siemens 8US, Wöhner Classic, and Rittal RiLine60 busbar systems without base				
	***Basic units***			
	Flat terminals			
	160	00	**3NP1133-1BC10**	1.091
	400	2	**3NP1153-1BC10**	4.280
	630	3	**3NP1163-1BC10**	5.299
	Box terminals			
	100[1]	000	**3NP1123-1BC20**	0.945
	160	00	**3NP1133-1BC20**	1.086
	250	1	**3NP1143-1BC20**	3.350
	400	2	**3NP1153-1BC20**	4.597
	630	3	**3NP1163-1BC20**	5.438

[1] 160 A available in combination with feeder terminal 3NP1923-1BD00

[2] Cannot be used with T profile rails

Note:

Delivered from factory with cable feeder at bottom and convertible by the customer

Introduction

Overview

Installation switching devices[1)]


5TE8
control switches


5TE48
pushbuttons


5TE58
light indicators


5TE81/82, 5TL1
On/Off switches


5TE
DC isolators


5TE
busbars


5TT41, 5TT44
remote control
switches


5TT4, 5TT5
auxiliary switches


5TT42
switching relays


5TT50, 5TT58
Insta contactors


5TT3
soft-starting
devices

Accessories[1)]


Auxiliary switches
(AS)


Shunt trips
(ST)


Undervoltage
releases (UR)


Remote control
mechanisms
(RC mech.)


Handle locking
devices


LEDs


Caps/covers


Connectors

Timers[1)]


7LF4 digital
time switches


7LF5 mechanical
time switches


7LF6 timers for
buildings


5TT3 timers
for industrial
applications

Accessories[1)]


Holders

[1)] See Catalog LV 10.

Overview

Remote control switches up to 16 A and 20 up to 63 A

5TT4101-0 remote control switch for AC applications, up to 16 A, 2 NO contacts (left)
5TT44 remote control switch for AC applications, 2 CO contacts (center)
5TT4930 auxiliary switch for 5TT44 remote control switches, 1 NO + 1 NC (right)

Remote control switches are used in residential and non-residential buildings, as well as the switchboard engineering sector. They trip in the event of "current inrushes", i.e. pulses, and then electromechanically save the switching position, even in the event of a power failure.

All the devices have the CE mark and can also be equipped with an additional auxiliary switch. All devices have a switching position indication and are operated manually. The switching noise is particularly quiet and meets the requirements of residential buildings.

In addition to the 5TT41 remote control switch for up to 16 A, the 5TT44 version is now also available for 20 ... 63 A (up to 32 A DC).

Benefits

- Remote control switches with central/group switching support convenient and high feature applications
- High functional reliability due to electromechanical design without fault-prone electronics
- The devices have no standby losses
- All devices have a switching position indication and are operated manually
- All the remote control switches can be fitted with an additional auxiliary switch
- The remote control switches can be bus-mounted on 5TE9100 and 5TE9101 busbars; e.g.: bus mounting of the N conductor and/or infeed

Central switching functions

Versions with central On/Off function allow the central switching of all connected remote control switches. This type of central switching can also be actuated using a time switch. All remote control switches can be switched to the ON or OFF switching state, regardless of their current switching state.

Note:

Synchronous switching of the contacts cannot be guaranteed with parallel switching.
Products with central/group switching must be used for the mutual control of several remote control switches.

Contact sequences for remote control switches up to 16 A

1 – 2 – 1+2 – 0 or 1 – 0 – 2 – 0 means:

0: No contact closed

1: Only contact 1 closed

2: Only contact 2 closed

1+2: Contact 1 and contact 2 are closed.

The contact positions are constantly changing with each pushbutton impulse.

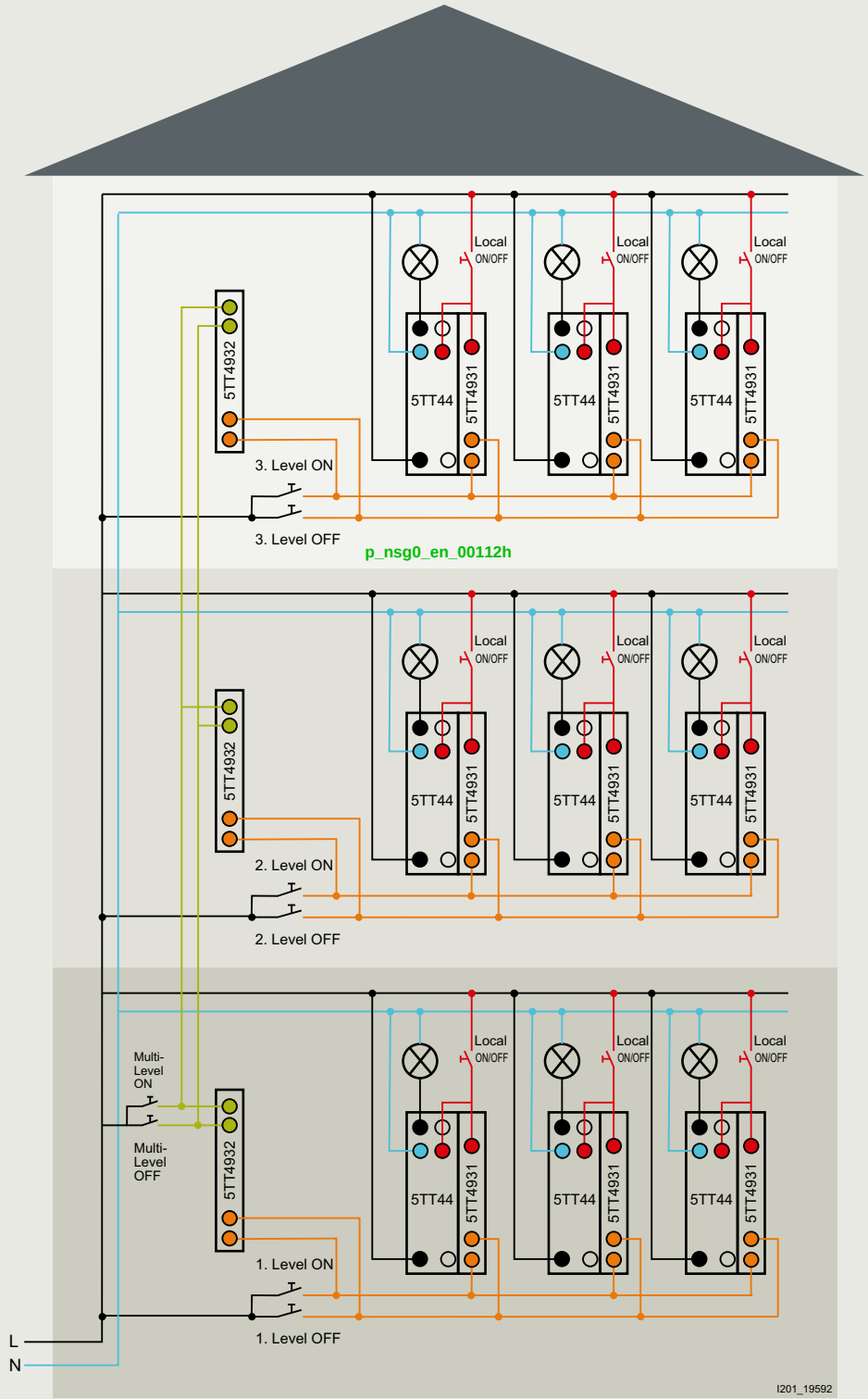
Note:
Synchronous switching of the contacts cannot be guaranteed with parallel switching. Products with central/group switching must be used for the mutual control of several remote control switches.

Bus mounting

All 5TT41 remote control switches up to 16 A and 5TT44 from 20 ... 63 A can be bus-mounted with each other.

Application

Example for 5TT44 remote control switches up to 63 A



Technical specifications

		5TT41 remote control switches up to 16 A				Auxiliary switches for 5TT41		5TT44 remote control switches from 20 ... 63 A	Auxiliary switches for 5TT44		
		5TT4101 5TT4102 5TT4105 5TT4111 5TT4112 5TT4114 5TT4115	5TT4103 5TT4104	5TT412 5TT415	5TT413 5TT414	5TT4900	5TT4901		5TT4930	5TT4931	5TT4932
Standards		IEC 60669-1, IEC 60669-2, IEC 60669-3, EN 60669 (VDE 0632), EN 60669-2-2, EN 60669-2-2/A1				EN 60947-1 (VDE 0660 Part 100) EN 60947-5-1 (VDE 0660 Part 200)		IEC 60669-2-2 (up to 32 A) EN IEC 60947-4-1 (40 ... 63 A)	IEC/EN60947-5-1		
Approvals		VDE						CE, CCC (only 20 A, 25 A)	CE, EAC		
Contact type		1 NO 2 NO 1 NO + 1 NC	3 NO 4 NO	1 NO 2 NO 3 NO 1 NO + 1 NC	Series Shutter/ blind	1 CO	1 CO	2 NO 4 NO 1 NO + 1 NC 2 NO + 2 NC 1 CO 2 CO	1 NO + 1 NC	Central	Group
Manual operation		Yes				--		Yes	No		
Switching position indication		Yes			--	--		Yes	No		
Rated control voltage U_c	V AC V DC	8 ... 230 12 ... 110				-- --		230, 24 24	250 --		
Primary operating range	× U_c	0.8 ... 1.1				--		--	--		
Rated frequency f_c (AC types)	Hz	50				--		50/60	50/60		
Rated impulse withstand voltage U_{imp}	kV	4				1		3	1		
Rated power dissipation P_v	W	--				--	--	--	0.3 per pole		
• Magnet coil, only pulse at 16 A	W/VA	4.5/7	9/13	4.5/7		--	--	--	--	--	--
• Magnet coil, for "on" pulse at 20...25 A	W/VA	--	--	--	--	--	--	13/18; DC: 9/9	--	--	--
• Magnet coil, for "on" pulse at 40...63 A	W/VA	--	--	--	--	--	--	12/26	--	--	--
• Per contact at 16 A	W	1.2				--	--	--	--	--	--
• Per contact at 20 A	W	--				--	--	1.5	--	--	--
• Per contact at 25 A	W	--				--	--	2	--	--	--
• Per contact at 32 A	W	--				--	--	3	--	--	--
• Per contact at 40 A	W	--				--	--	3	--	--	--
• Per contact at 63 A	W	--				--	--	3.5	--	--	--
Minimum contact load	V; mA	10; 100 AC					AC/DC 5;1	10; 100 AC	12; 5	--	--
Rated operational current I_e At p.f. = 0.6 ... 1 (AC-15)	A	16						5TT440../41..: 20 5TT442../43..: 25 5TT445..: 32 5TT446..: 40 5TT447..: 63	4	--	--
Rated operational voltage U_e	V AC	--						--	--	250	250
• 1 NO	V AC	250	--	250	--	250	30 AC/DC	--	--		
• 2 NO	V AC	400	--	400	250	--		440	--		
• 3 NO	V AC	--	400	400	--	--		440	--		
• 4 NO	V AC	400	400	--	--	--		440	--		
• 1 NO + 1 NC	V AC	250	--	250	--	--		440	250		
Glow lamp load at 230 V	mA	5				--		--	--		
• With 1 5TT4920 compensator	mA	25				--		--	--		
• With 2 5TT4920 compensators	mA	45				--		--	--		
Incandescent lamp load With AC-5b (230V) switching of incandescent lamps for 15000 switching cycles	W	1200				--		5TT440../41..: 4400 5TT442../43..: 5500 5TT445..: 7000 5TT446..: 8800 5TT447..: 13800	--		
Rated operational power (AC-3)											
• Single-phase, at 230 V	kW	--	--	--	--	--	--	5TT440../41..: 0.5 5TT442../43..: 0.75 5TT445..: 1.1 5TT446..: 2.2 5TT447..: 4	--		
• Three-phase, at 230 V	kW	--	--	--	--	--	--	5TT440../41..: 1.5 5TT442../43..: 2.2 5TT445..: 3 5TT446..: 5.5 5TT447..: 11	--		
• Three-phase, at 400 V	kW	--	--	--	--	--	--	5TT440../41..: 3 5TT442../43..: 4 5TT445..: 5.5 5TT446..: 11 5TT447..: 18.5	--		

3

Technical specifications (continued)

		5TT41 remote control switches up to 16 A				Auxiliary switches for 5TT41		5TT44 remote control switches from 20 ... 63 A	Auxiliary switches for 5TT44		
		5TT4101 5TT4102 5TT4105 5TT4111 5TT4112 5TT4114 5TT4115	5TT4103 5TT4104	5TT412 5TT415	5TT413 5TT414	5TT4900	5TT4901		5TT4930	5TT4931	5TT4932
Different phases Between magnet coil/contact		Permissible				--	--	Permissible	--		
Contact gap	mm	> 1.2				< 1.2		> 3			
Safe separation Creepage distances and clearances between magnet coil/ contact	mm	> 6						--	--		
Pushbutton malfunction Protected against continuous voltage, safe due to design		Yes	PTC	Yes[1]	Yes	Yes	Yes	Yes	--		
Minimum pulse duration	ms	50						--	--		
Max. switching speed In switching cycles per hour	h^{-1}	--						5TT440../41..: 600 5TT442../43..: 450 5TT445../43..: 450 5TT446..: 360 5TT447..: 360	--		
Electrical service life At I_e/U_e, p.f. = 0.6; incandescent lamp load 600 W (switching cycles)		50000						50000	100000	--	
Terminals ± screw (Pozidriv)		1						Coil: 1; Contact: 2	1		
Torque	Nm	0.8 ... 1.0				max. 0.5		see conductor cross-sections	0.8		
Conductor cross-sections											
• Rigid	mm^2	1 ... 6				0.5 ... 2.5		**Coil:** 1 ...4, Torque: 0.6 Nm **Contacts**: 20 ... 32 A: 1 ...10, Torque: 1.2 Nm 40 ... 63 A: 2.5 ... 25, Tightening torque: 2.0 Nm	1 ... 4		
• Flexible, with end sleeve	mm^2	1 ... 6				0.5 ... 2.5		**Coil:** 1 ...4, Torque: 0.6 Nm **Contacts**: 20 ... 32 A: 1 ...10 Torque: 1.2 Nm 40 ... 63 A: 2.5 ... 25 Torque: 2.0 Nm	1 ... 4		
Resistance to climate At 95% relative humidity acc. to DIN 50015	°C	35						55	55		
Permissible ambient temperature	°C	-10 ... +40						Storage temperature: -30 ....+80 Operating temperature: -25 ....+55	Storage temperature: -30 ....+80 Operating temperature: -25 ....+70		
Degree of protection Acc. to EN 60529		IP20, with connected conductors						IP20	IP20		
Mounting position		Any						Any (not upside down)			

[1] For 2.5 MW 5TT4123-0 devices with PTC.

Selection and ordering data

	Version	U_e	I_e	Conductor cross-section	Mounting width	Article No.	Weight
		V AC	A	mm^2	MW[1]		kg
Socket outlets							
	**SCHUKO® socket outlets according to DIN VDE 0620-1** • Without hinged lid	230	16	6	2.5	**5TE6800**	0.080
	**SCHUKO® socket outlets according to DIN VDE 0620-1** • With hinged lid	230	16	6	2.5	**5TE6801**	0.091
	**SCHUKO® socket outlets according to DIN VDE 0620-1** • Without hinged lid, yellow RAL 1018	230	16	6	2,5	**5TE6810**	0.085
	**Socket outlets according to CEI 23-50** • With hinged lid	230	16	6	2,5	**5TE6802**	0.091
	**Socket outlets according to CEE 7 Standard sheet V** • Without hinged lid, with grounding pin	230	16	6	2,5	**5TE6803**	0.087
	**UL 498 socket outlets** • Without hinged lid	125	15	6	2,5	**5TE6804**	0.087

[1] 1 MW (modular width) = 18 mm.

Hardware and software components

Overview

Measuring devices and circuit breakers

	7KT PAC1200	SEM3	7KT PAC1600	7KM PAC2200	7KM PAC3100	7KM PAC3200T
						
	The flexible solution for multi-channel monitoring in the final circuit up to 63 A	The flexible solution for multichannel monitoring up to 1200 A	The entry-level solution when it comes to energy measurement	The energy meter solution for the standard mounting rail	The cost-effective solution for digital measurement	The compact solution for precise energy measurement
Measuring range/connection						
Max. input voltage L-L/L-N	400 V/230 V	480 V/277 V	400 V/230 V	480 V/277 V	480 V/276 V	480 V/277 V
Transformer connection version	x/5 A	50 ... 1200 A/0.1 A	x/5 A	x/1 A or x/5 A	x/5 A	x/1 A or x/5 A
Direct connection version	40/63 A	–	63 A/80 A	✓ (up to 65 A)	–	–
DC power supply unit w. extra-low volt. version	–	–	–	–	–	–
Single-phase counter version	–	✓	✓	✓	–	–
Electrically isolated voltage inputs	–	–	–	–	–	–
Version without display (for web interface)	–	✓	–	–	–	✓
Measured quantities						
Voltage, current, frequency,	✓	✓	✓	✓	✓	✓
Power, power factor	✓	✓	✓	✓	✓	✓
Energy measurement						
• Apparent, active, reactive energy, cos phi	– I ✓ I ✓ I –	✓ I ✓ I ✓I ✓	✓I ✓ I ✓I –	✓ I ✓ I ✓I –	– I ✓ I ✓I –	✓ I ✓ I ✓I –
Extended measured quantities						
• Distortion factor THD (voltage, current)	–	–	–	–	–	✓
• Harmonics (voltage, current)	–	–	–	–	–	–
• Phase angle/phase chart	–	–	–	–	–	–
• Load profile recording	–	✓	–	–	–	–
• Flicker acc. to IEC 61000-4-15	–	–	–	–	–	–
Monitoring functions						
Operating hours counter	–	✓	✓	✓	–	✓
Limit monitoring	–	–	✓	–	–	✓
Logic functions	–	✓	–	–	–	✓
Event log	–	✓	–	–	–	–
Gateway function	–	–	–	–	–	–
Reporting acc. to EN 50160	–	–	–	–	–	–
Integrated fault recorder	–	–	–	–	–	–
System integration and communication						
Digital inputs/digital outputs	–	✓	✓	1/1	2/2	1/1
S0 interface	–	–	✓	✓	✓	✓
4DI/2DO expansion module	–	–	–	–	–	–
Communication modules or protocols:						
• BACnet IP and BACnet MSTP	–	✓	--	--	--	--
• M-Bus	–	–	Optional	✓	–	–
• Instabus KNX	–	–	--	–	–	–
• Modbus RTU	–	✓	Optional	✓	✓	–
• Ethernet with Modbus TCP	✓	✓	–	✓	–	✓
• PROFIBUS DPV1	–	–	–	–	–	–
• PROFINET IO/ PROFIenergy	–	–	–	–	–	–
Expansion module I(N), I(Diff) analog	–	–	–	–	–	–
Parameterization software	powerconfig	Own web interface	powerconfig	powerconfig	powerconfig	powerconfig
Integration of power monitoring system	powermanager	powermanager	powermanager	powermanager	powermanager	powermanager
Web interface	✓	✓	–	✓	–	✓
Measuring accuracy, active/reactive energy	2	0.2 or 1.0	1 I 2	1 I 3	1 I 3	0.5 S I 2
MID version	–	–	✓	✓	–	–
Installation	Standard mounting rail	Screw mounting	Standard mounting rail	Standard mounting rail	Front mounting	Standard mounting rail
Dimensions in MW (1 MW = 18 mm) or in mm	4 MW	–	2/4 MW	6 MW	96 × 96 × 56	6 MW

1) With the exception of devices with power supply units with extra-low voltage.

2) THD indication.

	7KM PAC3200	7KM PAC4200	7KM PAC5100	7KM PAC5200	3WL	3VA ETU8
						
	The specialist solution for precise energy measurement	The professional solution for communication and monitoring	The specialist solution for measured value acquisition	The expert solution for power supply quality	The specialist solution for protection and energy measurement	The specialist solution for protection and energy measurement
	690 V/400 V[1]	690 V/400 V[1]	690 V/400 V	690 V/400 V	690 V/400 V	690 V/400 V
	x/1 A or x/5 A	x/1 A or x/5 A	x/1 A or x/5 A	x/1 A or x/5 A	Integrated	Integrated
	–	–	–	–	–	–
	22 ... 65 V	22 ... 65 V	–	–	24 V	24 V
	–	–	–	–	–	–
	–	–	✓	✓	–	–
	–	–	✓	✓	–	–
	✓	✓	✓	✓	✓	✓
	✓	✓	✓	✓	✓	✓
	✓ I ✓ I ✓ I –	✓ I ✓ I ✓ I ✓	✓ I ✓ I ✓ I ✓	✓ I ✓ I ✓ I ✓	✓ I ✓ I ✓ I ✓	✓ I ✓ I ✓ I ✓
	✓[2]	✓	✓	✓	✓	✓
	–	2 ... 64.	2. ... 40.	2. ... 40.	–	–
	–	✓	✓	✓	–	–
	–	✓	–	✓	✓	✓
	–	–	–	✓	–	–
	✓	✓	–	–	✓	✓
	✓	✓	✓	✓	✓	✓
	✓	✓	✓	✓	–	–
	–	> 4000 events	✓	✓	✓	✓
	–	✓	–	–	–	–
	–	–	–	✓	–	–
	–	–	–	✓	–	–
	1/1	2/2	0/2	0/2	–	–
	✓	✓	–	–	Optional	Optional
	–	Optional	–	–	Optional	Optional
	–	–	–	–	–	–
	–	–	–	–	–	–
	Optional	Optional	–	–	Optional	Optional
	✓	✓	✓	✓	✓	✓
	Optional	Optional	–	–	Optional	Optional
	Optional	Optional	–	–	Optional	Optional
	Optional	Optional	–	–	--	--
	powerconfig, TIA Portal	powerconfig, TIA Portal	powerconfig	powerconfig	powerconfig	powerconfig, TIA Portal V14
	powermanager SIMATIC Energy Suite	powermanager SIMATIC Energy Suite	powermanager	powermanager	powermanager	powermanager SIMATIC Energy Suite
	–	–	✓	✓	–	–
	0.5 S I 2	0.2 S I 2	0.5 S I 2	0.5 S I 2	2 S I 2[3]	2 S I 2[3]
	–	–	–	–	–	–
	Front mounting	Front mounting	Front mounting/standard rail			
	96 × 96 × 56	96 × 96 × 82	96 × 96 × 100	96 × 96 × 100	96 × 96 × 82[4]	96 × 96 × 82[4]

[3] Measuring accuracy including current transformer

[4] DSP800

✓ Available / possible -- Not available / not possible

3

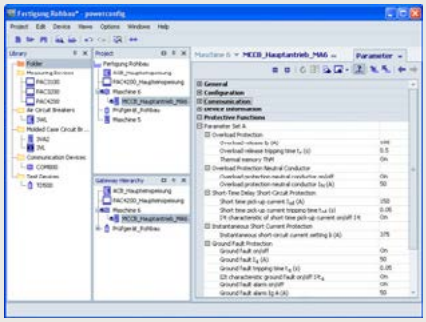
Overview (continued)

Expansion modules for 7KM PAC measuring devices

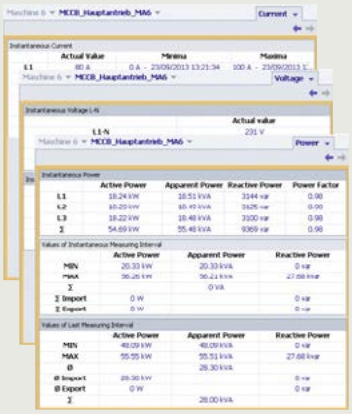
					
	Switched Ethernet For 7KM PAC3200, 7KM PAC4200 and 3VA COM100/COM800	PROFIBUS DP For 7KM PAC3200, 7KM PAC4200 and 3VA COM100/COM800	RS 485 For 7KM PAC3200, 7KM PAC4200 and 3VA COM100/COM800	4DI/2DO For 7KM PAC4200 (number of digital inputs/outputs per module 4/2)	7KM PAC I(N), I(Diff), analog For 7KM PAC4200 and 3200
Protocol	PROFINET IO PROFIenergy Modbus TCP	DPV1	Modbus RTU	--	--
Maximum number of connectable expansion modules of the same type	1	1	1	2	1

The powerconfig software for commissioning

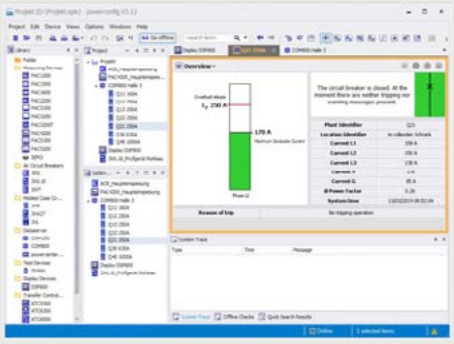
	Software tool for the efficient commissioning and diagnosis of communication-capable SENTRON components
License	Free use
Supported devices	All PAC measuring devices incl. expansion modules, 3WL/3VL/3VA circuit breakers and further communication-capable components, e.g. ATC6300
General range of functions	The PC-based tool facilitates parameterization of the devices, resulting in substantial time savings, particularly when several devices have to be set up. The device settings can be stored in the PC and printed out. The tool enables monitoring of instantaneous measured quantities, which can be saved or printed out if required. Execution of specific device functions, such as resetting of devices and setting of energy counters
Supported languages	German, English, Chinese, Spanish, Portuguese, Italian, Turkish
Service functions	Firmware updates and switching of language packs for 7KM PAC measuring devices
Functional scope with 7KM PAC4200 and 3VA	Readout of data stored in the device (events; load profile history; daily energy counters), which are saved in csv format



Setting of parameter values



Display of actual measured quantities



Display of the circuit breaker state

Overview

Hardware components of the PC-based power monitoring system

Software component of the power monitoring software: powermanager

Power monitoring system with SENTRON components

The TÜV-certified power monitoring system from the SENTRON portfolio consists of the 7KT/7KM PAC measuring devices, the 3WL/3VA/3VL circuit breakers, and the powermanager power monitoring software. This forms the technical basis for supporting a corporate energy management system as specified by ISO 50001.

The hardware and software components are optimally coordinated with each other. For example, special drivers for the SENTRON devices are integrated in the powermanager power monitoring software. They enable energy data to be captured without any great configuration effort and they indicate the key measured values or the status by means of predefined views.

This reduces the engineering overhead. The device functions are optimally supported in the software.

Features of the powermanager power monitoring software

The powermanager power monitoring software constitutes the optimum technical basis for supporting a corporate power monitoring system as specified by ISO 50001 and EN 16247:

- Independent power monitoring software
- Can be operated using a Windows PC, circuit breakers and measuring devices with Ethernet connection
- Easy getting started with basic license (Basic Package), can be extended with flexible licensing concept according to customer requirements
- Fully scalable, relative to number of devices and software functions
- Optimum integration of 7KT/7KM PAC measuring devices, 3WL/3VL/3VA circuit breakers, 7KM PAC 5200 power quality devices and any other Modbus devices
- Support of the various device and communication interfaces (Modbus RTU, Modbus TCP)
- Status display of devices
- Available languages: German, English, Spanish, Portuguese, Italian, French, Turkish, Chinese

7KN Powercenter 1000

Overview

The 7KN Powercenter 1000 data transceiver is designed to enable comprehensive data acquisition of communication and metering-capable circuit protection devices. This increases transparency in the final circuit, through which optimization measures can be derived to increase system availability.

Up to 24 devices can communicate wirelessly with 7KN Powercenter 1000 via radio link. This means that no increased installation effort is required for communication. Selected measured values of the circuit protection devices are stored in the data transceiver for up to 30 days. These can be visualized to ensure extensive data availability.

The compact design of the 7KN Powercenter 1000, in a single modular width, results in an extremely small footprint in the distribution board so as to enable wireless, comprehensive data acquisition.

This is complemented by easy mounting on a 35 mm DIN rail and plug-in terminals for a 24 V DC power supply, which can be immediately looped through (daisy chain) to supply other devices.

The integrated Bluetooth interface enables simple on-site communication and commissioning via the SENTRON powerconfig mobile app. Connection to various configuration or power monitoring systems, such as SENTRON powerconfig, SENTRON powermanager or customized solutions, is ensured via the Modbus TCP interface. Furthermore, this interface also enables a connection via e.g. 7KN Powercenter 3000 or via LOGO! to cloud applications.

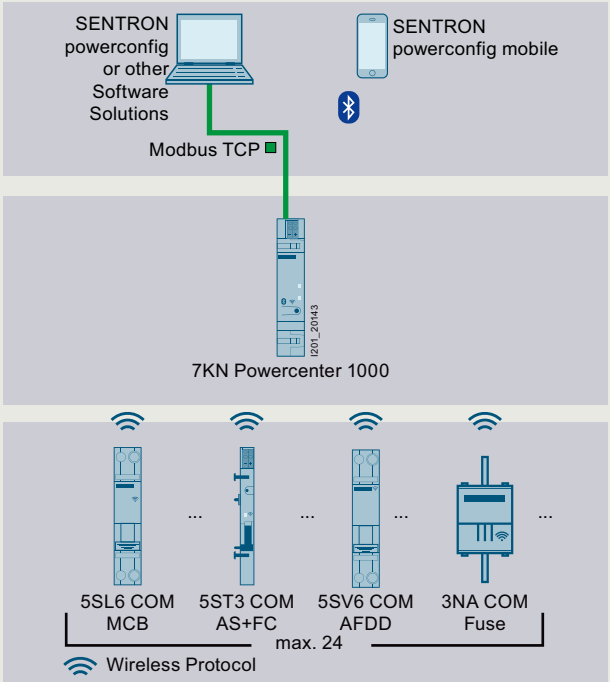
Selection and ordering data

	Mounting	Power supply	Devices that can be connected	Interfaces	Article No.	Weight kg
7KN Powercenter 1000						
	DIN-rail mounting	24 V DC SELV	24 circuit protection devices via radio link	1× Ethernet (Modbus TCP) 1× Bluetooth	**7KN1110-0MC00**	0.070

Note:

Please note the country-specific radio licenses of the products in SIOS:
www.siemens.com/lowvoltage/certificates (109801197)

Datentransceiver 7KN Powercenter 1000



- Wireless radio transmission of measured values and data to the 7KN Powercenter data transceiver
- Parameter assignment, firmware updates and further processing of the data via the 7KN Powercenter 1000 data transceiver

You eill find further information under:

Quick Installation Guide – 7KN Powercenter 1000 (109791805)

System Manual – Circuit protection devices with communication and metering functio (109791806)

* You can order this quantity or a multiple thereof.

Overview

Devices	Page	Application	Standards	Used in		
				Non-residential buildings	Residential buildings	Industry
7KM PAC measuring devices						
		The 7KM PAC measuring devices are used to measure and display all relevant system parameters in low-voltage power distribution. They can be used for both single-phase and multi-phase measurements in 3 and 4-conductor power supply systems (TN, TT, IT). They record energy values for main distribution boards, electrical branches or individual loads precisely and reliably, and also supply key measured values for assessment of the state of the plant and the quality of the power supply.				
	**7KM PAC2200 measuring device** Screw terminals	1)	Standard rail instrument with graphics display, one integrated digital input and output and integrated communication interfaces (Modbus TCP– 3 simultaneous connections, Modbus RTU, M-Bus) for the transmission of measured values and for configuration. Display of 30 electrical measured values and consumption values in switchboard assemblies, infeeds or outgoing feeders. Versions available with or without MID. International standards and multi-lingual displays for worldwide use.	Measurement accuracy for energy acc. to IEC 61557-12	✓	--	✓
	**7KM PAC3100 measuring device** AC/DC wide-range power supply unit, screw connection	1)	Control panel instrument with graphics display, integrated digital inputs and outputs and an RS 485 interface for the transmission of measured values and for configuration. Display of 30 electrical measured values and consumption values in switchboard assemblies, infeeds or outgoing feeders. International standards and multi-lingual displays for worldwide use.	Measurement accuracy for energy acc. to IEC 61557-12	✓	--	✓
	**7KM PAC3200T measuring device** Screw terminals	1)	Standard rail instrument without graphics display with integrated web interface, one integrated digital input and output and a Modbus TCP interface for the transmission (3 simultaneous connections) of measured values and for configuration. Display of 50 electrical measured values and consumption values in switchboard assemblies, infeeds or outgoing feeders. International standards for worldwide use.	Measurement accuracy for energy acc. to IEC 61557-12	✓	--	✓
	**7KM PAC3200 measuring device** 3 versions: • AC/DC wide-range power supply unit, screw connection • DC power supply unit with extra-low voltage, screw connection • AC/DC wide-range power supply unit, ring cable lug connection	1)	Control panel instrument with graphics display, integrated digital inputs and outputs and an integrated Ethernet interface for the transmission of measured values and for configuration. Display of over 50 electrical measured values for switchboard assemblies, infeeds or outgoing feeders. Dual-tariff measuring devices for precise energy measurement for power import and feedback. The following expansion modules are available: • 7KM PAC Switched Ethernet PROFINET • 7KM PAC RS 485 • 7KM PAC PROFIBUS DP • 7KM PAC I(N), I(Diff), analog	Measuring accuracy for energy acc. to IEC 62053-22/23 and IEC 61557-12	✓	--	✓
	**7KM PAC4200 measuring device** 3 versions: • AC/DC wide-range power supply unit, screw connection • DC power supply unit with extra-low voltage, screw connection • AC/DC wide-range power supply unit, ring cable lug connection	1)	Control panel instrument with graphics display, user-defined displays, memory, clock and calendar function, digital inputs and outputs and an integrated Ethernet interface with gateway function to transfer measured values and for configuration. Display of over 200 electrical measured values for switchboard assemblies, infeeds or outgoing feeders. Extensive functions for precise energy measurement for power import and feedback and assessment of the system quality. The following expansion modules are available: • 7KM PAC Switched Ethernet PROFINET • 7KM PAC RS 485 • 7KM PAC PROFIBUS DP • 7KM PAC 4DI/2DO • 7KM PAC I(N), I(Diff), analog	Measuring accuracy for energy acc. to IEC 62053-22/23 and IEC 61557-12	✓	--	✓

3

Overview (continued)

Devices		Page	Application	Standards	Used in		
					Non-residential buildings	Residential buildings	Industry
	**7KM PAC5100 measuring device** 2 versions: • Control panel instrument with graphics display • Standard rail instrument without display	[1]	Control panel instrument with graphics display and user-defined displays, or instrument for standard rail mounting in accordance with EN 60750, web interface for parameterization, visualization and data management, 2 binary outputs, electrically isolated voltage inputs, synchronization via internal RTC clock or externally via NTP, 4 freely parameterizable LEDs for device status or limit violations, as well as an integrated RJ45 Ethernet interface. Recording of more than 250 electrical measured values for switchboard assemblies, infeeds or outgoing feeders, extensive functions for precise energy measurement for power import and feedback, and for assessment of the system quality.	Measuring accuracy for energy acc. to IEC 62053-22/23 and IEC 61557-12	✓	--	✓
	**7KM PAC5200 measuring device** 2 versions: • Control panel instrument with graphics display • Standard rail instrument without display	[1]	Control panel instrument with graphics display and user-defined displays or instrument for standard rail mounting in accordance with EN 60750, web interface for parameterization, visualization and data management, 2 binary outputs, electrically isolated voltage inputs, flicker in accordance with IEC 61000-4-15, synchronization via internal RTC clock or externally via NTP, 4 freely parameterizable LEDs for device status or limit violations, 2 GB memory, integrated fault recorder, reporting in accordance with EN 50160, rms recorder, as well as an integrated RJ45 Ethernet interface. Recording of more than 250 electrical measured values for switchboard assemblies, infeeds or outgoing feeders. Extensive functions for precise energy measurement for power import and feedback and assessment of the system quality.	Measuring accuracy for energy acc. to IEC 62053-22/23 and IEC 61557-12	✓	--	✓
	**7KM PAC expansion modules**	3/73	• The 7KM PAC Switched Ethernet PROFINET expansion module is used to connect the 7KM PAC3200 and 7KM PAC4200 measuring devices and 3VA molded case circuit breakers to Switched Ethernet PROFINET (PROFIenergy). • The 7KM PAC PROFIBUS DP expansion module is used to connect the 7KM PAC3200 and 7KM PAC4200 measuring devices and 3VA molded case circuit breakers to the PROFIBUS DPV1 • The 7KM PAC RS 485 expansion module is used to connect simple devices with RS 485 interface, such as the 7KM PAC3200 and 3VA molded case circuit breaker, and supports the Modbus RTU protocol. • The 7KM PAC 4DI/2DO expansion module is used to expand the 7KM PAC4200 measuring device to up to 10 digital inputs and 6 digital outputs. • The 7KM PAC I(N), I(Diff), analog expansion module adds the following functions for 7KM PAC3200 and 7KM PAC4200 devices: - N-conductor measurement - Two analog inputs with 0/4 ... 20 mA signaling to measure electrical and non-electrical quantities - Residual current measurement	IEC 61784-2 IEC 61158 RS 485 IEC 62053-31	✓	--	✓

[1] See Catalog LV 10.

Overview

Expansion modules are used as communication interfaces and for expanding the digital inputs/outputs and analog measuring inputs for the 7KM PAC3200/4200 measuring devices.

The expansion modules are plugged in at the back of the measuring device. The device identifies the module automatically and presents the relevant parameters for this module for selection in the parameterization menu.

Versions

The following expansion modules are available (shown from left to right in the figure on the left):

- 7KM PAC Switched Ethernet PROFINET expansion module
- 7KM PAC PROFIBUS DP expansion module
- 7KM PAC RS 485 expansion module
- 7KM PAC 4DI/2DO expansion module
- 7KM PAC I(N), I(Diff), analog expansion module

Connection for 3VA molded case circuit breakers

The following expansion modules can also be mounted on the front of the COM800/COM100 breaker data servers of the 3VA molded case circuit breaker:

- 7KM PAC Switched Ethernet PROFINET and
- 7KM PAC PROFIBUS DP
- 7KM PAC RS 485

For further details see in the manual at
http://support.automation.siemens.com/WW/view/en/90318775

More information

For more information about the software components,
see page 1/293 and on the internet at
www.siemens.com/lowvoltage/powermonitoring

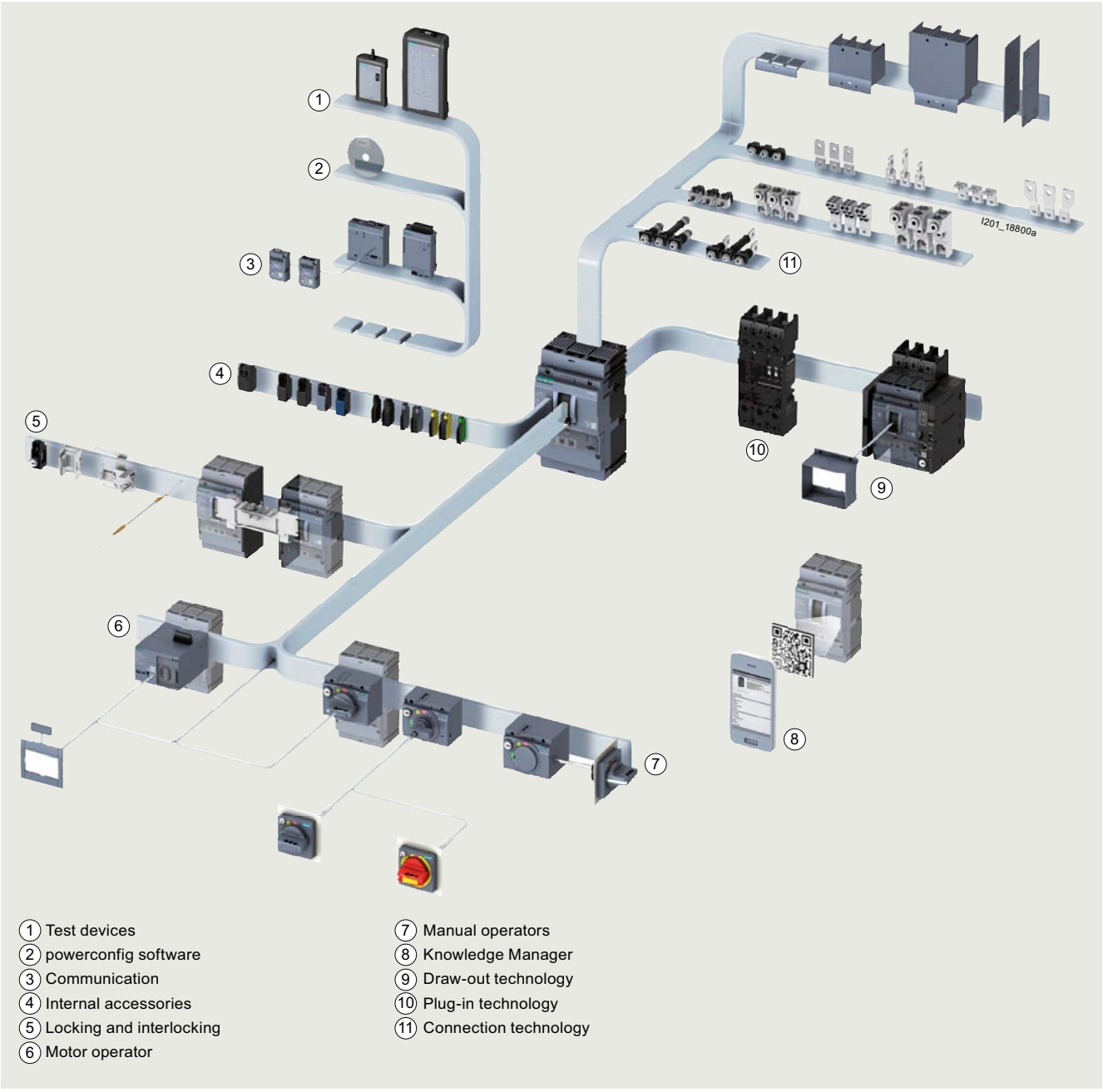
Version	Use in 7KM PAC							3VA
	PAC2200	PAC3100	PAC3200T	PAC3200	PAC4200	PAC5100	PAC5200	COM800/ COM100
7KM PAC expansion modules								
 **7KM PAC Switched Ethernet PROFINET expansion module** The 7KM PAC Switched Ethernet PROFINET expansion module is a plug-in communication module for 7KM PAC3200 and 7KM PAC4200 measuring devices and 3VA molded case circuit breakers. It provides the following features: • Standardized PROFIenergy interface to the measured quantities • The measured quantities can be individually selected using a GSDML file. This permits use of cost-effective S7 CPUs • Easy parameter assignment using the device display or powerconfig or TIA Portal • Integrated Ethernet switching allows networking with short cables without additional switches • Direct integration in production machine networks using IRT (IRT = Isochronous-Real-Time) • Full support of PROFINET IO (DHC, DNS, SNMP, SNTP) • Device replacement without PG in the PROFINET assembly using LLDP • Deterministic reversing time through ring redundancy (MRP) • Modbus TCP communication • Communication with powermanager or powerconfig • 2 x Ethernet (RJ45) sockets • Transmission rates 10 and 100 Mbit/s • Protocols PROFINET IO, PROFIenergy and Modbus TCP • No external auxiliary power necessary • Additional display via the device display and via LEDs on the module All measured variables from 7KM PAC3200 and 7KM PAC4200 can be individually selected and cyclically transmitted by means of the GSDML file. This enables optimum use of the process image of the PROFINET controller, e.g. CPU 315-2 PN/DP of SIMATIC S7. The measured quantities can be read out in acyclic mode using PROFIenergy, a PNO protocol profile. Thanks to PROFIenergy, it is possible to assemble a power monitoring system with devices from various manufacturers using PROFINET.	--	--	--	✓	✓	--	--	✓

7KM PAC expansion modules

Overview (continued)

Version		Use in 7KM PAC							3VA
		PAC2200	PAC3100	PAC3200T	PAC3200	PAC4200	PAC5100	PAC5200	COM800/ COM100
	**7KM PAC PROFIBUS DP expansion module** The 7KM PAC PROFIBUS DP expansion module is a plug-in communication module for 7KM PAC3200 and 7KM PAC4200 measuring devices and 3VA molded case circuit breakers. The 7KM PAC PROFIBUS DP expansion module has the following features: • Plug-in communication module for measuring devices for connection to PROFIBUS DPV1 • For 7KM PAC3200 and 7KM PAC4200 • Easy parameter assignment using the device display or powerconfig or TIA Portal • Data can be transferred both cyclically and acyclically via PROFIBUS DPV1 • Easy integration via device master data (GSD file) for other programming systems • Optimum use of process image of a control system for selection of individual measured quantities for cyclical transfer • Supports all baud rates from 9.6 kbit/s up to 12 Mbit/s • Connection through 9-pole Sub-D connector according to IEC 61158 • No external auxiliary power necessary • Additional display via the device display and via LEDs on the module	--	--	--	✓	✓	--	--	✓
	**7KM PAC RS 485 expansion module** The 7KM PAC RS 485 expansion module has the following features: • Plug-in 7KM PAC RS 485 communication module for 7KM PAC3200 and 7KM PAC4200 measuring devices and 3VA molded case circuit breakers • Easy parameter assignment using the device display or powerconfig • Support for the Modbus RTU protocol • Plug and play • Supports transmission rates of 4.8/9.6/19.2 and 38.4 kbit/s • Connection by means of 6-pole screw terminals • No external auxiliary power necessary • Status indication by LED on the module • The 7KM PAC RS 485 expansion module is required for the gateway function of the 7KM PAC4200 for communication with simple devices with RS 485 interface, such as the 7KM PAC3100, via Ethernet (Modbus TCP).	--	--	--	✓	✓	--	--	✓
	**7KM PAC 4DI/2DO expansion module** The 7KM PAC 4DI/2DO expansion module is used to expand the 7KM PAC4200 measuring device to up to 10 digital inputs and 6 digital outputs and offers the following features: • Up to two 7KM PAC 4DI/2DO modules can be plugged onto a 7KM PAC4200. • The 7KM PAC 4DI/2DO expansion modules mean that the internal digital inputs and outputs can be expanded by up to 8 inputs and 4 outputs. • Easy parameter assignment using the device display or powerconfig • The digital inputs can be used without the need for an external power supply as they are self-powered. This is particularly useful for the integration of non-electric measuring devices, such as water or compressed-air counters • All functions of the integrated multifunctional inputs/outputs on the 7KM PAC4200 are also available in the 7KM PAC 4DI/2DO expansion module • Inputs and outputs can be used as an S0 interface conforming to IEC 62053-31 • The connection is made via a 9-pole screw terminal • No external auxiliary power supply is required	--	--	--	--	✓	--	--	--
	**7KM PAC I(N), I(Diff), analog expansion module** The 7KM PAC I(N), I(Diff), analog expansion module adds the following features for 7KM PAC4200 and 7KM PAC3200 devices: • N-conductor measurement (IN), Class 1, in accordance with IEC 61557-12 via x/5A current transformers • Two analog inputs: The analog inputs can be used without an external voltage source via imposed direct currents from 0/4 to 20 mA. This is especially advantageous for measuring non-electrical quantities such as temperature, water or air pressure. • Residual current measurement: One of the two analog inputs can be used for residual current measurement via Type A or Type B summation current transformers. • Easy parameter assignment using the device display or powerconfig • The connection is made via a 6-pole screw terminal • One 7KM PAC I(N), I(Diff), analog module can be plugged onto a 7KM PAC4200 or 7KM PAC3200. • No external auxiliary power supply is required	--	--	--	✓	✓	--	--	--

Overview



1 Test devices
2 powerconfig software
3 Communication
4 Internal accessories
5 Locking and interlocking
6 Motor operator
7 Manual operators
8 Knowledge Manager
9 Draw-out technology
10 Plug-in technology
11 Connection technology

3VA molded case circuit breakers from the portfolio of SENTRON protection, switching, measuring and monitoring devices ensure the reliable protection of people and property as integral components of efficient power distribution systems. With a wide range of accessories they can be adapted flexibly, quickly and easily to individual requirements.

Selection and ordering data

Design of electrical connection for main circuit	Number of poles	Uninterrupted current Rated value	Current setting of the inverse-time delayed overload protection "L" I_r	Operating current of the instantaneous short-circuit protection "I" I_i	Article No.	Weight
		A				kg
3VA21 up to 160 A (line protection) Fixed-mounted						
Electronic trip units ETU320 LI with adjustable overload protection Ir and adjustable instantaneous short-circuit protection Ii						
I_{cu} up to 55 kA at 415 V (medium breaking capacity M)						
Box terminals	3	25	10 ... 25	38 ... 300	**3VA2125-5HL36-0AA0**	2.306
		40	16 ... 40	60 ... 480	**3VA2140-5HL36-0AA0**	2.305
		63	25 ... 63	95 ... 756	**3VA2163-5HL36-0AA0**	2.294
		100	40 ... 100	240 ... 1600	**3VA2110-5HL36-0AA0**	2.269
		160	63 ... 160	150 ... 1200	**3VA2116-5HL36-0AA0**	2.245
Lug terminals		25	10 ... 25	38 ... 300	**3VA2125-5HL32-0AA0**	2.159
		40	16 ... 40	60 ... 480	**3VA2140-5HL32-0AA0**	2.165
		63	25 ... 63	95 ... 756	**3VA2163-5HL32-0AA0**	2.174
		100	40 ... 100	150 ... 1200	**3VA2110-5HL32-0AA0**	2.125
		160	63 ... 160	240 ... 1600	**3VA2116-5HL32-0AA0**	2.121
			63 ... 160	240 ... 1920	**3VA2216-5HL32-0AA0**	2.240
		250	100 ... 250	375 ... 2500	**3VA2225-5HL32-0AA0**	2.234
			100 ... 250	375 ... 3000	**3VA2325-5HL32-0AA0**	4.715
		400	160 ... 400	600 ... 4000	**3VA2340-5HL32-0AA0**	4.694
			160 ... 400	600 ... 4800[1)]	**3VA2440-5HL32-0AA0**	4.751
		630	250 ... 630	945 ... 5670	**3VA2463-5HL32-0AA0**	5.221

[1)] At breaking capacity L 440 A

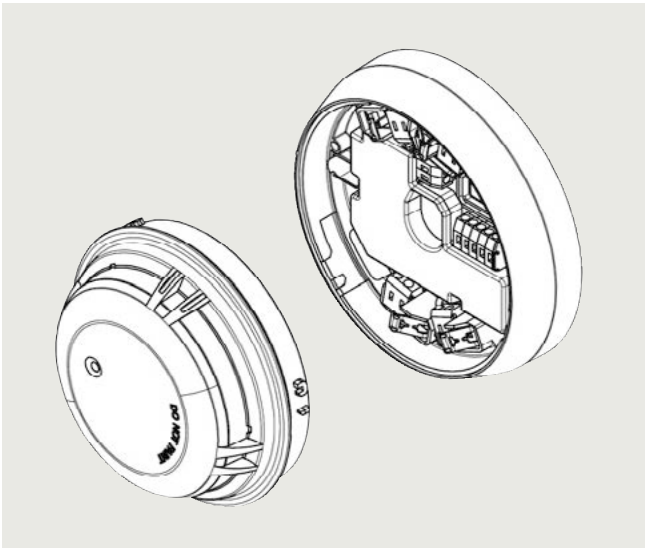
* You can order this quantity or a multiple thereof.

Fire protection for rolling stock

Spot Detector for Rail

Overview

Spot Detector for Rail - based on High End Multi-Sensor DS1 024R-AT, DS1 110R-AT – Standard Base



Sensor Technology:

- Multi criteria sensor (heat & smoke)
- Signal processing with ASAtechnology
- Highly developed immunity to deceptive phenomena
- Resistant to environmental and interfering influences such as dust, fibers, moisture, electromagnetic interference, corrosive vapors, artificial aerosols and atypical fire phenomena

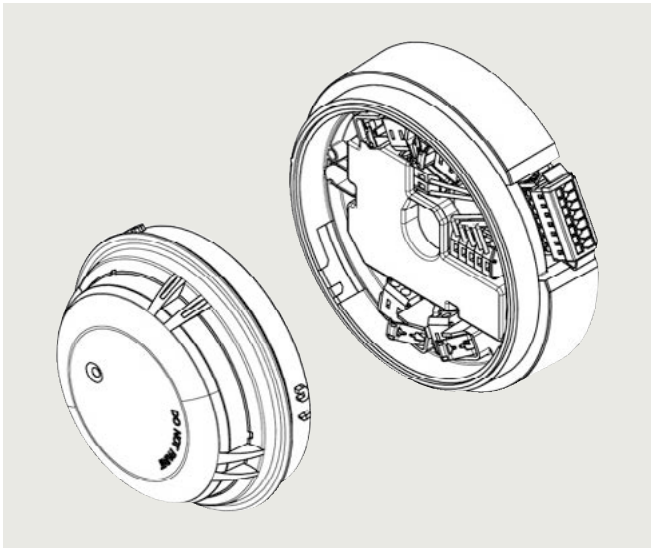
Detector base designed for Rail Application:

- Rail base for standard ceiling installation
- Power supply 24 VDC or 110 VDC
- Alarm and Fault signaling via relay output
- 3 parameters selectable
- Stand-alone connectivity

Standards:

- Railway Applications EN 50155
- Extended temperature range OT4
- Requirements for fire behavior of materials and components EN 45545
- Fire detection and fire alarm systems EN 54
- Safety Integrity Level SIL2 acc. EN 5012x

Spot Detector for Rail - based on High End Multi-Sensor DS2 024R-AT, DS2 110R-AT – Connector Base



Sensor Technology:

- Multi criteria sensor (heat & smoke)
- Signal processing with ASAtechnology
- Highly developed immunity to deceptive phenomena
- Resistant to environmental and interfering influences such as dust, fibers, moisture, electromagnetic interference, corrosive vapors, artificial aerosols and atypical fire phenomena

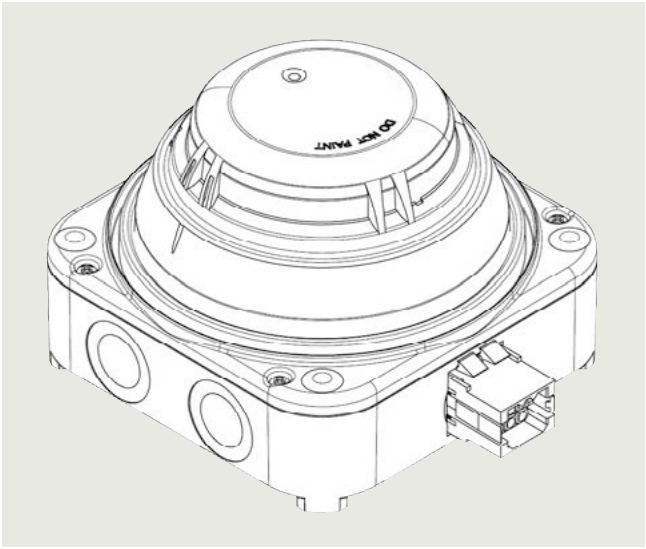
Detector base designed for Rail Application:

- Rail base with external industry standard plug
- Plug & Play solution
- Power supply 24 VDC or 110 VDC
- Alarm and Fault signaling via relay output
- 3 parameters selectable
- Stand-alone connectivity

Standards:

- Railway Applications EN 50155
- Extended temperature range OT4
- Requirements for fire behavior of materials and components EN 45545
- Fire detection and fire alarm systems EN 54
- Safety Integrity Level SIL2 acc. EN 5012x

Spot Detector for Rail - based on High End Multi-Sensor DSW 024R-AT, DSW 110R-AT – Wet Base



Sensor Technology:

- Multi criteria sensor (heat & smoke)
- Signal processing with ASAtechnology
- Highly developed immunity to deceptive phenomena
- Resistant to environmental and interfering influences such as dust, fibers, moisture, electromagnetic interference, corrosive vapors, artificial aerosols and atypical fire phenomena

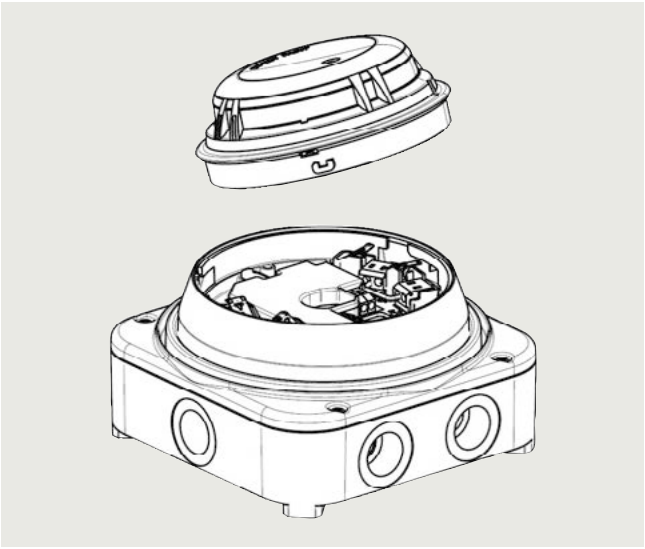
Detector base designed for Rail Application:

- Solution for rough environmental conditions
- Rail base with external industry standard plug
- Plug & Play solution
- Power supply 24 VDC or 110 VDC
- Alarm and Fault signaling via relay output
- 3 parameters selectable
- Stand-alone connectivity

Standards:

- Railway Applications EN 50155
- Extended temperature range OT4
- Requirements for fire behavior of materials and components EN 45545
- Fire detection and fire alarm systems EN 54
- Safety Integrity Level SIL2 acc. EN 5012x

Spot Detector for Rail - based on Smoke-only Sensor DSWOP 024R-AT, DSWOP 110R-AT – Wet Base



Sensor Technology:

- Single criteria sensor (smoke)
- Signal processing with detection algorithm
- 3-color LED indicator
- Drift compensation and internal error monitoring

Detector base designed for Rail Application:

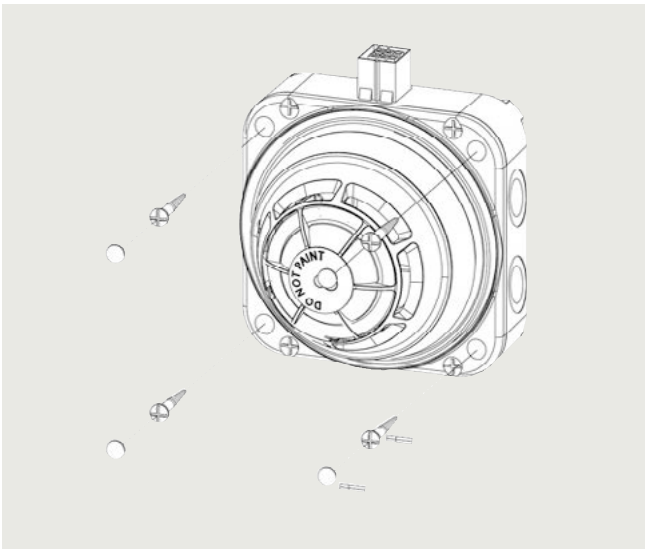
- Solution for rough environmental conditions
- Rail base with external industry standard plug
- Plug & Play solution
- Power supply 24 VDC or 110 VDC
- Alarm and Fault signaling via relay output
- 2 parameters selectable
- Stand-alone connectivity

Standards:

- Railway Applications EN 50155
- Extended temperature range OT4
- Requirements for fire behavior of materials and components EN 45545
- Fire detection and fire alarm systems EN 54

Spot Detector for Rail

Spot Detector for Rail - based on Heat-only Sensor DSWH10 024R-AT, DSWH10 110R-AT – Wet Base



Sensor Technology:

- Single criteria sensor (heat, static and differential)
- Signal processing with detection algorithm
- 3-color LED indicator
- Drift compensation and internal error monitoring

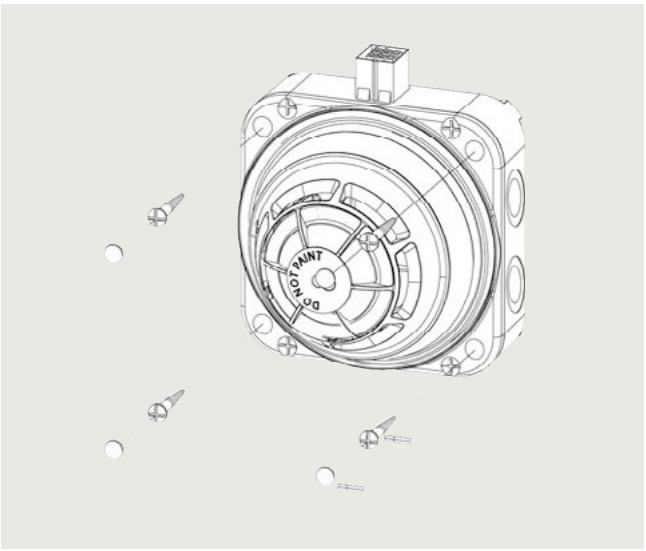
Detector base designed for Rail Application:

- Solution for rough environmental conditions
- Rail base with external industry standard plug
- Plug & Play solution
- Power supply 24 VDC or 110 VDC
- Alarm and Fault signaling via relay output
- Fixed parameter
- Stand-alone connectivity

Standards:

- Railway Applications EN 50155
- Extended temperature range OT4
- Requirements for fire behavior of materials and components EN 45545
- Fire detection and fire alarm systems EN 54

Spot Detector for Rail - based on Heat-only Sensor DSWH12 024R-AT, DSWH12 110R-AT – Wet Base



Sensor Technology:

- Single criteria sensor (heat, static)
- Signal processing with detection algorithm
- 3-color LED indicator
- Drift compensation and internal error monitoring

Detector base designed for Rail Application:

- Solution for rough environmental conditions
- Rail base with external industry standard plug
- Plug & Play solution
- Power supply 24 VDC or 110 VDC
- Alarm and Fault signaling via relay output
- 2 parameters selectable
- Stand-alone connectivity

Standards:

- Railway Applications EN 50155
- Extended temperature range OT4
- Requirements for fire behavior of materials and components EN 45545
- Fire detection and fire alarm systems EN 54

Technical specifications

Typ	**Multi-sensor incl. Base**
Operating voltage (modulated)	DC 19 … 30 V (24 V Print Version), DC 70 … 140 V (110 V Print Version)
Operating current (quiescent)	10 ... 11 mA (24 V Print Version), 3 … 3,5 mA (110 V Print Version)
Max. number of external alarm indicators that can be connected	2
Operating temperature	-25 ... +55 °C
Rail specific approval	Temperature class OT4: -40 … +70 °C
Storage temperature	-30 ... +70 °C
Air humidity (short-term moisture condensation permitted)	≤ 95% rel.
Communication protocol	Potential-free contacts
Color	~RAL 9010 pure white
Weight	~0.230 kg
Protection category (IEC 60529)	IP40
Standards	CEA 4021, EN 54-5, EN 54-7, EN 54-17
Approvals	
OOH740 only:	
• VdS	G211070
• LPCB	126bh/05
• FM	3051081
• DNV GL (Marine)	MEDB00003UK
OOH740 incl. Base (DBxR-AT):	EN 50155, EN 50121-3-2, EN 61000-4-2/3/4/5/6
• Standards	EN 60068-2-1/2/27/30, EN 61373, EN 45545-2
• TUEV	Test Report TÜV Austria EN 50155 Railway applications Test Report TÜV Austria EN 50121-3-2, EN 50155 EMV Test Report AIT EN 60068-2-27, EN 61373 Shock and vibration tests Test Report TÜV Austria ÖNORM EN 60068-2-1 SIL Report & Certificate acc. EN 50126, EN 50128, EN 50129
Permissible wind speed	Max. 5 m/s

Selection and ordering data

	Type	Designation	Article No.	Weight kg
Multi-sensor type				
	DS1 024R-AT	Complete Detector Set 1, 24 V DC Version	**6500007594**	0.223
	DS1 110R-AT	Complete Detector Set 1, 110 V DC Version	**6500007595**	0.226
	DS2 024R-AT	Complete Detector Set 2, 24 V DC Version	**6500007587**	0.236
	DS2 110R-AT	Complete Detector Set 2, 110 V DC Version	**6500007588**	0.239
	DSW024R-AT	Detector Set Wet, 24 V DC	**6500007569**	0.500
	DSW110R-AT	Detector Set Wet, 110 V DC	**6500007593**	0.503
	Accessories			
	LP720	Detector locking device	**S54319-F9-A1**	0.001
Smoke-only type				
	DSWOP 024R-AT	Detector Set Wet smoke-only, 24 V DC Version	**6500008237**	0.397
	DSWOP 110R-AT	Detector Set Wet smoke-only, 110 V DC Version	**6500008240**	0.398
Heat-only type				
	DSWH10 024R-AT	Detector Set Wet heat-only, 24 V DC Version	**6500007740**	0.450
	DSWH10 110R-AT	Detector Set Wet heat-only, 110 V DC Version	**6500007997**	0.451
	DSWH12 024R-AT	Detector Set Wet heat max-only, 24 V DC Version	**6500007741**	0.450
	DSWH12 110R-AT	Detector Set Wet heat max-only, 110 V DC Version	**6500007998**	0.451

Aspiration Smoke Detection for Rail

Overview

Aspiration smoke detection for Rail

Sensor Technology:

- Patented technology
- Early detection of a wide spectrum of particle size in the air
- Configuration using the USB interface
- ASD Asyst-Tool' software to assist with pipe configuration
- Unique dust-resistant detection chamber
- Intuitive front indicator for airflow and smoke value
- Access to service functions
- Different event protocols
- Offline/Online configuration supported
- Cleaning function (FDA241)

Designed for Rail Application:

- Power supply 24 VDC
- Stand-alone connectivity
- Alarm and Fault signaling via relay output
- Variation of selectable parameter settings to meet all project specific requirements
- Fast start-up and configuration sequence

Standards:

- Railway Applications EN 50155
- Extended temperature range OT4
- Requirements for fire behavior of materials and components EN 45545
- Fire detection and fire alarm systems EN 54
- SIL 2 according EN 50126/128/129

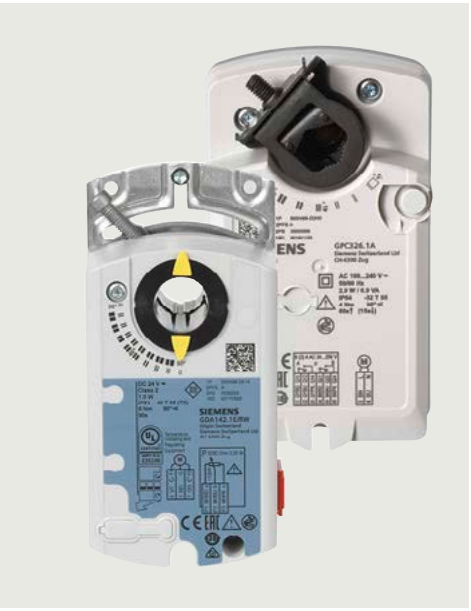
Further Fire Safety applications
https://new.siemens.com/global/en/products/buildings/fire-safety/applications.html

Technical specifications

Typ	FDA241	FDA221
Operating voltage	DC 19 … 30 V	
Operating current at DC 24 V	150 mA (nominal), 250 mA (during alarm)	
Dimensions (W x H x D)	162 x 285 x 120 mm	
Protection category	IP30	
Installation position	Vertically upward, vertically downward	
Sound power level LWA (dBA)	--	
At suction speed		
• High	37	33
• Medium	33	30
• Low	30	26
Operating temperature	-20 … +60 °C	
Rail specific approval	Temperature class OT4: -40 … +70 °C	
Air humidity	5 … 95% (no moisture condensation)	
Dust indicator	Yes	--
Maximum pipe length		
• Single line	60 m	30 m
• Branched lines	2 x 60 m	2 x 25 m
Options for aspirating holes	Prefabricated option or the maximum pipe length must correspond to the calculation made using the "FXS2056 ASD Asyst Tool V2" software	
Air intake/exhaust pipe	Metric: 25 mm outer diameter (OD)	
Monitoring area (dependent on local provisions and standards)	Up to 800 m^2	Up to 500 m^2
Relay alarm outputs can be selected with/without lock nominal current 2.0 A at DC 30 V. Contact: NO/NC	4	3
Fault relay	1	1
Cable inlet	10 cm x 2.5 cm on the rear or from above	
Terminal configuration	Screw terminals	
Cable cross section	0.2 … 2.5 mm^2 (AWG 12 … 30)	
Other interfaces	Power supply, 4 … 20 mA	
Alarm threshold for parameter sets		
• Fire 1	10 sets; 0.05 … 2.0%/m obs	5 sets; 0.20 … 2.0%/m obs
• Fire 2	10 sets; 2.0 … 20%/m obs	5 sets; 6.0 … 20%/m obs
Alarm delay, can be set individually	0 … 300 seconds: default value 0 seconds smoke density and 15 seconds flow	
Indication	• 4 x alarm status indicators (FDA241) • 3 x alarm status indicators (FDA221) • Faults • Blowing out (FDA241) • Dust (FDA241) • Smoke density and flow indicator	
Service area	• LED "Status OK" • USB • Settings for reset functions • Settings for smoke density and airflow	
Event log	Non-volatile event memory with time and date stamp for: smoke density, airflow, detector status, and faults	
Normalization of smoke value and airflow	• Setting of threshold values for smoke alarms and faults • User setting for normalization of smoke density and airflow • Preset values are retained during the normalization period	
Warranty period	2 years	
Approvals		
• VdS	G213050	
• Standards	EN 50155, EN 50121-3-2, EN 61000-4-2/3/4/5/6, EN 60068-2-1/2/27/30, EN 61373, EN 45545-2	
• TUEV	Test Report TÜV Austria EN 50155 Railway applications Test Report TÜV Austria EN 50121-3-2, EN 50155 EMV Test Report AIT EN 60068-2-27, EN 61373 Shock and vibration tests Test Report TÜV Austria ÖNORM EN 60068-2-1 SIL Report & Certificate acc. EN 50126, EN 50128, EN 50129	

Selection and ordering data

Type	Designation	Article No.	Weight kg
FDA241 (Rail)	Aspirating smoke detector	**S54333-F17-A1 Rail**	1.495
FDA221 (Rail)	Aspirating smoke detector	**S54333-F15-A1 Rail**	1.495
Accessories			
FDAZ292	ASD filter box	**S54333-C92-A1**	0.220
Spare parts			
FDAZ292-AA	ASD filter set	**S54333-S91-A1**	0.009
FDAZ291	Aspirator (FDA241/FDA221)	**S54333-G1-A1**	0.106



Damper actuators for rail vehicles

OpenAir fits everywhere

Overview

Certified, reliable, space-saving

The challenge: harsh environmental and operating conditions.

Air conditioning units and air distribution systems in rail vehicle applications must ensure passenger comfort at all times. These systems are subject to special conditions: vibrations, extreme temperature fluctuations, special safety and fire protection regulations and confined spaces. To accomplish their task under these demanding conditions, they must have components that are precisely tailored to applications in rail vehicles. All components and materials must be certified in accordance with application-specific standards, must function reliably under harsh conditions and must be as compact as possible.
More information see www.siemens.com/openair

Highlights

- All standards are met
- New extended voltage range (110 V/24 V)
- More safety due to Actuators with spring return function
- Compact design due to integrated auxiliary switches

Relevant standards for the certification of damper actuators:

- EN 50155 - Electronic equipment used on rolling stock
- EN 45545 - Fire protection on railway vehicles (interior applications)
- EN 61373 - Shock and vibration, railway applications

Selection and ordering data

Air damper actuators with spring return

Actuators for rail vehicles	Control signal	Operating voltage	Standard model	Feedback potentiometer	2 integrated auxiliary switches	Rotary direction switch
 **GPC series**	Modulating	DC 24 V	**GPC161.1A/RW**	--	--	No
4 Nm	DC 0/2 ... 10 V	DC 110 V	**GPC261.1A/RW**	--	--	No
60 s running time	2-position	DC 24 V	**GPC121.1A/RW**	--	**GPC126.1A/RW**	No
15 s SR time		DC 110 V	**GPC221.1A/RW**	--	**GPC226.1A/RW**	No

Air damper actuators without spring return

Actuators for rail vehicles	Control signal	Operating voltage	Standard model	Feedback potentiometer	2 integrated auxiliary switches	Rotary direction switch
 **GDD series**	Modulating	DC 24 V	**GDD161.1E/RW**	--	--	Yes
5 Nm	DC 0/2 ... 10 V	DC 110 V	**GDD261.1E/RW**	--	--	Yes
30 s running time	2-position	DC 24 V	**GDD141.1E/RW**	**GDD142.1E/RW**	**GDD146.1E/RW**	Yes
	3-position	DC 110 V	**GDD241.1E/RW**	**GDD242.1E/RW**	**GDD246.1E/RW**	Yes
 **GDA series**	Modulating	DC 24 V	**GDA161.1E/RW**	--	--	Yes
5 Nm	DC 0/2 ... 10 V					
90 s running time	2-position 3-position	DC 110 V	**GDA141.1E/RW**	**GDA142.1E/RW**	**GDA146.1E/RW**	Yes
 **GLD series**	Modulating	DC 24 V	**GLD161.1E/RW**	--	--	Yes
8 Nm	DC 0/2 ... 10 V	DC 110 V	**GLD261.1E/RW**	--	--	Yes
30 s running time	2-position	DC 24 V	**GLD141.1E/RW**	**GLD142.1E/RW**	**GLD146.1E/RW**	Yes
	3-position	DC 110 V	**GLD241.1E/RW**	**GLD242.1E/RW**	**GLD246.1E/RW**	Yes
 **GLA series**	Modulating DC 0/2 ... 10 V	DC 24 V	**GLA161.1E/RW**	--	--	Yes
10 Nm						
90 s running time	2-position 3-position	DC 24 V	**GLA141.1E/RW**	**GLA142.1E/RW**	**GLDA146.1E/RW**	Yes

The solution: OpenAir damper actuators

With OpenAir, we offer you technically perfected damper actuators that can be **used the world over** and meet all the requisite standards (EN 45545, EN 50155, EN 61373) for use in rail vehicles - certified and documented, of course. These rugged devices with a tested service life of up to 100.000 full cycles and 5.000.000 partial cycles are available with 5 and 10(8) Nm of torque and running times of 30 and 90 seconds. You benefit from loadindependent running times thanks to robust, brushless DC (BLDC) motors and an extremely low sound power level of <28 dB(A).

Easy and safe in any area

The halogen-free printed circuit boards completely covered with a protective coating and the extremely wide temperature operating range (from -40 to +70 °C; short-term +85 °C) ensure maximum reliability and flexibility. The housings are also extremely compact because the two auxiliary switches for indicating damper position are integrated. Installation is with a single screw and the direction of rotation to be instantly adapted thanks to a rotary direction switch. To make your work easier, the actuators come preassembled with the plug of your choice and you also choose the length of the railway-specific, halogen-free connecting cables. For safety-relevant applications, damper actuators with spring return function are now also available. These are required when air dampers have to be moved to an emergency position in the event of a power failure.

Where's the datasheet?

EA question that never needs asking again. With the Scan to HIT app, you can simply scan in the data matrix code on the actuators and immediately obtain access to all important product information such as datasheets and installation instructions. The app is available free of charge for iOS and Android in the corresponding stores.

Note

SIPLUS S7-1200 CPU 1212C RAIL

Overview

- The superior compact solution
- Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic
- With 14 integral input/outputs
- Expandable by:
  - 1 signal board (SB) or communication board (CB)
  - 2 signal modules (SM)
  - Max. 3 communications modules (CM)

Design

The compact CPU 1212C has:

- Integrated power supply, either as wide-range AC or DC power supply (24 V DC).
- Integrated 24 V encoder/load current supply:
  For direct connection of sensors and encoders. With 300 mA output current also for use as load power supply.
- 8 integrated digital inputs 24 V DC (current sinking/current sourcing (IEC type 1 current sinking)).
- 6 integrated digital outputs, 24 V DC.
- 2 integrated analog inputs 0 ... 10 V.
- 2 pulse outputs (PTO) with a frequency of up to 100 MHz.
- Pulse-width modulated outputs (PWM) with a frequency of up to 100 kHz.
- Integrated Ethernet interface (TCP/IP native, ISO-on-TCP).
- 4 fast counters (3 with max. 100 kHz; 1 with max. 30 kHz), with configurable enable and reset inputs, can be used simultaneously as up and down counters with 2 separate inputs or for connecting incremental encoders.
- Expansion by additional communication interfaces, e.g. RS485 or RS232.
- Expansion by analog or digital signals directly on the CPU via signal board (with retention of CPU mounting dimensions).
- Expansion by a wide range of analog and digital input and output signals via signal modules.
- Optional memory expansion (SIMATIC Memory Card).
- PID controller with auto-tuning functionality.
- Integral real-time clock.
- Interrupt inputs:
  For extremely fast response to rising or falling edges of process signals.
- Removable terminals on all modules.
- Simulator (optional):
  For simulating the integrated inputs and for testing the user program.

Function

- Comprehensive instruction set:
  A wide range of operations facilitates programming:
  - Basic operations such as binary logic operations, result allocation, save, count, create times, load, transfer, compare, shift, rotate, create complement, call subprogram (with local variables),
  - integral communication commands (e.g. USS protocol, Modbus RTU, S7 communication "T-Send/T-Receive" or Freeport),
  - user-friendly functions such as pulse-width modulation, pulse sequence function, arithmetic functions, floating point arithmetic, PID closed-loop control, jump functions, loop functions and code conversions,
  - mathematical functions, e.g. SIN, COS, TAN, LN, EXP.
- Counting:
  User-friendly counting functions in conjunction with integrated counters and special commands for high-speed counters open up new application areas for the user.
- Interrupt processing:
  - Edge-triggered interrupts (activated by rising or falling edges of process signals on interrupt inputs) support a rapid response to process events.
  - Time-triggered interrupts.
  - Counter interrupts can be triggered when a setpoint is reached or when the direction of counting changes.
  - Communication interrupts allow the rapid and easy exchange of information with peripheral devices such as printers or bar code readers.
- Password protection
- Test and diagnostics functions:
  Easy-to-use functions support testing and diagnostics, e.g. online/offline diagnostics.
- "Forcing" of inputs and outputs during testing and diagnostics:
  Inputs and outputs can be set independently of the cycle and thus permanently, for example, to test the user program.
- Motion Control in accordance with PLCopen for simple control of movement
- Library functionality

Programming

The STEP 7 Basic programming package permits complete programming of all S7-1200 controllers and the associated I/O.

Technical specifications

Article number	**6AG2212-1AE40-1XB0** SIPLUS S7-1200 CPU 1212C DC/DC/DC RAIL
General information	
Product type designation	CPU 1212C DC/DC/DC
Engineering with • STEP 7 TIA Portal configurable/integrated from version	 see entry ID: 109746275
Supply voltage	
Rated value (DC) • 24 V DC	 Yes
Encoder supply	
24 V encoder supply • 24 V	 Permissible range: 20.4V to 28.8V
Memory	
Work memory • integrated	 50 kbyte
Load memory • integrated • Plug-in (SIMATIC Memory Card), max.	 1 Mbyte 2 Gbyte; with SIMATIC memory card
Backup • without battery	 Yes
CPU processing times	
for bit operations, typ.	0.085 µs; / Operation
for word operations, typ.	1.7 µs; / Operation
for floating point arithmetic, typ.	2.3 µs; / Operation
Data areas and their retentivity	
Flag • Size, max.	 4 kbyte; Size of bit memory address area
Address area	
I/O address area • Inputs • Outputs	 1 024 byte 1 024 byte
Process image • Inputs, adjustable • Outputs, adjustable	 1 kbyte 1 kbyte
Time of day	
Clock • Hardware clock (real-time)	 Yes
Digital inputs	
Number of digital inputs • of which inputs usable for technological functions	8; Integrated 6; HSC (High Speed Counting)
Digital outputs	
Number of digital outputs • of which high-speed outputs	6 4; 100 kHz Pulse Train Output
Analog inputs	
Number of analog inputs	2
Input ranges • Voltage	 Yes
Analog outputs	
Number of analog outputs	0
1. Interface	
Interface type	PROFINET
Protocols • PROFINET IO Controller • PROFINET IO Device • Open IE communication • Web server	 Yes Yes Yes Yes
Protocols	
Open IE communication • TCP/IP • ISO-on-TCP (RFC1006) • UDP	 Yes Yes Yes
Web server • supported	 Yes
communication functions / header	
S7 communication • supported	 Yes
Number of connections • overall	 16; dynamically

SIPLUS S7-1200 CPU 1212C RAIL

Article number	**6AG2212-1AE40-1XB0** SIPLUS S7-1200 CPU 1212C DC/DC/DC RAIL
Integrated Functions	
Counter	
• Number of counters	4
• Counting frequency, max.	100 kHz
Frequency measurement	Yes
Controlled positioning	Yes
Number of position-controlled positioning axes, max.	8
Number of positioning axes via pulse-direction interface	4; With integrated DO
PID controller	Yes
Number of alarm inputs	4
Number of pulse outputs	4
Limit frequency (pulse)	100 kHz
Standards, approvals, certificates	
Railway application	
• EN 50121-3-2	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support
Ambient conditions	
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity	
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance	
• Coolants and lubricants	
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air
Use in stationary industrial systems	
• to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
• to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
• to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *
Use on land craft, rail vehicles and special-purpose vehicles	
• to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
• to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
• to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *
Usage in industrial process technology	
• Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)
• Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
Remark	
• Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating	
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A
Configuration / header	
Configuration / programming / header	
Programming language	
• LAD	Yes
• FBD	Yes
• SCL	Yes

Article number	**6AG2212-1AE40-1XB0** SIPLUS S7-1200 CPU 1212C DC/DC/DC RAIL
Dimensions	
Width	90 mm
Height	100 mm
Depth	75 mm
Weights	
Weight, approx.	370 g
Other	
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

	Version	Article No.
	SIPLUS S7-1200 CPU 1212C RAIL Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic Integrated program/data memory 75 KB, load memory 1 MB; Supply voltage 24 V DC; Boolean execution times 0.1 µs per operation; 8 digital inputs, 6 digital outputs, 2 analog inputs; Expandable by up to 3 communications modules, 2 signal modules, and 1 signal board/communication board; Digital inputs can be used as HSC at 100 kHz, 24 V DC digital outputs can be used as pulse outputs (PTO) or pulse-width modulated outputs (PWM) at 100 kHz • For areas with extreme exposure to environmental substances (conformal coating); ambient temperature -25 ... +70 °C	**6AG2212-1AE40-1XB0**

*** You can order this quantity or a multiple thereof.**

SIPLUS S7-1200 CPU 1214C RAIL

Overview

- The compact high-performance CPU
- Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic
- With 24 integrated I/Os
- Expandable by:
  - 1 signal board (SB) or communication board (CB)
  - 8 signal modules (SM)
  - Max. 3 communications modules (CM)

Design

The compact CPU 1214C has:

- Integrated power supply, either as wide-range AC or DC power supply (24 V DC).
- Integrated 24 V encoder/load current supply:
  For direct connection of sensors and encoders. With a 400 mA output current, it can also be used as load power supply.
- 14 integrated digital inputs 24 V DC (current sinking/current sourcing (IEC type 1 current sinking)).
- 10 integrated digital outputs, 24 V DC.
- 2 integrated analog inputs 0 ... 10 V.
- 2 pulse outputs (PTO) with a frequency of up to 100 MHz.
- Pulse-width modulated outputs (PWM) with a frequency of up to 100 kHz.
- Integrated Ethernet interface (TCP/IP native, ISO-on-TCP).
- 6 high-speed counters (3 with max. 100 kHz; 3 with max. 30 kHz), with configurable enable and reset inputs, can be used simultaneously as up and down counters with 2 separate inputs or for connecting incremental encoders.
- Expansion by additional communication interfaces, e.g. RS485 or RS232.
- Expansion by analog or digital signals directly on the CPU via signal board (with retention of CPU mounting dimensions).
- Expansion by a wide range of analog and digital input and output signals via signal modules.
- Optional memory expansion (SIMATIC Memory Card).
- PID controller with auto-tuning functionality.
- Integral real-time clock.
- Interrupt inputs:
  For extremely fast response to rising or falling edges of process signals.
- Removable terminals on all modules.
- Simulator (optional):
  For simulating the integrated inputs and for testing the user program.

Function

- Comprehensive instruction set:
  A wide range of operations facilitates programming:
  - Basic operations such as binary logic operations, result allocation, save, count, create times, load, transfer, compare, shift, rotate, create complement, call subprogram (with local variables),
  - Integral communication commands (e.g. USS protocol, Modbus RTU, S7 communication "T-Send/T-Receive" or Freeport),
  - user-friendly functions such as pulse-width modulation, pulse sequence function, arithmetic functions, floating point arithmetic, PID closed-loop control, jump functions, loop functions and code conversions,
  - mathematical functions, e.g. SIN, COS, TAN, LN, EXP.
- Counting:
  User-friendly counting functions in conjunction with integrated counters and special commands for high-speed counters open up new application areas for the user.
- Interrupt processing:
  - Edge-triggered interrupts (activated by rising or falling edges of process signals on interrupt inputs) support a rapid response to process events.
  - Time-triggered interrupts.
  - Counter interrupts can be triggered when a setpoint is reached or when the direction of counting changes.
  - Communication interrupts allow the rapid and easy exchange of information with peripheral devices such as printers or bar code readers.
- Password protection
- Test and diagnostics functions:
  Easy-to-use functions support testing and diagnostics, e.g. online/offline diagnostics.
- "Forcing" of inputs and outputs during testing and diagnostics:
  Inputs and outputs can be set independently of the cycle and thus permanently, for example, to test the user program.
- Motion Control in accordance with PLCopen for simple control of movement.
- Library functionality

Programming

The STEP 7 Basic programming package permits complete programming of all S7-1200 controllers and the associated I/O.

Technical specifications

Article number	**6AG2214-1AG40-1XB0** SIPLUS S7-1200 CPU 1214C DC/DC/DC RAIL
General information	
Product type designation	CPU 1214C DC/DC/DC
Engineering with • STEP 7 TIA Portal configurable/integrated from version	see entry ID: 109746275
Supply voltage	
Rated value (DC) • 24 V DC	Yes
Encoder supply	
24 V encoder supply • 24 V	L+ minus 4 V DC min.
Memory	
Work memory • integrated	100 kbyte
Load memory • integrated • Plug-in (SIMATIC Memory Card), max.	4 Mbyte with SIMATIC memory card
Backup • without battery	Yes
CPU processing times	
for bit operations, typ.	0.085 µs; / instruction
for word operations, typ.	1.7 µs; / instruction
for floating point arithmetic, typ.	2.3 µs; / instruction
Data areas and their retentivity	
Flag • Size, max.	8 kbyte; Size of bit memory address area
Address area	
Process image • Inputs, adjustable • Outputs, adjustable	1 kbyte 1 kbyte
Time of day	
Clock • Hardware clock (real-time)	Yes
Digital inputs	
Number of digital inputs • of which inputs usable for technological functions	14; Integrated 6; HSC (High Speed Counting)
Digital outputs	
Number of digital outputs • of which high-speed outputs	10 4; 100 kHz Pulse Train Output
Analog inputs	
Number of analog inputs	2
Input ranges • Voltage	Yes
Analog outputs	
Number of analog outputs	0
1. Interface	
Interface type	PROFINET
Protocols • PROFINET IO Controller • PROFINET IO Device • Open IE communication • Web server	 Yes Yes Yes Yes
Protocols	
Open IE communication • TCP/IP • ISO-on-TCP (RFC1006) • UDP	 Yes Yes Yes
Web server • supported	Yes
communication functions / header	
S7 communication • supported	Yes
Number of connections • overall	16; dynamically
Integrated Functions	
Counter • Number of counters • Counting frequency, max.	6 100 kHz

SIPLUS S7-1200 CPU 1214C RAIL

Article number	**6AG2214-1AG40-1XB0** SIPLUS S7-1200 CPU 1214C DC/DC/DC RAIL
Frequency measurement	Yes
controlled positioning	Yes
Number of position-controlled positioning axes, max.	8
Number of positioning axes via pulse-direction interface	4; With integrated DO
PID controller	Yes
Number of alarm inputs	4
Number of pulse outputs	4
Limit frequency (pulse)	100 kHz
Standards, approvals, certificates	
Railway application	
• EN 50121-3-2	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support
Ambient conditions	
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity	
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance	
Coolants and lubricants	
• Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air
Use in stationary industrial systems	
• to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
• to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
• to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *
Use on land craft, rail vehicles and special-purpose vehicles	
• to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
• to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
• to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *
Usage in industrial process technology	
• Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)
• Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
Remark	
• Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating	
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A
Configuration / header	
Configuration / programming / header	
• Programming language	
- LAD	Yes
- FBD	Yes
- SCL	Yes
Dimensions	
Width	110 mm
Height	100 mm
Depth	75 mm
Weights	
Weight, approx.	415 g
Other	
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

Version	Article No.
SIPLUS S7-1200 CPU 1214C RAIL Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic Integrated program/data memory 100 KB, load memory 2 MB; Supply voltage 24 V DC; Boolean execution times 0.1 µs per operation; 14 digital inputs, 10 digital outputs, 2 analog inputs; Expandable by up to 3 communications modules, 8 signal modules, and 1 signal board/communication board; Digital inputs can be used as HSC at 100 kHz, 24 V DC digital outputs can be used as pulse outputs (PTO) or pulse-width modulated outputs (PWM) at 100 kHz • For areas with extreme exposure to environmental substances (conformal coating); ambient temperature -25 ... +70 °C	**6AG2214-1AG40-1XB0**

*** You can order this quantity or a multiple thereof.**

SIPLUS S7-1200 SM 1221 RAIL

Overview

- Digital inputs as supplement to the integral I/O of the CPUs
- Approved in accordance with the railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic
- For flexible adaptation of the controller to the corresponding task
- For subsequent expansion of the system with additional inputs

Application

Digital input modules allow the connection of the controller to digital signals of the process.

This provides users with the following advantages:

- Optimum adaptation:
  with signal modules which can be mixed as desired, users can adapt their controllers exactly to the relevant task. This avoids superfluous investments.
- Flexibility:
  if the task is expanded subsequently, the controller can be upgraded. Updating of the user program is extremely simple.

Function

The SM 1221 digital input signal modules convert the level of the external digital signals from the process into the internal signal level of the S7-1200.

6

Technical specifications

Article number	**6AG2221-1BF32-1XB0** SIPLUS S7-1200 SM 1221 8DI RAIL
General information	
Product type designation	SM 1221, DI 8x24 V DC
Supply voltage	
Rated value (DC)	24 V
Input current	
from backplane bus 5 V DC, max.	105 mA
Digital inputs	
• from load voltage L+ (without load), max.	4 mA; per channel
Output voltage / header	
supply voltage of the transmitters / header	
• product function / supply voltage for transmitters	Yes
Digital inputs	
Number of digital inputs	8
• in groups of	2
Input characteristic curve in accordance with IEC 61131, type 1	Yes
Number of simultaneously controllable inputs	
• all mounting positions	
- up to 40 °C, max.	8
• horizontal installation	
- up to 40 °C, max.	8
- up to 50 °C, max.	8
• vertical installation	
- up to 40 °C, max.	8
Input voltage	
• Rated value (DC)	24 V
• for signal "0"	5 V DC at 1 mA
• for signal "1"	15 V DC at 2.5 mA
Input current	
• for signal "0", max. (permissible quiescent current)	1 mA
• for signal "1", min.	2.5 mA
• for signal "1", typ.	4 mA
Input delay (for rated value of input voltage)	
• for standard inputs	
- parameterizable	Yes; 0.2 ms, 0.4 ms, 0.8 ms, 1.6 ms, 3.2 ms, 6.4 ms and 12.8 ms, selectable in groups of four
• for interrupt inputs	
- parameterizable	Yes

Article number	**6AG2221-1BF32-1XB0** SIPLUS S7-1200 SM 1221 8DI RAIL
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Alarms	
• Diagnostic alarm	Yes
Diagnoses	
• Monitoring the supply voltage	Yes
Diagnostics indication LED	
• for status of the inputs	Yes
• for maintenance	Yes
Potential separation	
Potential separation digital inputs	
• between the channels, in groups of	2
Degree and class of protection	
IP degree of protection	IP20
Standards, approvals, certificates	
Railway application	
• EN 50121-3-2	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support
Ambient conditions	
Ambient temperature during operation	
• min.	-25 °C; = Tmin (incl. condensation/frost)
• max.	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155)
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity	
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance	
Coolants and lubricants	
• Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air
Use in stationary industrial systems	
• to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
• to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
• to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *
Use on land craft, rail vehicles and special-purpose vehicles	
• to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
• to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
• to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *
Usage in industrial process technology	
• Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)
• Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
Remark	
• Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating	
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A
Connection method / header	
Required front connector	Yes

SIPLUS S7-1200 SM 1221 RAIL

Article number	**6AG2221-1BF32-1XB0** SIPLUS S7-1200 SM 1221 8DI RAIL
Mechanics/material	
Enclosure material (front) • Plastic	Yes
Dimensions	
Width	45 mm
Height	100 mm
Depth	75 mm
Weights	
Weight, approx.	170 g
Other	
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

	Version	Article No.
	SIPLUS SM 1221 RAIL digital input module Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic 8 inputs, 24 V DC, isolated, current sourcing/sinking • For areas with extreme exposure to environmental substances (conformal coating); ambient temperature -25 ... +70 °C	**6AG2221-1BF32-1XB0**

* You can order this quantity or a multiple thereof.

Overview

- Digital outputs as a supplement to the integral I/O of the CPUs
- Approved in accordance with the railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic
- For flexible adaptation of the controller to the corresponding task
- For subsequent expansion of the system with additional outputs

Application

Digital output modules permit the output of digital signals from the controller to the process.

This provides users with the following advantages:

- Optimum adaptation:
  with signal modules which can be mixed as desired, users can adapt their controllers exactly to the relevant task. This avoids superfluous investments.
- Flexibility:
  if the task is expanded subsequently, the controller can be upgraded. Updating of the user program is extremely simple.

Function

The SM 1222 digital output signal modules convert the internal signal level of the SIMATIC S7-1200 into the external signal level required by the process.

Technical specifications

Article number	**6AG2222-1BF32-1XB0** SIPLUS S7-1200 SM 1222 8DQ RAIL	**6AG2222-1HF32-1XB0** SIPLUS S7-1200 SM 1222 8DQ RLY RAIL
General information		
Product type designation	SM 1222, DQ 8x24 V DC/0.5 A	SM 1222, DQ 8x relay/2 A
Input current		
From backplane bus 5 V DC, max.	120 mA	120 mA
Digital outputs • from load voltage L+, max.		11 mA/relay coil
Digital outputs		
Number of digital outputs • in groups of	8 1	8 2
Short-circuit protection	No; to be provided externally	No; to be provided externally
Limitation of inductive shutdown voltage to	typ. (L+) -48 V	
Switching capacity of the outputs • with resistive load, max. • on lamp load, max.	 0.5 A 5 W	 2 A 30 W with DC, 200 W with AC
Output voltage • Rated value (DC) • Rated value (AC) • for signal "0", max. • for signal "1", min.	 24 V 0.1 V; with 10 kOhm load 20 V DC	 5 V DC to 30 V DC 5 V AC to 250 V AC
Output current • for signal "1" rated value • for signal "0" residual current, max.	 0.5 A 10 µA	 2 A
Output delay with resistive load • "0" to "1", max. • "1" to "0", max.	 50 µs 200 µs	 10 ms 10 ms
Total current of the outputs (per group) • horizontal installation - up to 50 °C, max.	 4 A; Current per mass	 10 A; Current per mass
Relay outputs • Number of relay outputs • Rated supply voltage of relay coil L+ (DC) • Number of operating cycles, max.		 8 24 V mechanically 10 million, at rated load voltage 100 000
Switching capacity of contacts • with inductive load, max. • on lamp load, max. • with resistive load, max.	 0.5 A 5 W 0.5 A	 2 A 30 W with DC, 200 W with AC 2 A

SIPLUS S7-1200 SM 1222 RAIL

Article number	**6AG2222-1BF32-1XB0** SIPLUS S7-1200 SM 1222 8DQ RAIL	**6AG2222-1HF32-1XB0** SIPLUS S7-1200 SM 1222 8DQ RLY RAIL
Interrupts/diagnostics/status information		
Diagnostics function	Yes	
Alarms		
• Diagnostic alarm	Yes	Yes
Diagnoses		
• Monitoring the supply voltage	Yes	
Diagnostics indication LED		
• for status of the outputs	Yes	Yes
• for maintenance	Yes	
Potential separation		
Potential separation digital outputs		
• between the channels		Relays
• between the channels, in groups of	1	2
• between the channels and backplane bus	500 V AC	1 500 V AC for 1 minute
Degree and class of protection		
IP degree of protection	IP20	IP20
Standards, approvals, certificates		
Railway application		
• EN 50121-3-2	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support
Ambient conditions		
Ambient temperature during operation		
• min.	-25 °C; = Tmin (incl. condensation/frost)	-25 °C; = Tmin (incl. condensation/frost)
• max.	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155)	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155)
Altitude during operation relating to sea level		
• Installation altitude above sea level, max.	2 000 m	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... + 2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... + 2 000 m)
Relative humidity		
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Coolants and lubricants		
• Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air
Use in stationary industrial systems		
• to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
• to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
• to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *
Use on land craft, rail vehicles and special-purpose vehicles		
• to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
• to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
• to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *
Usage in industrial process technology		
• Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)
• Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
Remark		
• Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!

Article number	**6AG2222-1BF32-1XB0** SIPLUS S7-1200 SM 1222 8DQ RAIL	**6AG2222-1HF32-1XB0** SIPLUS S7-1200 SM 1222 8DQ RLY RAIL
Conformal coating		
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A
Connection method / header		
Required front connector	Yes	Yes
Mechanics/material		
Enclosure material (front)		
• Plastic	Yes	Yes
Dimensions		
Width	45 mm	45 mm
Height	100 mm	100 mm
Depth	75 mm	75 mm
Weights		
Weight, approx.	180 g	190 g
Other		
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

Version	Article No.
SIPLUS signal module SM 1222 RAIL digital output module	
Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic	
8 outputs, 24 V DC; 0.5 A, 5 W, isolated	
• For areas subject to exceptional medial exposure (conformal coating); ambient temperature range -25 ... +70 °C	**6AG2222-1BF32-1XB0**
8 outputs, 5 ... 30 V DC / 5 ... 250 V AC, relay 2 A, 30 W DC / 200 W AC	
• For areas subject to exceptional medial exposure (conformal coating); ambient temperature -25 ... +60 °C	**6AG2222-1HF32-1XB0**

*** You can order this quantity or a multiple thereof.**

SIPLUS S7-1200 SM 1223 RAIL

Overview

- Digital inputs and outputs as supplement to the integral I/O of the CPUs
- Approved in accordance with the railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic
- For flexible adaptation of the controller to the corresponding task
- For subsequent expansion of the system with additional inputs and outputs

Application

Digital input/output modules permit:

- Connection of the controller to digital signals of the process
- Output of digital signals from the controller to the process.

This provides users with the following advantages:

- Optimum adaptation:
  with signal modules which can be mixed as desired, users can adapt their controllers exactly to the relevant task. This avoids superfluous investments. Modules with 8 and 16 input/output channels are available.
- Flexibility:
  if the task is expanded subsequently, the controller can be upgraded. Updating of the user program is extremely simple.

Function

The SM 1223 digital input/output signal modules convert

- the level of the external digital signals from the process into the internal signal level of the S7-1200 and
- the internal signal level of the S7-1200 into the external signal level required by the process.

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Technical specifications

Article number	**6AG2223-1BH32-1XB0** SIPLUS S7-1200 SM 1223 8DI/8DQ RAIL	**6AG2223-1PL32-1XB0** SIPLUS S7-1200 SM 1223 16DI/16DQ RAIL
General information		
Product type designation	SM 1223, DI 8x24 V DC, DQ 8x24 V DC	SM 1223, DI 16x24 V DC, DQ 16x relay
Supply voltage		
Rated value (DC)	24 V	24 V
Input current		
From backplane bus 5 V DC, max.	145 mA	180 mA
Digital inputs • from load voltage L+ (without load), max.	4 mA; per channel	4 mA/input 11 mA/relay
Output voltage / header		
Supply voltage of the transmitters / header • product function / supply voltage for transmitters	Yes	Yes
Digital inputs		
Number of digital inputs • in groups of	8 2	16 2
Input characteristic curve in accordance with IEC 61131, type 1	Yes	Yes
Number of simultaneously controllable inputs • all mounting positions - up to 40 °C, max. • horizontal installation - up to 40 °C, max. - up to 50 °C, max. • vertical installation - up to 40 °C, max.	 8 8 8 8	 16 16 16 16
Input voltage • Type of input voltage • Rated value (DC) • for signal "0" • for signal "1"	 DC 24 V 5 V DC at 1 mA 15 V DC at 2.5 mA	 DC 24 V 5 V DC at 1 mA 15 V DC at 2.5 mA
Input current • for signal "0", max. (permissible quiescent current) • for signal "1", min. • for signal "1", typ.	 1 mA 2.5 mA 4 mA	 1 mA 2.5 mA 4 mA
Input delay (for rated value of input voltage) • for standard inputs - parameterizable • for interrupt inputs - parameterizable	 Yes; 0.2 ms, 0.4 ms, 0.8 ms, 1.6 ms, 3.2 ms, 6.4 ms and 12.8 ms, selectable in groups of four Yes	 Yes; 0.2 ms, 0.4 ms, 0.8 ms, 1.6 ms, 3.2 ms, 6.4 ms and 12.8 ms, selectable in groups of four Yes

Article number	**6AG2223-1BH32-1XB0** SIPLUS S7-1200 SM 1223 8DI/8DQ RAIL	**6AG2223-1PL32-1XB0** SIPLUS S7-1200 SM 1223 16DI/16DQ RAIL
Digital outputs		
Number of digital outputs	8	16
• in groups of	1	4
Short-circuit protection	No; to be provided externally	No; to be provided externally
Limitation of inductive shutdown voltage to	L+ (-48 V)	
Switching capacity of the outputs		
• with resistive load, max.	0.5 A	2 A
• on lamp load, max.	5 W	30 W with DC, 200 W with AC
Output voltage		
• Rated value (DC)	24 V	5 V DC to 30 V DC
• Rated value (AC)		5 V AC to 250 V AC
• for signal "0", max.	0.1 V; with 10 kOhm load	
• for signal "1", min.	20 V DC	
Output current		
• for signal "1" rated value	0.5 A	2 A
• for signal "0" residual current, max.	10 µA	
Output delay with resistive load		
• "0" to "1", max.	50 µs	10 ms
• "1" to "0", max.	200 µs	10 ms
Total current of the outputs (per group)		
• horizontal installation		
- up to 50 °C, max.	4 A; Current per mass	8 A; Current per mass
Relay outputs		
• Number of relay outputs		16
• Rated supply voltage of relay coil L+ (DC)		24 V
• Number of operating cycles, max.		mechanically 10 million, at rated load voltage 100 000
Switching capacity of contacts		
• with inductive load, max.	0.5 A	2 A
• on lamp load, max.	5 W	30 W with DC, 200 W with AC
• with resistive load, max.	0.5 A	2 A
Interrupts/diagnostics/status information		
Alarms	Yes	Yes
Diagnostics function	Yes	Yes
Alarms		
• Diagnostic alarm	Yes	Yes
Diagnoses		
• Monitoring the supply voltage	Yes	Yes
Diagnostics indication LED		
• for status of the inputs	Yes	Yes
• for status of the outputs	Yes	Yes
• for maintenance	Yes	Yes
Potential separation		
Potential separation digital inputs		
• between the channels, in groups of	2	2
Potential separation digital outputs		
• between the channels		Relays
• between the channels, in groups of	1	4
• between the channels and backplane bus	500 V AC	1 500 V AC for 1 minute
Degree and class of protection		
IP degree of protection	IP20	IP20
Standards, approvals, certificates		
Railway application		
• EN 50121-3-2	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support

SIPLUS S7-1200 SM 1223 RAIL

Article number	**6AG2223-1BH32-1XB0** SIPLUS S7-1200 SM 1223 8DI/8DQ RAIL	**6AG2223-1PL32-1XB0** SIPLUS S7-1200 SM 1223 16DI/16DQ RAIL
Ambient conditions		
Ambient temperature during operation		
• min.	-25 °C; = Tmin (incl. condensation/frost)	-25 °C; = Tmin (incl. condensation/frost)
• max.	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155)	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155); number of simultaneously switched on outputs: 8 (no adjacent points) at 60 °C horizontal or 50 °C vertical, 16 at 55 °C horizontal or 45 °C vertical
Altitude during operation relating to sea level		
• Installation altitude above sea level, max.	2 000 m	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity		
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance		
• Coolants and lubricants		
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems		
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *
• Use on land craft, rail vehicles and special-purpose vehicles		
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *
• Usage in industrial process technology		
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark		
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating		
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A
Connection method / header		
Required front connector	Yes	Yes
Mechanics / material		
Enclosure material (front)		
• Plastic	Yes	Yes
Dimensions		
Width	45 mm	70 mm
Height	100 mm	100 mm
Depth	75 mm	75 mm
Weights		
Weight, approx.	210 g	350 g
Other		
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

	Version	Article No.
	SIPLUS SM 1223 RAIL digital input/output signal module Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic 8 inputs, 24 V DC, IEC type 1 current sinking; 8 transistor outputs, 24 V DC, 0.5 A, 5 W	
	• For areas with extreme exposure to environmental substances (conformal coating); ambient temperature -25 ... +70 °C	**6AG2223-1BH32-1XB0**
	16 inputs, 24 V DC, IEC type 1 current sinking; 16 relay outputs, 5 ... 30 V DC / 5 ... 250 V AC, 2 A, 30 W DC / 200 W AC	
	• For areas with extreme exposure to environmental substances (conformal coating); ambient temperature -25 ... +70 °C	**6AG2223-1PL32-1XB0**

*** You can order this quantity or a multiple thereof.**

SIPLUS S7-1200 SB 1223 RAIL

Overview

- Digital inputs and outputs as supplement to the integral I/O of the SIPLUS S7-1200-CPUs
- Approved in accordance with the railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic
- Can be plugged directly into the CPU

Application

The SB 1223 digital input/output signal board permits:

- Connection of the controller to digital signals of the process
- Output of digital signals from the controller to the process.

Design

The signal boards are plugged directly into the receptacle on the front of each S7-1200 CPU.

- Mounting:
  Signal boards are plugged directly into the SIMATIC S7-1200 CPU and are thus electrically and mechanically connected to the CPU
- The CPU mounting dimensions remain unchanged
- All signal boards are easy to replace thanks to removable connecting terminals ("independent wiring")

Function

The SB 1223 digital input/output signal board converts

- the level of the external digital signals from the process into the internal signal level of the S7-1200 and
- the internal signal level of the S7-1200 into the external signal level required by the process

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Technical specifications

Article number	**6AG2223-0BD30-1XB0** SIPLUS S7-1200 SB 1223 2DI/2DQ RAIL
General information	
Product type designation	SB 1223, DI 2x24 V DC/DQ 2x24 V DC
Engineering with • STEP 7 TIA Portal configurable/integrated from version	 see entry ID: 109746275
Input current	
From backplane bus 5 V DC, typ.	50 mA
Output voltage / header	
supply voltage of the transmitters / header • supply current from supply voltage for transmitter maximum	 4 mA; per channel
Digital inputs	
Number of digital inputs • in groups of	2; Current-sinking 1
Input characteristic curve in accordance with IEC 61131, type 1	Yes
Number of simultaneously controllable inputs • all mounting positions - up to 40 °C, max.	 2
Input voltage • Type of input voltage • Rated value (DC) • for signal "0" • for signal "1"	 DC 24 V 0 to 5 V +15 to +30 V
Input current • for signal "0", max. (permissible quiescent current) • for signal "1", typ.	 1 mA 0.5 A
Input delay (for rated value of input voltage) • for standard inputs - parameterizable • for interrupt inputs - parameterizable • for technological functions - parameterizable	 Yes; 0.2 ms, 0.4 ms, 0.8 ms, 1.6 ms, 3.2 ms, 6.4 ms and 12.8 ms, selectable in groups of four Yes Yes
Digital outputs	
Number of digital outputs • in groups of	2; MOSFET, solid-state (current-sinking/current-sourcing) 1
Short-circuit protection	No
Switching capacity of the outputs • with resistive load, max. • on lamp load, max.	 0.5 A 5 W
Load resistance range • upper limit	 0.6 Ω

Article number	**6AG2223-0BD30-1XB0** SIPLUS S7-1200 SB 1223 2DI/2DQ RAIL
Output voltage	
• Rated value (DC)	24 V
• for signal "0", max.	0.1 V; with 10 kOhm load
• for signal "1", min.	20 V
Output current	
• for signal "1" permissible range, max.	0.5 A
• for signal "0" residual current, max.	10 µA
Interrupts/diagnostics/status information	
Alarms	Yes
Diagnostics function	Yes
Diagnostics indication LED	
• for status of the inputs	Yes
• for status of the outputs	Yes
Standards, approvals, certificates	
Railway application	
• EN 50121-3-2	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support
Ambient conditions	
Ambient temperature during operation	
• min.	-25 °C; = Tmin (incl. condensation/frost)
• max.	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155)
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity	
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance	
• Coolants and lubricants	
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems	
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *
• Use on land craft, rail vehicles and special-purpose vehicles	
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *
• Usage in industrial process technology	
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark	
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating	
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A
Mechanics/material	
Enclosure material (front)	
• Plastic	Yes
Dimensions	
Width	38 mm
Height	62 mm
Depth	21 mm
Weights	
Weight, approx.	40 g
Other	
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

Version	Article No.
SIPLUS SB 1223 RAIL digital input/output signal board Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic 2 inputs, 24 V DC, IEC type 1 current sinking; 2 transistor outputs 24 V DC, 0.5 A, 5 W; can be used as HSC at up to 30 kHz For areas with extreme exposure to environmental substances (conformal coating); ambient temperature -25 ... +70 °C	**6AG2223-0BD30-1XB0**

*** You can order this quantity or a multiple thereof.**

Overview

- For the convenient recording of temperatures with great accuracy
- Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic
- 4 inputs
- Most popular resistance temperature detectors can be used
- Can easily be retrofitted to existing plant

Application

The SM 1231 RTD modules enable temperatures to be measured with high precision using established resistance temperature detectors. They can be used with CPU 1211, 1212 and 1214.

Design

The SM 1231 RTD modules exhibit the same structural features as the other modules of the S7-1200 series:

- Mounting on a DIN rail:
  The modules are snapped onto the rail just to the right of the CPU and connected to one another and with the CPU 12xx by means of the integral backplane bus.
- Direct mounting:
  Drilled holes permit the module to be bolted directly to walls. This type of mounting is recommended for applications subject to strong vibrations.
- Resistance temperature detectors:
  The most popular resistance temperature detectors can be used: Pt 100, Pt 200, Pt 500, Pt 1000, Pt 10000, Ni 100, Ni 120, Ni 1000, Cu 10, FS 150, FS 30, FS 600. They are connected directly to the module without amplifiers and all RTDs must be of the same type. The detectors can be connected with 2, 3 or 4 cables.
- Mounting location:
  For maximum possible measurement and repeat accuracy, the RTD module should be mounted in locations with low temperature variations.
- DIP switches:
  Required settings, e.g. selection of the connected RTDs, should be made using the DIP switches on the module.

Function

- Different measurement ranges:
  Resistance temperature detectors of types Pt 100, Pt 200, Pt 500, Pt 1000, Pt 10000, Ni 100, Ni 120, Ni 1000, Cu 10, FS 150, FS 30, FS 600.
- Temperature scaling:
  The measured temperature can be shown in °C or °F.

Technical specifications

Article number	**6AG2231-5PD32-1XB0** SIPLUS S7-1200 SM 1231 RTD RAIL
General information	
Product type designation	SM 1231, AI 4x16 bit RTD
Supply voltage	
Rated value (DC)	24 V
Input current	
Current consumption, typ.	40 mA
From backplane bus 5 V DC, typ.	80 mA
Analog inputs	
Number of analog inputs	4; Resistance thermometer
permissible input voltage for voltage input (destruction limit), max.	±35 V
Technical unit for temperature measurement adjustable	Degrees Celsius/degrees Fahrenheit
Input ranges • Voltage • Current • Thermocouple • Resistance thermometer • Resistance	 No No No Yes; Resistance-type transmitter: Pt10, Pt50, Pt100, Pt200, Pt500, Pt1000, Ni100, Ni120, Ni200, Ni500, Ni1000, Cu10, Cu50, Cu100, LG-Ni1000 Yes; 150 Ω, 300 Ω, 600 Ω
Input ranges (rated values), resistance thermometer • Cu 10 • Ni 100 • Ni 1000 • LG-Ni 1000 • Ni 120 • Ni 200 • Ni 500 • Pt 100 • Pt 1000 • Pt 200 • Pt 500	 Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes
Input ranges (rated values), resistors • 0 to 150 ohms • 0 to 300 ohms • 0 to 600 ohms	 Yes Yes Yes
Thermocouple (TC) • Temperature compensation - parameterizable	 No
Analog value generation for the inputs	
Integration and conversion time/resolution per channel • Resolution with overrange (bit including sign), max.	 15 bit; + sign

SIPLUS extreme S7-1200 SM 1231 RTD RAIL

Article number	**6AG2231-5PD32-1XB0**
	SIPLUS S7-1200 SM 1231 RTD RAIL
• Integration time, parameterizable	No
• Interference voltage suppression for interference frequency f1 in Hz	85 dB at 50 / 60 / 400 Hz
Errors/accuracies	
Temperature error (relative to input range), (+/-)	25 °C ±0.1%, to 55 °C ±0.2% total measurement range
Repeat accuracy in steady state at 25 °C (relative to output range), (+/-)	0.05 %
Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency	
• Common mode interference, min.	120 dB
Interrupts/diagnostics/status information	
Alarms	Yes
Diagnostics function	Yes; Can be read out
Alarms	
• Diagnostic alarm	Yes
Diagnoses	
• Monitoring the supply voltage	Yes
• Wire-break	Yes
Diagnostics indication LED	
• for status of the inputs	Yes
• for maintenance	Yes
Degree and class of protection	
IP degree of protection	IP20
Standards, approvals, certificates	
CE mark	Yes
Railway application	
• EN 50121-3-2	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support
Ambient conditions	
Ambient temperature during operation	
• min.	-25 °C; = Tmin (incl. condensation/frost)
• max.	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155)
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity	
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance	
• Coolants and lubricants	
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems	
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *
• Use on land craft, rail vehicles and special-purpose vehicles	
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *
• Usage in industrial process technology	
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark	
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating	
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A

Article number	**6AG2231-5PD32-1XB0** SIPLUS S7-1200 SM 1231 RTD RAIL
Connection method/header	
Required front connector	Yes
Mechanics/material	
Enclosure material (front) • Plastic	Yes
Dimensions	
Width	45 mm
Height	100 mm
Depth	75 mm
Weights	
Weight, approx.	220 g
Other	
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

Version	Article No.
SIPLUS RTD signal module SM 1231 RAIL Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic 4 inputs for resistance temperature detectors Pt10/50/100/200/500/1000, Ni100/120/200/500/1000, Cu10/50/100, LG-Ni1000; resistance 150/300/600 Ohm, resolution 15 bits + sign For areas subject to exceptional medial exposure (conformal coating); ambient temperature range -25 ... +60 °C	**6AG2231-5PD32-1XB0**

*** You can order this quantity or a multiple thereof.**

SIPLUS extreme S7-1200 SM 1232 RAIL

Overview

- Analog outputs for SIPLUS S7-1200
- Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic
- With extremely short conversion times
- For connecting analog actuators without additional amplifiers
- Even solves more complex automation tasks

Application

SM 1232 analog output signal modules permit the use of analog outputs.

This provides users with the following advantages:

- Optimal adaptation:
  With analog signal modules, users can optimally adapt their controllers even to more complex tasks.
- Direct connection of actuators:
  up to 14 bit resolution permit the connection of actuators without an additional amplifier.
- Flexibility:
  if the task is expanded subsequently, the controller can be upgraded. Updating of the user program is extremely simple.

Design

The signal modules have the same design features as the basic devices.

- Installation on DIN rails:
  The modules are snapped onto the rail next to the CPU on the right and are electrically and mechanically connected to each other and to the CPU by the integral slide mechanism.
- Direct installation:
  Horizontal or vertical mounting on DIN rail or direct mounting in the cabinet using integral lugs.

Function

SM 1232 analog output signal modules convert digital signals of the SIMATIC S7-1200 into signals for controlling the respective process.

Technical specifications

Article number	**6AG2232-4HD32-1XB0** SIPLUS S7-1200 SM 1232 4AQ RAIL
General information	
Product type designation	SM 1232 AQ 4x 14 bit
Supply voltage	
Rated value (DC)	24 V
Input current	
Current consumption, typ.	45 mA
From backplane bus 5 V DC, typ.	80 mA
Analog outputs	
Number of analog outputs	4; Current or voltage
Output ranges, voltage • -10 V to +10 V	 Yes
Output ranges, current • 0 to 20 mA	 Yes
Load impedance (in rated range of output) • with voltage outputs, min. • with current outputs, max.	 1 000 Ω 600 Ω
Analog value generation for the outputs	
Integration and conversion time/resolution per channel • Resolution with overrange (bit including sign), max.	 14 bit; Voltage: 14 bit; Current : 13 bit
Errors/accuracies	
Temperature error (relative to output range), (+/-)	25 °C ±0.3%, to 55 °C ±0.6% total measurement range
Basic error limit (operational limit at 25 °C) • Voltage, relative to output range, (+/-) • Current, relative to output range, (+/-)	 0.3 % 0.3 %
Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency • Common mode voltage, max.	 12 V

Article number	**6AG2232-4HD32-1XB0** SIPLUS S7-1200 SM 1232 4AQ RAIL
Interrupts/diagnostics/status information	
Alarms	Yes
Diagnostics function	Yes
Alarms	
• Diagnostic alarm	Yes
Diagnoses	
• Monitoring the supply voltage	Yes
• Wire-break	Yes
• Short-circuit	Yes
Diagnostics indication LED	
• for status of the outputs	Yes
• for maintenance	Yes
Degree and class of protection	
IP degree of protection	IP20
Standards, approvals, certificates	
CE mark	Yes
Railway application	
• EN 50121-3-2	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support
Ambient conditions	
Ambient temperature during operation	
• min.	-25 °C; = Tmin (incl. condensation/frost)
• max.	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155)
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity	
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance	
• Coolants and lubricants	
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems	
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *
• Use on land craft, rail vehicles and special-purpose vehicles	
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *
• Usage in industrial process technology	
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark	
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating	
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A

SIPLUS extreme S7-1200 SM 1232 RAIL

Article number	**6AG2232-4HD32-1XB0** SIPLUS S7-1200 SM 1232 4AQ RAIL
Connection method/header	
Required front connector	Yes
Mechanics/material	
Enclosure material (front) • Plastic	Yes
Dimensions	
Width	45 mm
Height	100 mm
Depth	75 mm
Weights	
Weight, approx.	180 g
Other	
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

Version	Article No.
Analog output SIPLUS signal module SM 1232 RAIL Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic 4 analog outputs, ±10 V with 14 bits or 0 ... 20 mA with 13 bits For areas subject to exceptional medial exposure (conformal coating); ambient temperature range -25 ... +60 °C	**6AG2232-4HD32-1XB0**

* You can order this quantity or a multiple thereof.

Overview

- Analog inputs and outputs for SIPLUS S7-1200
- Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic
- With extremely short conversion times
- For connecting analog actuators and sensors without additional amplifiers
- Even solves more complex automation tasks
- From +60 °C to +70 °C, max. 50% of the inputs and outputs can be controlled simultaneously

Application

SM 1234 analog input/outputs permit the use of analog inputs/outputs.

This provides users with the following advantages:

- Optimal adaptation:
  With analog and digital expansion modules, users can optimally match their controllers even to more complex tasks.
- Direct connection of sensors and actuators:
  up to 14 bit resolution plus sign and different input/output ranges permit the connection of sensors and actuators without an additional amplifier.
- Flexibility:
  if the task is expanded subsequently, the controller can be upgraded. Updating of the user program is extremely simple.

Design

The SM 1234 analog input/output signal modules have the same design features as the basic devices.

- Installation on DIN rails:
  The modules are snapped onto the rail next to the CPU on the right and are electrically and mechanically connected to each other and to the CPU by the integral slide mechanism.
- Direct installation:
  Horizontal or vertical mounting on DIN rail or direct mounting in the cabinet using integral lugs.

Function

The SM 1234 analog input/output signal modules

- convert analog signals from the process into digital signals for internal processing by the SIMATIC S7-1200.
- convert digital signals of the SIMATIC S7-1200 into signals for controlling the respective process.

Technical specifications

Article number	**6AG2234-4HE32-1XB1** SIPLUS S7-1200 SM 1234 4AI/2AQ RAIL
General information	
Product type designation	SM 1234, AI 4x13 bit/AQ 2x14 bit
Supply voltage	
Rated value (DC)	24 V
Input current	
Current consumption, typ.	60 mA
From backplane bus 5 V DC, typ.	80 mA
Analog inputs	
Number of analog inputs	4; Current or voltage differential inputs
Permissible input voltage for voltage input (destruction limit), max.	35 V
Permissible input current for current input (destruction limit), max.	40 mA
Cycle time (all channels) max.	625 µs
Input ranges • Voltage • Current	 Yes; ±10V, ±5V, ±2.5V Yes; 4 to 20 mA, 0 to 20 mA
Input ranges (rated values), voltages • -10 V to +10 V • -2.5 V to +2.5 V • -5 V to +5 V	 Yes Yes Yes
Input ranges (rated values), currents • 0 to 20 mA • 4 mA to 20 mA	 Yes Yes
Analog outputs	
Number of analog outputs	2; Current or voltage
Output ranges, voltage • -10 V to +10 V	 Yes
Output ranges, current • 0 to 20 mA • 4 mA to 20 mA	 Yes Yes
Load impedance (in rated range of output) • with voltage outputs, min. • with current outputs, max.	 1 000 Ω 600 Ω

SIPLUS extreme S7-1200 SM 1234 RAIL

Article number	**6AG2234-4HE32-1XB1** SIPLUS S7-1200 SM 1234 4AI/2AQ RAIL
Analog value generation for the inputs	
Integration and conversion time/resolution per channel	
• Resolution with overrange (bit including sign), max.	12 bit; + sign
• Integration time, parameterizable	Yes
• Interference voltage suppression for interference frequency f1 in Hz	40 dB, DC to 60 V for interference frequency 50 / 60 Hz
Smoothing of measured values	
• parameterizable	Yes
Analog value generation for the outputs	
Integration and conversion time/resolution per channel	
• Resolution with overrange (bit including sign), max.	14 bit; Voltage: 14 bit; Current : 13 bit
Errors/accuracies	
Temperature error (relative to input range), (+/-)	25 °C ±0.1%, to 55 °C ±0.2% total measurement range
Temperature error (relative to output range), (+/-)	25 °C ±0.3%, to 55 °C ±0.6% total measurement range
Basic error limit (operational limit at 25 °C)	
• Voltage, relative to input range, (+/-)	0.1 %
• Current, relative to input range, (+/-)	0.1 %
• Voltage, relative to output range, (+/-)	0.3 %
• Current, relative to output range, (+/-)	0.3 %
Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency	
• Common mode voltage, max.	12 V
Interrupts/diagnostics/status information	
Alarms	Yes
Diagnostics function	Yes
Alarms	
• Diagnostic alarm	Yes
Diagnoses	
• Monitoring the supply voltage	Yes
• Wire-break	Yes
• Short-circuit	Yes
Diagnostics indication LED	
• for status of the inputs	Yes
• for status of the outputs	Yes
• for maintenance	Yes
Potential separation	
Potential separation analog outputs	
• between the channels and the power supply of the electronics	No
Standards, approvals, certificates	
CE mark	Yes
Railway application	
• EN 50121-3-2	Yes; EMC for rail vehicles - 24 V supply of assembly: Cable length <3 m or with upstream filter for supply cable
• EN 50121-4	Yes; EMC for signal and telecommunications systems - 24 V supply of the assembly: with upstream filter for supply cable
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support
Ambient conditions	
Ambient temperature during operation	
• min.	-25 °C; = Tmin (incl. condensation/frost)
• max.	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155)
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity	
• With condensation, tested in accordance with _IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation

Article number	**6AG2234-4HE32-1XB1** SIPLUS S7-1200 SM 1234 4AI/2AQ RAIL
Resistance	
• Coolants and lubricants	
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems	
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *
• Use on land craft, rail vehicles and special-purpose vehicles	
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *
• Usage in industrial process technology	
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark	
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating	
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A
Connection method / header	
Required front connector	Yes
Mechanics/material	
Enclosure material (front)	
• Plastic	Yes
Dimensions	
Width	45 mm
Height	100 mm
Depth	75 mm
Weights	
Weight, approx.	220 g
Other	
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

Version	Article No.
Analog input/output SIPLUS signal module SM 1234 RAIL Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic Ambient temperature range -25 ... +70 °C incl. +15 °C/K temperature rise for 10 minutes 4 analog inputs, ±10 V, ±5 V, ±2.5 V, or 0 ... 20 mA, 12 bits + sign; 2 analog outputs, ±10 V with 14 bits or 0 ... 20 mA with 13 bits	**6AG2234-4HE32-1XB1**

*** You can order this quantity or a multiple thereof.**

SIPLUS S7-1200 CM 1241 RAIL

Overview

- For fast, high-performance serial data exchange via point-to-point connection
- Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic
- Implemented protocols: ASCII, USS drive protocol, Modbus RTU
- Additional protocols can be loaded later
- Simple parameterization with STEP 7 Basic

Application

The CM 1241 communications modules are used for quick, high-performance serial data exchange via point-to-point connection.

Point-to-point connection is possible to, e.g.:

- SIMATIC S7 automation systems and the systems of many other manufacturers
- Printers
- Robot controls
- Modems
- Scanners
- Bar code readers, etc.

Design

The CM 1241 communications modules have the same design features as the basic devices.

- Installation on DIN rails:
  The modules are snapped onto the rail next to the CPU on the right and are electrically and mechanically connected to each other and to the CPU by the integral slide mechanism.
- Direct installation:
  Horizontal or vertical mounting on DIN rail or direct mounting in the cabinet using integral lugs.

The communications modules are equipped with the following:

- Status LEDs for indicating “Send”, “Receive” and “Error”
- Communication interface:
  available for the RS232 or RS422/485 physical transmission properties

Function

The following standard protocols are available on the CM 1241 communications modules:

- ASCII:
  For interfacing to third-party systems with simple transmission protocols, e.g. protocols with start and end characters or with block check characters. The interface handshake signals can be called and controlled via the user program.
- Modbus:
  For communication according to the Modbus protocol with RTU format:
  - Modbus Master:
    Master-slave interfacing with SIMATIC S7 as master.
  - Modbus slave:
    master-slave interfacing with SIMATIC S7 as slave; message frame traffic from slave to slave not possible.
- USS drive protocol:
  instructions for connection of USS protocol drives are especially supported. In this case, drives exchange data over RS485. It is then possible to control these drives, and to read and write parameters.

Further drivers for downloading are also available.

Parameterization

Parameterization of the CM 1241 communications module is particularly user-friendly and simple with STEP 7 Basic:

- The user assigns the module characteristics via a parameterization environment integrated in STEP 7 Basic, e.g.:
  - The implemented protocol drivers that are used.
  - The driver-specific characteristics that are used.

Technical specifications

Article number	**6AG2241-1AH32-1XB0** SIPLUS S7-1200 CM1241 RS232 RAIL	**6AG2241-1CH32-1XB0** SIPLUS S7-1200 CM1241 RS422/485 RAIL
General information		
Product type designation	CM 1241 RS 232	CM 1241 RS 422 / 485
Supply voltage		
Rated value (DC)	24 V	24 V
Input current		
Current consumption, max.	200 mA; From backplane bus 5 V DC	220 mA; From backplane bus 5 V DC
Interfaces		
Interfaces/bus type	RS 232C (V.24)	RS 422 / 485 (X.27)
Number of interfaces	1	1
Point-to-point connection • Cable length, max.	 10 m	 1 000 m
Integrated protocol driver • Freeport • ASCII • Modbus RTU master • MODBUS RTU slave • USS	 Yes Yes; Available as library function Yes Yes	 Yes Yes; Available as library function Yes Yes Yes; Available as library function

Article number	**6AG2241-1AH32-1XB0** SIPLUS S7-1200 CM1241 RS232 RAIL	**6AG2241-1CH32-1XB0** SIPLUS S7-1200 CM1241 RS422/485 RAIL
Protocols		
Integrated protocols		
• Freeport		
- Bits per character	7 or 8	7 or 8
- Number of stop bits	1 (Standard), 2	1 (Standard), 2
- Parity	No parity (standard); even, uneven, mark (parity bit always 1); space (parity bit always 0)	No parity (standard); even, uneven, mark (parity bit always 1); space (parity bit always 0)
• 3964 (R)		
- Bits per character	7 or 8	7 or 8
- Number of stop bits	1 (Standard), 2	1 (Standard), 2
- Parity	No parity (standard); even, uneven, mark (parity bit always 1); space (parity bit always 0)	No parity (standard); even, uneven, mark (parity bit always 1); space (parity bit always 0)
• Modbus RTU master		
- Address area	1 through 49 999 (Standard Modbus addressing)	1 through 49 999 (Standard Modbus addressing)
- Number of slaves, max.	247; slave numbers 1 through 247, per MODBUS network segment maximum 32 devices, additional repeaters needed to expand the network to maximum configuration	247; slave numbers 1 through 247, per MODBUS network segment maximum 32 devices, additional repeaters needed to expand the network to maximum configuration
• MODBUS RTU slave		
- Address area	1 through 49 999 (Standard Modbus addressing)	1 through 49 999 (Standard Modbus addressing)
Interrupts/diagnostics/status information		
Diagnostics function	Yes	Yes
Diagnostics indication LED		
• for status of the outputs	Yes	Yes
Degree and class of protection		
IP degree of protection	IP20	IP20
Standards, approvals, certificates		
Railway application		
• EN 50121-3-2	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support
Ambient conditions		
Ambient temperature during operation		
• min.	-25 °C; = Tmin (incl. condensation/frost)	-25 °C; = Tmin (incl. condensation/frost)
• max.	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155)	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155)
Altitude during operation relating to sea level		
• Installation altitude above sea level, max.	2 000 m	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity		
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance		
• Coolants and lubricants		
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems		
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *
• Use on land craft, rail vehicles and special-purpose vehicles		
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *

SIPLUS S7-1200 CM 1241 RAIL

Article number	**6AG2241-1AH32-1XB0** SIPLUS S7-1200 CM1241 RS232 RAIL	**6AG2241-1CH32-1XB0** SIPLUS S7-1200 CM1241 RS422/485 RAIL
• Usage in industrial process technology - Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark - Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating		
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A
Dimensions		
Width	30 mm	30 mm
Height	100 mm	100 mm
Depth	75 mm	75 mm
Weights		
Weight, approx.	150 g	155 g
Other		
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

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Selection and ordering data

Version	Article No.
SIPLUS S7-1200 CM1241 RS232 T1 RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic	**6AG2241-1AH32-1XB0**
SIPLUS S7-1200 CM1241 RS422/485 T1 RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic	**6AG2241-1CH32-1XB0**

*** You can order this quantity or a multiple thereof.**

Overview

- For fast, high-performance serial data exchange via point-to-point connection
- Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic
- Implemented protocols: ASCII, USS drive protocol, Modbus RTU
- Additional protocols can be loaded later
- Simple parameterization with STEP 7 Basic
- Can be plugged directly into the CPU

Application

The Communication Board CB 1241 RS 485 is used for fast, high-performance serial data exchange via point-to-point connections.

Point-to-point coupling is possible, for example, to:

- SIMATIC S7 automation systems and systems of many other manufacturers
- Printers
- Robot controls
- Modems
- Scanners
- Bar code readers, etc.

The Communication Board CB 1241 RS 485 can be plugged directly into all SIMATIC S7-1200 CPUs.

This provides users with the following advantages:

- Optimal adaptation:
  With communication boards, users can optimally adapt their controllers even to more complex tasks.
- Flexibility:
  If the task is expanded subsequently, the controller can be upgraded. Updating of the user program is extremely simple.
- Use where space is limited:
  The communication boards are directly plugged into the CPU, enabling the controller to be expanded without taking up any additional space.

Design

The communication boards are plugged straight into the holder on the front of the S7-1200 CPU.

- Installation:
  Communication boards are plugged directly into the SIPLUS extreme S7-1200 RAIL-CPU, and are thus connected electrically and mechanically with the CPU.
- The installation dimensions of the CPU remain unchanged.
- Replacement of all communication boards is facilitated by removable terminals ("permanent wiring").

Function

On the Communication Board CB 1241 RS 485, the following standard protocols are available:

- ASCII:
  For interfacing to third-party systems with simple transmission protocols, e.g. protocols with start and end characters or with block check characters. The interface handshake signals can be queried and controlled via the user program.
- Modbus:
  For communication according to the Modbus protocol with RTU format:
  - Modbus Master:
    Master-slave interfacing with SIMATIC S7 as master.
  - Modbus slave:
    Master-slave interfacing with SIMATIC S7 as slave; message frame traffic from slave to slave not possible.
- USS drive protocol:
  Instructions for connection of USS protocol drives are specifically supported. In this case, drives exchange data over RS485. It is then possible to control these drives, and to read and write parameters.

Additional drivers can also be downloaded.

Parameterization

The parameterization of the Communication Board CB 1241 is particularly user-friendly and simple with STEP 7 Basic:

The user specifies the properties of the module by means of a parameterization environment integrated into STEP 7 Basic.

SIPLUS S7-1200 CB 1241 RS485 RAIL

Technical specifications

Article number	**6AG2241-1CH30-1XB0** SIPLUS S7-1200 CB 1241 RS485 T1 RAIL
General information	
Product type designation	CB 1241 RS 485
Input current	
from backplane bus 5 V DC, typ.	50 mA
Interfaces	
Point-to-point connection	
• Cable length, max.	1 000 m
Integrated protocol driver	
• Freeport	Yes
• ASCII	Yes; Available as library function
• Modbus RTU master	Yes
• MODBUS RTU slave	Yes
• USS	Yes; Available as library function
Protocols	
Integrated protocols	
• Freeport	
- Telegram length, max.	1 kbyte
- Bits per character	7 or 8
- Number of stop bits	1 (Standard), 2
- Parity	No parity (standard); even, uneven, mark (parity bit always 1); space (parity bit always 0)
• 3964 (R)	
- Telegram length, max.	1 kbyte
- Bits per character	7 or 8
- Number of stop bits	1 (Standard), 2
- Parity	No parity (standard); even, uneven, mark (parity bit always 1); space (parity bit always 0)
• Modbus RTU master	
- Address area	1 through 49 999 (Standard Modbus addressing)
- Number of slaves, max.	247; slave numbers 1 through 247, per MODBUS network segment maximum 32 devices, additional repeaters needed to expand the network to maximum configuration
• MODBUS RTU slave	
- Address area	1 through 49 999 (Standard Modbus addressing)
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Degree and class of protection	
IP degree of protection	IP20
Standards, approvals, certificates	
Railway application	
• EN 50121-3-2	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support
Ambient conditions	
Ambient temperature during operation	
• min.	-25 °C; = Tmin (incl. condensation/frost)
• max.	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155)
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity	
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation

Article number	**6AG2241-1CH30-1XB0** SIPLUS S7-1200 CB 1241 RS485 T1 RAIL
Resistance	
• Coolants and lubricants	
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems	
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *
• Use on land craft, rail vehicles and special-purpose vehicles	
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *
• Usage in industrial process technology	
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark	
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating	
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A
Mechanics/material	
Enclosure material (front)	
• Plastic	Yes
Dimensions	
Width	38 mm
Height	62 mm
Depth	21 mm
Weights	
Weight, approx.	40 g
Other	
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

Version	Article No.
SIPLUS CB 1241 communication board RS 485 RAIL Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic for point-to-point connection, with 1 RS 485 interface	**6AG2241-1CH30-1XB0**

*** You can order this quantity or a multiple thereof.**

SIPLUS S7-1200 CM 1242-5 RAIL

Overview

DP-M	DP-S	FMS	PG/OP	S7
	●			

The SIPLUS S7-1200 CM 1242-5 RAIL communication module is used to connect a SIPLUS extreme RAIL S7-1200 to PROFIBUS as a DP slave and has the following characteristics:

- Approved in accordance with the railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic
- PROFIBUS DPV1 slave in accordance with IEC 61158
- Module replacement without PG supported
- Power is supplied via the backplane bus so that no extra cabling is required
- Support of all standard baud rates from 9.6 Kbps to 12 Mbps
- Compact industry-standard enclosure in S7-1200 design for mounting on a DIN rail
- Fast commissioning thanks to easy configuration using STEP 7 without additional programming overhead

The SIPLUS S7-1200 CM 1242-5 RAIL is intended for use in rail traffic. Low-cost PROFIBUS-based automation solutions can be created on the basis of the S7-1200.

Benefits

get Designed for Industry

PROFIBUS-based systems can be operated effectively for lower operating and maintenance costs:

- Low costs since an automation solution requires no fixed wiring and less hardware
- Fast response to faults thanks to comprehensive diagnostics options
- Optimized plant and inventory management

The SIPLUS S7-1200 CM 1242-5 RAIL also offers further benefits especially for the requirements of micro-automation solutions:

- Uncomplicated connection of the S7-1200 to PROFIBUS without extra power supply
- Low-cost implementation of automation solutions based on PROFIBUS
- Fast commissioning, as no programming overhead is required

Application

The SIPLUS S7-1200 CM 1242-5 RAIL is designed for use in rail traffic.

With the CM 1242-5 RAIL, low-cost, distributed automation solutions can be implemented on the basis of the S7-1200, or in simple cases even complete plant automation systems.

Design

The SIPLUS S7-1200 CM 1242-5 RAIL offers all the benefits of the S7-1200 design.

- Rugged, compact plastic enclosure
- Easily accessible connection and diagnostics elements, protected by front flaps
- Removable terminals
- Simple mounting on the mounting rail of the S7-1200
- 9-pin sub-D socket for the bus interface to PROFIBUS

The CM 1242-5 RAIL is plugged into the left-hand system bus interface of the S7-1200. Power is supplied via the system bus of the S7-1200 so that no extra cabling is required. The rugged RS485 interface is located on the underside of the module, protected by the lower front flap.

Function

The SIPLUS S7-1200 CM 1242-5 RAIL provides the communication services for integrating an S7-1200 into an automation solution as a PROFIBUS DP slave.

PROFIBUS DP slave

The CM 1242-5 RAIL works as a DPV1 slave in accordance with IEC 61158, handles data traffic completely autonomously, and thus relieves the CPU of communication tasks.

The data areas of the distributed I/Os are transferred consistently between CP and CPU.

Diagnostics

Extensive diagnostic options are available via STEP 7, including

- Operating status of the CM
- General diagnostics functions
- Connection diagnostics
- Alarm buffer

STEP 7 Basic is required for configuring the full functional scope of the CM 1242-5.

Technical specifications

Article number	**6AG2242-5DX30-1XE0**
product type designation	SIPLUS S7-1200 CM 1242-5 RAIL
Transfer rate	
Transfer rate • at the 1st interface according to PROFIBUS	 9.6 kbit/s ... 12 Mbit/s
Interfaces	
Number of interfaces according to Industrial Ethernet	0
Number of electrical connections • at the 1st interface according to PROFIBUS • for power supply	 1 0
Type of electrical connection • at the 1st interface according to PROFIBUS	 9-pin Sub-D socket (RS485)
Supply voltage, current consumption, power loss	
Type of voltage of the supply voltage	DC
Supply voltage 1 from backplane bus	5 V
Consumed current • from backplane bus at DC at 5 V typical	 0.15 A
Power loss [W]	0.75 W
Ambient conditions	
Ambient temperature • during operation • during storage • during transport • note	 -25 ... +55 °C -40 ... +70 °C -40 ... +70 °C +70 °C for 10 min (OT1, ST1/ST2 according to EN 50155)
Installation altitude at height above sea level maximum	2 000 m
Ambient condition relating to ambient temperature - air pressure - installation altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity • with condensation according to IEC 60068-2-38 maximum	 100 %; RH including condensation/frost (no commissioning when condensation is present), horizontal installation
chemical resistance to commercially available cooling lubricants	Yes; incl. airborne diesel and oil droplets
Resistance to biologically active substances • conformity according to EN 60721-3-3 • conformity according to EN 60721-3-5	 Yes; Class 3B2 mold and fungal spores (excluding fauna), Class 3B3 on request Yes; Class 5B2 mold and fungal spores (excluding fauna), Class 5B3 on request
Resistance to chemically active substances • conformity according to EN 60721-3-3 • conformity according to EN 60721-3-5	 Yes; Class 3C4 (RH < 75 %) incl. salt spray in accordance with EN 60068-2-52 (Severity 3). The supplied plug covers must remain in place on the unused interfaces during operation. Yes; Class 5C3 (RH < 75%) including salt spray acc. to EN 60068-2-52 (Severity level 3). The supplied plug covers must remain in place over the unused interfaces during operation!
Resistance to mechanically active substances • conformity according to EN 60721-3-3 • conformity according to EN 60721-3-5	 Yes; Class 3S4 incl. sand, dust. The supplied plug covers must remain in place over the unused interfaces during operation. Yes; Class 5S3 incl. sand, dust. The supplied plug covers must remain in place over the unused interfaces during operation.
Conformal coating • coating for equipped printed circuit board according to EN 61086 • type of coating protection against pollution according to EN 60664-3 • type of coating for electronic devices in railway applications according to EN 50155 • type of test of the coating according to MIL-I-46058C • product conformity of the coating Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A • protection class IP	 Yes; Class 2 for high availability Yes; Protection of the type 1 Yes; Protective coating of the Class PC2 according to EN 50155:2017 Yes; Coating discoloration during service life possible Yes; Conformal coating, class A IP20
Design, dimensions and weights	
Module format	Compact module S7-1200 single width
Width	30 mm
Height	100 mm
Depth	75 mm
Net weight	0.115 kg
Fastening method • 35 mm top hat DIN rail mounting • S7-300 rail mounting • wall mounting	 Yes No Yes
Product features, product functions, product components general	
Number of units • per CPU maximum	 3

SIPLUS S7-1200 CM 1242-5 RAIL

Article number	**6AG2242-5DX30-1XE0**
product type designation	SIPLUS S7-1200 CM 1242-5 RAIL
Performance data PROFIBUS DP	
Service as DP slave	
• DPV0	Yes
• DPV1	Yes
Data volume	
• of the address range of the inputs as DP slave total	240 byte
Performance data telecontrol	
Protocol is supported	
• TCP/IP	No
Standards, specifications, approvals	
Certificate of suitability	
• fire protection in accordance with EN 45545-2	Yes; Railway vehicles - for proof, see Service & Support
Railway application	
Certificate of suitability railway application in accordance with EN 50121-3-2	Yes; EMC for railway vehicles
Certificate of suitability railway application in accordance with EN 50121-4	Yes; EMC for signal and telecommunication equipment
Certificate of suitability railway application in accordance with EN 50124-1	Yes; Railway applications - Overvoltage category OV2 pollution degree PD2 rated impulse voltage UNi = 0.5 kVUNm = DC 24
Certificate of suitability railway application in accordance with EN 50125-1	Yes; Railway vehicles - See ambient conditions
Certificate of suitability railway application in accordance with EN 50125-2	Yes; Fixed-electrical installations - see ambient conditions
Certificate of suitability railway application in accordance with EN 50125-3	Yes; Signal and telecommunications equipment - see Ambient conditions vibrations and shocks: Application point outside the rails (distance 1 m to 3 m from rail)
Certificate of suitability railway application in accordance with EN 50155	Yes; Railway vehicles - temperature class OT1, ST1/ST2, horizontal mounting position
Certificate of suitability railway application in accordance with EN 61373	Yes; Railway vehicles - Vibrations and shocks Category 1 Class A/B

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Selection and ordering data

Version	Article No.
SIPLUS CM 1242-5 RAIL communication module	**6AG2242-5DX30-1XE0**
Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic	
Communication module for electrical connection of SIPLUS S7-1200 RAIL to PROFIBUS as a DPV1 slave	
• For areas with extreme exposure to environmental substances (conformal coating); ambient temperature -25 ... +70 °C	

* You can order this quantity or a multiple thereof.

Overview

DP-M	DP-S	FMS	PG/OP	S7
●			●	●

The SIPLUS S7-1200 CM 1243-5 RAIL communication module is used to connect a SIPLUS extreme RAIL S7-1200 to PROFIBUS as a DP master and has the following characteristics:

- Approved in accordance with the railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic
- PROFIBUS DPV1 master in accordance with IEC 61158
- Support of up to 16 PROFIBUS DP slaves
- Communication with other S7 controllers based on S7 communication
- Allows the connection of programming devices and operator panels with a PROFIBUS interface to the S7-1200
- Module replacement without PG supported
- Support of all standard baud rates from 9.6 Kbps to 12 Mbps
- Compact industry-standard enclosure in S7-1200 design for mounting on a DIN rail
- Fast commissioning thanks to easy configuration using STEP 7 without additional programming overhead

The SIPLUS S7-1200 CM 1243-5 RAIL is intended for use in rail traffic. Low-cost PROFIBUS-based automation solutions can be created on the basis of the S7-1200 for optimal production.

Benefits

get Designed for Industry

PROFIBUS-based systems can be operated effectively for lower operating and maintenance costs:

- Low costs since an automation solution requires no fixed wiring and less hardware
- Fast response to faults thanks to excellent diagnostics options
- Optimized plant and inventory management

The SIPLUS S7-1200 CM 1243-5 RAIL also offers further benefits especially for the requirements of micro-automation solutions:

- Uncomplicated connection of the S7-1200 to PROFIBUS
- Low-cost implementation of automation solutions based on PROFIBUS
- Fast commissioning, as no programming overhead is required

Use of PROFIBUS-based micro-automation solutions enables optimal operation of the plant.

Application

The SIPLUS S7-1200 CM 1243-5 RAIL is designed for use in rail traffic.

With the CM 1243-5 RAIL, low-cost, distributed automation solutions can be implemented on the basis of the S7-1200, or in simple cases even complete plant automation systems. It can be used in all sectors of discrete automation.

Design

The SIPLUS S7-1200 CM 1243-5 RAIL offers all the benefits of the S7-1200 design.

- Rugged, compact plastic enclosure
- Easily accessible connection and diagnostics elements, protected by front flaps
- Removable terminals
- Simple mounting on the mounting rail of the S7-1200
- 9-pin sub-D socket for the bus interface to PROFIBUS
- 3-pin plug-in terminal strip for connection of the 24 V DC external supply voltage

The CM 1243-5 RAIL is plugged into the left-hand system bus interface of the S7-1200. The power is supplied via a 3-pin terminal strip on top of the module. The rugged RS485 interface is located on the underside of the module, protected by the lower front flap.

SIPLUS S7-1200 CM 1243-5 RAIL

Function

The SIPLUS S7-1200 CM 1243-5 RAIL provides access to different communication services on the basis of PROFIBUS:

- PROFIBUS DP (according to IEC 61158, master)
- PG/OP communication
- S7 communication

PROFIBUS DP master

The CM 1243-5 RAIL works as a DP-V1 master in accordance with IEC 61158, handles data traffic completely autonomously, and thus relieves the CPU of communication tasks.

The data areas of the distributed I/Os are transferred consistently between CP and CPU. As a DP master, it allows the connection of up to 16 PROFIBUS-compliant DP slaves

PG/OP communication

The S7-1200 to which the CM 1243-5 RAIL is connected can be programmed with the help of PG/OP communication.

S7 communication

Communication with the following other systems can be implemented with the mechanisms familiar from the S7 world (Put/Get) on the basis of S7 communication:

- To other SIMATIC S7 programmable controllers
- To HMI devices
- To PCs, laptops, field PGs with PROFIBUS cards

Diagnostics

Extensive diagnostic options are available via STEP 7, including

- Operating status of the CM
- General diagnostics and statistics functions
- Connection diagnostics
- Alarm buffer

STEP 7 Basic is required for configuring the full functional scope of the CM 1243-5 RAIL.

Technical specifications

Article number	**6AG2243-5DX30-1XE0**
product type designation	SIPLUS S7-1200 CM 1243-5 RAIL
Transfer rate	
Transfer rate	
• at the 1st interface according to PROFIBUS	9.6 kbit/s ... 12 Mbit/s
Interfaces	
Number of interfaces according to Industrial Ethernet	0
• number of electrical connections	
- at the 1st interface according to PROFIBUS	1
- for power supply	1
• type of electrical connection	
- at the 1st interface according to PROFIBUS	9-pin Sub-D socket (RS485)
- for power supply	3-pole terminal block
Supply voltage, current consumption, power loss	
Type of voltage of the supply voltage	DC
Supply voltage external	24 V
Supply voltage external at DC rated value	24 V
Relative positive tolerance at DC at 24 V	20 %
Relative negative tolerance at DC at 24 V	20 %
Consumed current	
• from external supply voltage at DC at 24 V typical	0.1 A
Power loss [W]	2.4 W
Ambient conditions	
Ambient temperature	
• during operation	-25 ... +55 °C
• during storage	-40 ... +70 °C
• during transport	-40 ... +70 °C
• note	+70 °C for 10 min (OT1, ST1/ST2 according to EN 50155)
Installation altitude at height above sea level maximum	2 000 m
Ambient condition relating to ambient temperature - air pressure - installation altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity	
• with condensation according to IEC 60068-2-38 maximum	100 %; RH including condensation/frost (no commissioning when condensation is present), horizontal installation
Chemical resistance to commercially available cooling lubricants	Yes; incl. airborne diesel and oil droplets
Resistance to biologically active substances	
• conformity according to EN 60721-3-3	Yes; Class 3B2 mold and fungal spores (excluding fauna), Class 3B3 on request
• conformity according to EN 60721-3-5	Yes; Class 5B2 mold and fungal spores (excluding fauna), Class 5B3 on request
Resistance to chemically active substances	
• conformity according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray in accordance with EN 60068-2-52 (Severity 3). The supplied plug covers must remain in place on the unused interfaces during operation.
• conformity according to EN 60721-3-5	Yes; Class 5C3 (RH < 75%) including salt spray acc. to EN 60068-2-52 (Severity level 3). The supplied plug covers must remain in place over the unused interfaces during operation!

Article number	**6AG2243-5DX30-1XE0**
product type designation	SIPLUS S7-1200 CM 1243-5 RAIL
Resistance to mechanically active substances	
• conformity according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied plug covers must remain in place over the unused interfaces during operation.
• conformity according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust. The supplied plug covers must remain in place over the unused interfaces during operation.
Conformal coating	
• coating for equipped printed circuit board according to EN 61086	Yes; Class 2 for high availability
• type of coating protection against pollution according to EN 60664-3	Yes; Protection of the type 1
• type of coating for electronic devices in railway applications according to EN 50155	Yes; Protective coating of the Class PC2 according to EN 50155:2018
• type of test of the coating according to MIL-I-46058C	Yes; Coating discoloration during service life possible
• product conformity of the coating Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, class A
Protection class IP	IP20
Design, dimensions and weights	
Module format	Compact module S7-1200 single width
Width	30 mm
Height	100 mm
Depth	75 mm
Net weight	0.134 kg
Fastening method	
• 35 mm top hat DIN rail mounting	Yes
• S7-300 rail mounting	No
• wall mounting	Yes
Product features, product functions, product components general	
Number of units	
• per CPU maximum	1
Performance data PROFIBUS DP	
Service as DP master	
• DPV1	Yes
Number of DP slaves	
• on DP master operable	16
Data volume	
• of the address range of the inputs as DP master total	512 byte
• of the address range of the outputs as DP master total	512 byte
• of the address range of the inputs per DP slave	244 byte
• of the address range of the outputs per DP slave	244 byte
• of the address range of the diagnostic data per DP slave	240 byte
Service as DP slave	
• DPV0	No
• DPV1	No
Performance data S7 communication	
Number of possible connections for S7 communication	
• maximum	8; max. 4 connections to other S7 stations
• with PG connections maximum	1
• with PG/OP connections maximum	3
Performance data multi-protocol mode	
Number of active connections with multi-protocol mode	
• without DP maximum	8
• with DP maximum	8
Performance data telecontrol	
Protocol is supported	
• TCP/IP	No
Standards, specifications, approvals	
Certificate of suitability	
• fire protection in accordance with EN 45545-2	Yes; Railway vehicles - for proof, see Service & Support

SIPLUS S7-1200 CM 1243-5 RAIL

Article number	**6AG2243-5DX30-1XE0**
product type designation	SIPLUS S7-1200 CM 1243-5 RAIL
Railway application	
Certificate of suitability railway application in accordance with EN 50121-3-2	Yes; EMC for railway vehicles
Certificate of suitability railway application in accordance with EN 50121-4	Yes; EMC for signal and telecommunication equipment
Certificate of suitability railway application in accordance with EN 50124-1	Yes; Railway applications - Overvoltage category OV2 pollution degree PD2 rated impulse voltage UNi = 0.5 kVUNm = DC 24
Certificate of suitability railway application in accordance with EN 50125-1	Yes; Railway vehicles - See ambient conditions
Certificate of suitability railway application in accordance with EN 50125-2	Yes; Fixed-electrical installations - see ambient conditions
Certificate of suitability railway application in accordance with EN 50125-3	Yes; Signal and telecommunications equipment - see Ambient conditions vibrations and shocks: Application point outside the rails (distance 1 m to 3 m from rail)
Certificate of suitability railway application in accordance with EN 50155	Yes; Railway vehicles - temperature class OT1, ST1/ST2, horizontal mounting position
Certificate of suitability railway application in accordance with EN 61373	Yes; Railway vehicles - Vibrations and shocks Category 1 Class A/B

Selection and ordering data

Version	Article No.
SIPLUS CM 1243-5 RAIL Communications Module Approved in accordance with railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic Communications module for electrical connection of SIPLUS S7-1200 CM 1243-5 T1 RAIL to PROFIBUS as a DPV1 master • For areas with extreme exposure to environmental substances (conformal coating); ambient temperature -25 ... +55 °C, OT1 with ST1/2, (+70 °C for 10 min.)	**6AG2243-5DX30-1XE0**

* You can order this quantity or a multiple thereof.

Overview

The CP 1243-1 communications processor is used for connecting the SIMATIC S7-1200 to telecontrol centers via remote networks and telecontrol protocols (DNP3, IEC 60870-5-104, TeleControl Basic), and for safe communication via IP-based networks.

The CP has the following features:

- Ethernet-based connection to TeleControl Server Basic, e.g. via Internet
- Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic
- Data transfer of measured values, control variables, or alarms optimized for telecontrol systems
- Automatic sending of alert emails
- Data buffering of up to 64,000 values ensures a secure database even with temporary connection failures
- Secure communication via VPN connections based on IPSec
- Access protection via Stateful Inspection Firewall
- Support of SINEMA Remote Connect with autoconfiguration
- Clearly laid out LED signaling for fast and easy diagnostics
- Compact industrial enclosure in S7-1200 design for mounting on a standard mounting rail
- Fast commissioning thanks to easy configuration using STEP 7

Benefits

get Designed for Industry

- **Data security**
  The CP 1243-1 has a large buffer for several thousand data values. Downtimes in the transmission link can then be bridged.
- **Fully automatic time stamp**
  To enable subsequent and correct archiving of process data in the control system, all data frames are time-stamped at their place of origin.
- **Fast and flexible data communication**
  Operators are quickly provided with alarms, statuses and values from the process, and they can influence process control by entering commands or setpoints at any time.
- **Simple, low-cost engineering**
  The cyclic or event-controller transfer of measurements, setpoints or alarms can be implemented in just a few steps, without any programming effort.
- **Remote diagnostics**
  Saving of traveling and maintenance costs due to cost-effective remote programming, diagnostics, control and monitoring via the Internet
- **Industrial Security**
  Securing plant networks against unauthorized access by means of:
  - Central access protection for any devices within an automation cell, e.g. by means of authentication of the network stations
  - Secure remote access via the Internet by means of data encryption (VPN) and data integrity checking

Application

By using the CP 1243-1, the S7-1200 can be used as a remote terminal unit (substation) in telecontrol applications. Typical uses include the collection of measured values in geographically widely distributed outdoor areas (level measurement for water tanks) or centralized opening and closing of valves (oil/gas transport in pipelines).

- Plants in water, wastewater or environmental sectors:
  - Irrigation systems
  - Drinking water supply
- Monitoring of power networks for consumption metering and cost control
  - District heating networks
  - Wind farms
- Plants in the oil and gas sector
  - Oilfield water injection
  - Pipelines
- Transportation systems
  - Ventilation control in tunnel systems
  - Traffic control

Regardless of the telecontrol features of the CP, it can also be used purely for security applications if the automation system is to be connected securely to a higher-level IT network. This ensures that, within the framework of a network segmentation, the SIMATIC S7-1200 is protected against unauthorized access from Industrial Ethernet networks. The CP 1243-1 allows secure access via an Industrial Ethernet connection and allows the data transferred between devices or network segments to be protected from manipulation and industrial espionage.

Design

The CP 1243-1 offers all the advantages of the S7-1200 design:

- Rugged, compact plastic enclosure
- Easily accessible connection and diagnostics elements, protected by front flaps
- Simple mounting on the mounting rail of the S7-1200

The CP 1243-1 is plugged into the left-hand system bus interface of the S7-1200. Power is supplied directly via the S7-1200. No additional wiring is necessary. Any required modems or routers are connected via the Ethernet interface on the underside of the module.

Function

The CP 1243-1 communications processor is used for connecting the SIMATIC S7-1200 to control centers via Ethernet in telecontrol applications and is also used in secure communications via IP-based networks (security functions).

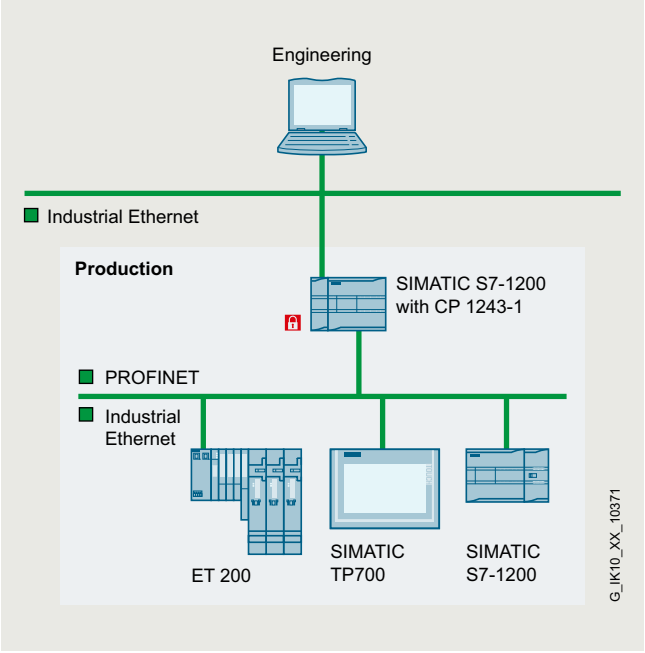
Virtual Private Network (IPsec)

The connection of S7-1200 via a VPN network ensures that only authenticated network nodes can communicate with the controller. Secure encryption of the data and verification of the data integrity protect the data traffic from espionage and manipulation.

Stateful inspection firewall

By using a firewall, the S7-1200 can provide additional protection against unauthorized access and attempted manipulation.

The firewall filters data packets and checks the communication connections in accordance with the filter list. Both incoming and outgoing communication can be filtered based on IP and MAC addresses.



Cell protection for SIMATIC S7-1200 with CP 1243-1 (Security Integrated) e.g. safe engineering access to the S7-1200

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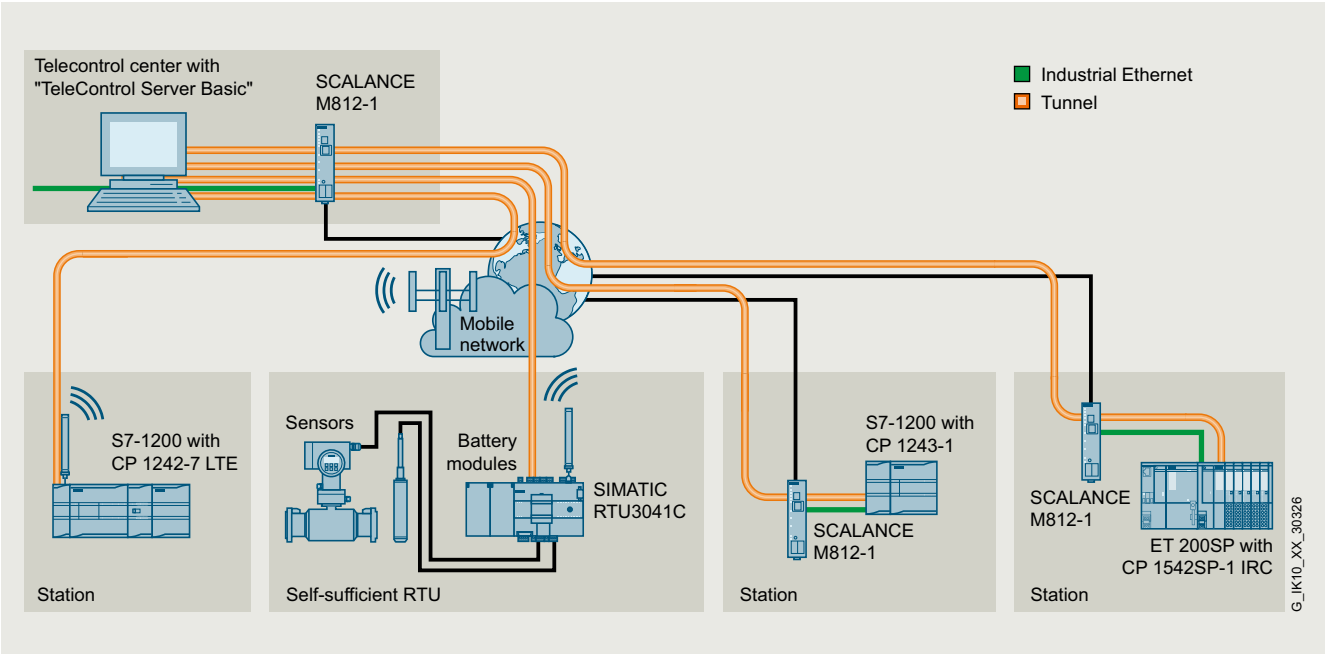
Connection to a control center with TeleControl Server Basic

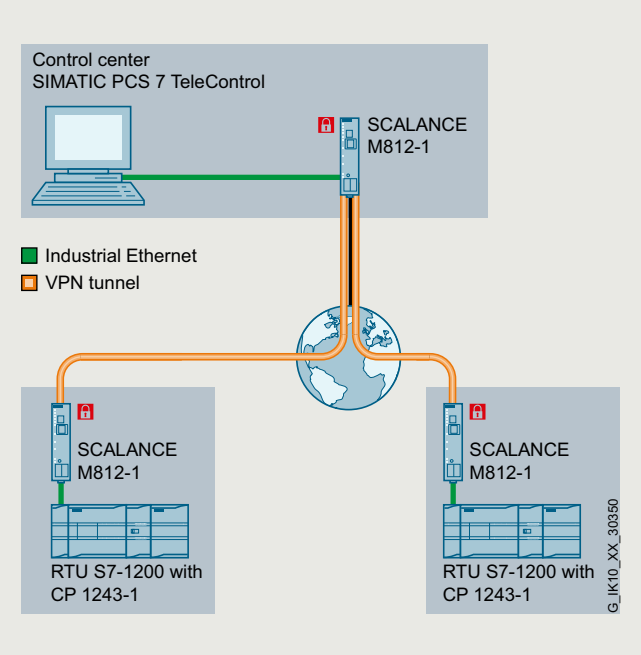
With the help of the CP 1243-1, S7-1200-based remote stations in telecontrol applications can be directly connected via an IP-based network to the TeleControl Server Basic. By using additional routers (e.g. SCALANCE M for communication via mobile wireless or DSL), it is possible to make the connection via other media.



Telecontrol application with the S7-1200 as RTU, connected via mobile wireless (CP 1242-7) and DSL (with CP 1243-1 and SCALANCE M812-1)

Connection to WinCC based or 3rd party control centers

With CP1243-1, it is possible in just a few steps to connect the remote station S7-1200 to a DNP3 or IEC 60870-5-104 based control center (e.g. WinCC or PCS 7).



Telecontrol application with the S7-1200 as RTU, connected via DSL to a PCS 7 control center with Telecontrol Add On

Completely configurable application using "data point configuration"

"Data point configuration" in STEP 7 eliminates all programming effort for transmission of data to the control center.

The data of the CPU relevant to the control center is selected via user-friendly "item browsing" in STEP 7. In a clearly-arranged menu, the data transfer parameters are then assigned to the data points selected in this way. The cyclic or event-controller transfer of measured values, setpoints or alarms can thus be implemented in only a few operations and without programming effort.

Data buffering

Data losses are prevented by the data buffering mechanisms integrated in the product.

In the event of a connection failure, up to 64 000 time-stamped values are buffered. When the connection returns, the buffered values are automatically transferred to the control center in the right order.

DNP3 protocol

Communication with the control center is based on the established standard of DNP3 specification 2 (2007/2009).

Thanks to support of the object and data transfer mechanisms defined in the specification, compatibility with PCS 7, WinCC (with corresponding telecontrol packages), and all other control center systems available on the market is ensured.

The security mechanisms already defined in the DNP3 standard for secure data transfer through trunk networks are fully supported.

IEC 60870 standard

Communication with the control center is based on the established communication standard in accordance with IEC 60870-5-104. This ensures that telecontrol and instrumentation and control devices and systems from Siemens or other vendors can communicate with each other without any fundamental adaptations. The variance and variabilities provided by this standard allow different vendor-specific profiles (e.g. the frame types and functions used). The profiles can be coordinated with each other with the help of an interoperability list. This standard has become widely used, especially in Europe and Asia. The IEC 60870-5-104 telecontrol protocol is also suitable as a field or station bus. Use as a station bus also enables direct communication between individual devices.

Email alerts

Email alerts can be configured for timely provision of station states to service or maintenance personnel. When previously defined events (such as threshold violation) occur, application-specific information is sent automatically by email.

Diagnostics

The CP1243-1 offers comprehensive diagnostic options for quick and informative analysis of the station status and VPN connections. Elementary diagnostic information is signaled directly via LEDs at the CP.

Extensive information, such as connection history, buffer status and transferred measured values, can be called up via STEP 7.

Remote maintenance

For remote access from the control center to the substation, the CP provides a remote maintenance port parallel to process operation. This ensures monitoring access for firmware updates or program changes. Support of SINEMA Remote Connect with autoconfiguration.

Interfaces

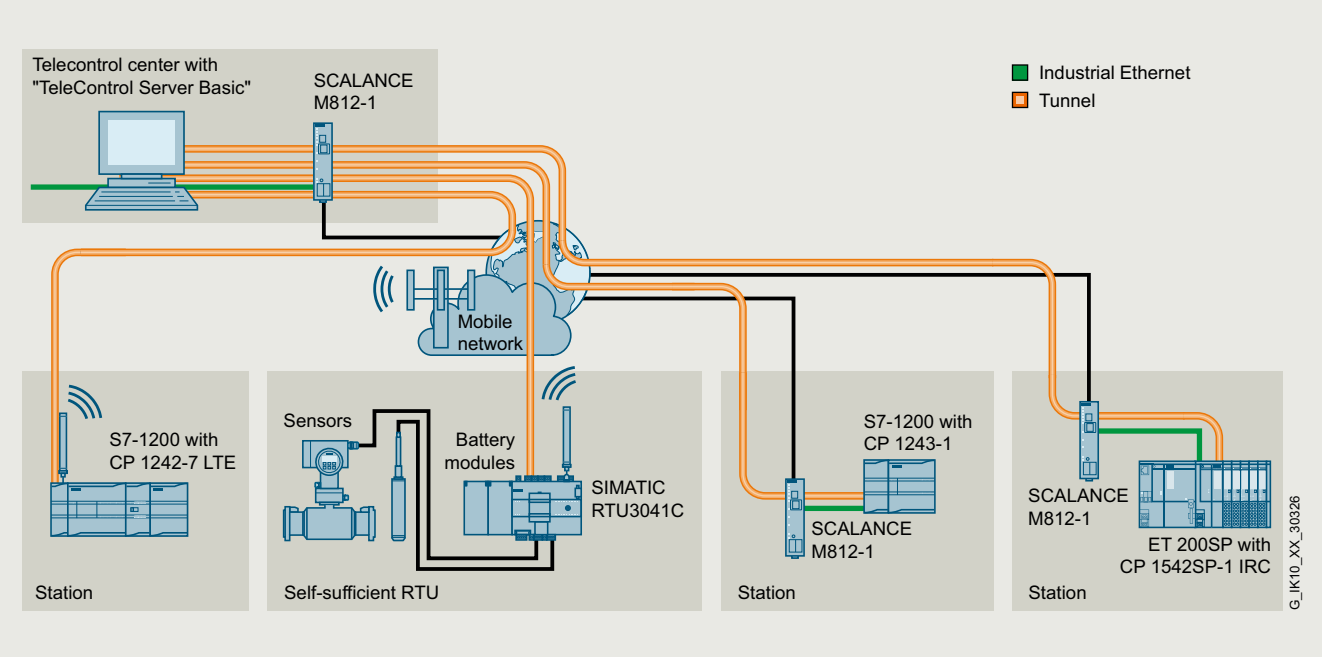
The CP1243-1 has an Ethernet interface. The S7-1200 can be connected directly via an existing network, or using additional routers via other media (e.g. SCALANCE M for mobile wireless communication).

Power supply

Extra wiring for the CP power supply is not required. Power is supplied directly via the backplane bus of the S7-1200.

SIPLUS S7-1200 CP 1243-1 RAIL

Integration



Connection of S7-1200 to Telecontrol Server via mobile network and DSL Internet access

Technical specifications

Article number	**6AG2243-1BX30-1XE0**
product type designation	SIPLUS S7-1200 CP 1243-1 RAIL
Transfer rate	
transfer rate • at the 1st interface	 10 ... 100 Mbit/s
Interfaces	
number of interfaces according to Industrial Ethernet	1
number of electrical connections • at the 1st interface according to Industrial Ethernet • for power supply	 1 0
type of electrical connection • at the 1st interface according to Industrial Ethernet	 RJ45 port
Supply voltage, current consumption, power loss	
type of voltage of the supply voltage	DC
supply voltage 1 from backplane bus	5 V
consumed current • from backplane bus at DC at 5 V typical	 0.25 A
power loss [W]	1.25 W
Ambient conditions	
ambient temperature • for vertical installation during operation • for horizontally arranged busbars during operation • during storage • during transport • note	 -25 ... +60 °C -25 ... +70 °C -40 ... +70 °C -40 ... +70 °C +70 °C for 10 min (OT1, ST1/ST2 according to EN 50155)
installation altitude at height above sea level maximum	2 000 m
ambient condition relating to ambient temperature - air pressure - installation altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
relative humidity • with condensation according to IEC 60068-2-38 maximum	 100 %; RH including condensation/frost (no commissioning when condensation is present), horizontal installation
chemical resistance to commercially available cooling lubricants	Yes; incl. airborne diesel and oil droplets
resistance to biologically active substances • conformity according to EN 60721-3-3 • conformity according to EN 60721-3-5	 Yes; Class 3B2 mold and fungal spores (excluding fauna), Class 3B3 on request Yes; Class 5B2 mold and fungal spores (excluding fauna), Class 5B3 on request

Article number	**6AG2243-1BX30-1XE0**
product type designation	SIPLUS S7-1200 CP 1243-1 RAIL
resistance to chemically active substances • conformity according to EN 60721-3-3 • conformity according to EN 60721-3-5	 Yes; Class 3C4 (RH < 75 %) incl. salt spray in accordance with EN 60068-2-52 (Severity 3). The supplied plug covers must remain in place on the unused interfaces during operation. Yes; Class 5C3 (RH < 75%) including salt spray acc. to EN 60068-2-52 (Severity level 3). The supplied plug covers must remain in place over the unused interfaces during operation!
resistance to mechanically active substances • conformity according to EN 60721-3-3 • conformity according to EN 60721-3-5	 Yes; Class 3S4 incl. sand, dust. The supplied plug covers must remain in place over the unused interfaces during operation. Yes; Class 5S3 incl. sand, dust. The supplied plug covers must remain in place over the unused interfaces during operation.
coating for equipped printed circuit board according to EN 61086	Yes; Class 2 for high availability
type of coating protection against pollution according to EN 60664-3	Yes; Protection of the type 1
type of coating for electronic devices in railway applications according to EN 50155	Yes; Protective coating of the Class PC2 according to EN 50155:2017
type of test of the coating according to MIL-I-46058C	Yes; Coating discoloration during service life possible
product conformity of the coating Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, class A
protection class IP	IP20
Design, dimensions and weights	
module format	Compact module S7-1200 single width
width	30 mm
height	110 mm
depth	75 mm
net weight	0.122 kg
fastening method • 35 mm top hat DIN rail mounting • wall mounting	 Yes Yes
Product features, product functions, product components general	
number of units • per CPU maximum	 3
Performance data open communication	
number of possible connections for open communication • by means of T blocks maximum	 like CPU
Performance data S7 communication	
number of possible connections for S7 communication • maximum	 like CPU
Performance data IT functions	
number of possible connections • as email client maximum	 1
Performance data telecontrol	
suitability for use • node station • substation • TIM control center • control center connection • by means of a permanent connection • note	 No Yes No For use with TeleControl Server Basic, WinCC and PCS7 supported Connection to SCADA system via Telecontrol Server Basic and Standard Telecontrol protocols
protocol is supported • DNP3 • IEC 60870-5	 Yes Yes
product function data buffering if connection is aborted	Yes; 64,000 events
number of data points per station maximum	200
number of stations for direct communication with Telecontrol Server Basic • in send direction maximum • in receive direction maximum	 3 15
Performance data teleservice	
diagnostics function online diagnostics with SIMATIC STEP 7	Yes
product function • program download with SIMATIC STEP 7 • remote firmware update	 Yes Yes
Product functions management, configuration, engineering	
configuration software • required	 STEP 7 Basic/Professional

SIPLUS S7-1200 CP 1243-1 RAIL

Article number	**6AG2243-1BX30-1XE0**
product type designation	SIPLUS S7-1200 CP 1243-1 RAIL
Product functions diagnostics	
product function web-based diagnostics	Yes
Product functions security	
firewall version	stateful inspection
product function with VPN connection	IPsec, SINEMA RC
type of encryption algorithms with VPN connection	AES-256, AES-192, AES-128, 3DES-168
type of authentication procedure with VPN connection	Preshared key (PSK), X.509v3 certificates
type of hashing algorithms with VPN connection	MD5, SHA-1, SHA-2
number of possible connections with VPN connection	8
product function	
• password protection for Web applications	No
• password protection for teleservice access	No
• encrypted data transmission	Yes
• ACL - IP-based	No
• ACL - IP-based for PLC/routing	No
• switch-off of non-required services	Yes
• blocking of communication via physical ports	No
• log file for unauthorized access	No
Product functions time	
protocol is supported	
• NTP	Yes
• NTP (secure)	Yes
time synchronization	
• from NTP-server	Yes
• from control center	Yes
Standards, specifications, approvals	
certificate of suitability	
• fire protection in accordance with EN 45545-2	Yes; Railway vehicles - for proof, see Service & Support
Railway application	
certificate of suitability railway application in accordance with EN 50121-3-2	Yes; EMC for railway vehicles
certificate of suitability railway application in accordance with EN 50121-4	Yes; EMC for signal and telecommunication equipment
certificate of suitability railway application in accordance with EN 50124-1	Yes; Railway applications - Overvoltage category OV2 pollution degree PD2 rated impulse voltage UNi = 0.5 kVUNm = DC 24
certificate of suitability railway application in accordance with EN 50125-1	Yes; Railway vehicles - See ambient conditions
certificate of suitability railway application in accordance with EN 50125-2	Yes; Fixed-electrical installations - see ambient conditions
certificate of suitability railway application in accordance with EN 50125-3	Yes; Signal and telecommunications equipment - see Ambient conditions vibrations and shocks: Application point outside the rails (distance 1 m to 3 m from rail)
certificate of suitability railway application in accordance with EN 50155	Yes; Railway vehicles - temperature class OT1, ST1/ST2, horizontal mounting position
certificate of suitability railway application in accordance with EN 61373	Yes; Railway vehicles - Vibrations and shocks Category 1 Class A/B

Selection and ordering data

Version	Article No.
SIPLUS S7-1200 CP 1243-1 RAIL Approved in accordance with railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic Communications processor for connecting SIMATIC S7-1200 as an additional Ethernet interface and for connection to control centers via telecontrol protocols (DNP3, IEC 60870, TeleControl Basic), security (firewall, VPN) • For areas with extreme exposure to environmental substances (conformal coating); ambient temperature -25 ... +70 °C (T1 with 70 °C for 10 minutes)	**6AG2243-1BX30-1XE0**

More information

Technical requirements/compatibility

An S7-1200 CPU with firmware version 4.1 is required to operate the CP 1243-1.

The CP 1243-1 can be configured with STEP 7 Basic/Professional V14 SP1 update (TIA Portal) or higher.

The TeleControl Server Basic V3 software package is required to connect to the PCS 7/WinCC control center systems.

* You can order this quantity or a multiple thereof.

Overview

- Entry-level CPU in the SIPLUS extreme RAIL S7-1500 Controller product range
- Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic
- Suitable for applications with medium requirements for program scope and processing speed
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET I-Device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or non-Siemens PROFINET IO controller
- Isochronous mode
- SIMATIC Memory Card required for operation of the CPU

Application

The SIPLUS S7-1500 CPU 1511-1 PN RAIL is the most cost-effective entry-level CPU for applications with medium requirements for processing speed and speed of response. The CPU can be used as a PROFINET IO Controller or as distributed intelligence (PROFINET I-Device). The integrated PROFINET IO IRT interface is designed as a 2-port switch so that a linear topology can be set up. In addition, the CPU offers comprehensive control functionalities via easy-to-configure blocks as well as the ability to connect drives via standardized PLC-open blocks.

Design

The SIPLUS S7-1500 CPU 1511-1 PN RAIL has:

- A powerful processor:
  The CPU achieves command execution times as low as 60 ns per binary instruction.
- A large work memory:
  150 KB for program, 1 MB for data
- SIMATIC Memory Cards as load memory;
  permit additional functions such as datalog and archives
- Flexible expansion capability:
  single-tier configuration with max. 32 modules (CPU + 31 modules)
- PROFINET IO IRT interface for connecting distributed I/O via PROFINET

Function

- Performance
  - Faster command processing, depending on the CPU type, language extensions and new data types
  - Even shorter response times of the CPUs due to considerably faster backplane bus
  - Powerful network connection:
    each CPU is equipped with PROFINET IO IRT (2-port switch) as standard interface.
- Integrated technology
  - Connection of analog and PROFIdrive-capable drives via standardized blocks (PLCopen)
  - Support of speed-controlled and positioning axes as well as external encoders, positionally precise gearing between axes.
  - Trace functions for all CPU tags, both for diagnostics in real time as well as for sporadic error detection
  - Comprehensive control functionalities, e.g. easily configurable blocks for automatic optimization of the control parameters for optimum control quality
- Security Integrated
  - Password-based know-how protection against unauthorized read-out and modification of program blocks
  - Copy protection for tying individual blocks to the serial number of the SIMATIC Memory Card: The block can only run if the configured memory card is inserted into the CPU.
  - 4-level authorization concept:
    Communication to the HMI devices can also be restricted.
  - Manipulation protection:
    The controller recognizes changed or unauthorized transmissions of the engineering data.
- Integrated system diagnostics
  - System diagnostics information is displayed consistently and in plain text in the TIA Portal, HMI devices and Web server, even for messages from the drives, and is updated even if the CPU is in STOP mode.
  - Integrated into the firmware of the CPU, no special configuration is required
- SIMATIC Memory Card (required for operation of the CPU)
  - Used as a plug-in load memory or for updating the firmware.
  - Also for storing additional documents or csv files (for recipes and archives)
  - Creation of data blocks for storage/reading of data via SFCs of the user program
- Datalog (archives) and recipes
  - Storage of csv files for recipes and archives on the SIMATIC Memory Card;
    easy access to plant-relevant operating data using Office tools or via a Web server
  - Easy access to machine configuration data by means of a Web browser or SD card reader (two-way data exchange from and to the controller)
- Programming
  - Programming with STEP 7 Professional

SIPLUS S7-1500 CPU 1511-1 PN RAIL

Technical specifications

Article number	**6AG2511-1AK02-1AB0** SIPLUS S7-1500 CPU 1511-1 PN T1 RAIL	**6AG2511-1AK02-4AB0** SIPLUS S7-1500 CPU 1511-1 PN TX RAIL
General information		
Product type designation	CPU 1511-1 PN	CPU 1511-1 PN
Engineering with		
• STEP 7 TIA Portal configurable/integrated from version	see entry ID: 109746275	see entry ID: 109746275
Display		
Screen diagonal [cm]	3.45 cm	3.45 cm
Supply voltage		
Rated value (DC)	24 V	24 V
Memory		
Work memory		
• integrated (for program)	150 kbyte	150 kbyte
• integrated (for data)	1 Mbyte	1 Mbyte
Load memory		
• Plug-in (SIMATIC Memory Card), max.	32 Gbyte	32 Gbyte
CPU processing times		
for bit operations, typ.	60 ns	60 ns
for word operations, typ.	72 ns	72 ns
for fixed point arithmetic, typ.	96 ns	96 ns
for floating point arithmetic, typ.	384 ns	384 ns
Counters, timers and their retentivity		
S7 counter		
• Number	2 048	2 048
IEC counter		
• Number	Any (only limited by the main memory)	Any (only limited by the main memory)
S7 times		
• Number	2 048	2 048
IEC timer		
• Number	Any (only limited by the main memory)	Any (only limited by the main memory)
Data areas and their retentivity		
Flag		
• Size, max.	16 kbyte	16 kbyte
Address area		
I/O address area		
• Inputs	32 kbyte; All inputs are in the process image	32 kbyte; All inputs are in the process image
• Outputs	32 kbyte; All outputs are in the process image	32 kbyte; All outputs are in the process image
Time of day		
Clock		
• Type	Hardware clock	Hardware clock
1. Interface		
Interface types		
• RJ 45 (Ethernet)	Yes; X1	Yes; X1
• Number of ports	2	2
• integrated switch	Yes	Yes
Protocols		
• IP protocol	Yes; IPv4	Yes; IPv4
• PROFINET IO Controller	Yes	Yes
• PROFINET IO Device	Yes	Yes
• SIMATIC communication	Yes	Yes
• Open IE communication	Yes; Optionally also encrypted	Yes; Optionally also encrypted
• Web server	Yes	Yes
• Media redundancy	Yes	Yes

Article number	**6AG2511-1AK02-1AB0** SIPLUS S7-1500 CPU 1511-1 PN T1 RAIL	**6AG2511-1AK02-4AB0** SIPLUS S7-1500 CPU 1511-1 PN TX RAIL
PROFINET IO Controller		
• Services		
- PG/OP communication	Yes	Yes
- Isochronous mode	Yes	Yes
- Direct data exchange	Yes; Requirement: IRT and isochronous mode (MRPD optional)	Yes; Requirement: IRT and isochronous mode (MRPD optional)
- IRT	Yes	Yes
- PROFIenergy	Yes; per user program	Yes; per user program
- Prioritized startup	Yes; Max. 32 PROFINET devices	Yes; Max. 32 PROFINET devices
- Number of connectable IO Devices, max.	128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
- Of which IO devices with IRT, max.	64	64
- Number of connectable IO Devices for RT, max.	128	128
- of which in line, max.	128	128
- Number of IO Devices that can be simultaneously activated/deactivated, max.	8; in total across all interfaces	8; in total across all interfaces
- Number of IO Devices per tool, max.	8	8
- Updating times	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data
PROFINET IO Device		
• Services		
- PG/OP communication	Yes	Yes
- Isochronous mode	No	No
- IRT	Yes	Yes
- PROFIenergy	Yes; per user program	Yes; per user program
- Shared device	Yes	Yes
- Number of IO Controllers with shared device, max.	4	4
- Asset management record	Yes; per user program	Yes; per user program
Protocols		
Number of connections		
• Number of connections, max.	96; via integrated interfaces of the CPU and connected CPs / CMs	96; via integrated interfaces of the CPU and connected CPs / CMs
Redundancy mode		
• Media redundancy		
- MRP	Yes; as MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50	Yes; as MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50
- MRPD	Yes; Requirement: IRT	Yes; Requirement: IRT
- Switchover time on line break, typ.	200 ms; For MRP, bumpless for MRPD	200 ms; For MRP, bumpless for MRPD
- Number of stations in the ring, max.	50	50
SIMATIC communication		
• S7 routing	Yes	Yes
OPC UA		
• OPC UA Client	Yes	Yes
• OPC UA Server	Yes; Data access (read, write, subscribe), method call, custom address space	Yes; Data access (read, write, subscribe), method call, custom address space
Supported technology objects		
Motion Control	Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER	Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER
• Number of available Motion Control resources for technology objects	800	800
• Required Motion Control resources		
- per speed-controlled axis	40	40
- per positioning axis	80	80
- per synchronous axis	160	160
- per external encoder	80	80
- per output cam	20	20
- per cam track	160	160
- per probe	40	40
Controller		
• PID_Compact	Yes; Universal PID controller with integrated optimization	Yes; Universal PID controller with integrated optimization
• PID_3Step	Yes; PID controller with integrated optimization for valves	Yes; PID controller with integrated optimization for valves
• PID-Temp	Yes; PID controller with integrated optimization for temperature	Yes; PID controller with integrated optimization for temperature
Counting and measuring		
• High-speed counter	Yes	Yes

SIPLUS S7-1500 CPU 1511-1 PN RAIL

Article number	**6AG2511-1AK02-1AB0** SIPLUS S7-1500 CPU 1511-1 PN T1 RAIL	**6AG2511-1AK02-4AB0** SIPLUS S7-1500 CPU 1511-1 PN TX RAIL
Standards, approvals, certificates		
Railway application		
• EN 50121-3-2	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT2, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support
Ambient conditions		
Ambient temperature during operation		
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	60 °C; = Tmax; +70 °C for 10 min (OT2, ST1/ST2 acc. to EN 50155); display: 50 °C, the display is switched off at an operating temperature of typically 50 °C	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155); display: 50 °C, the display is switched off at an operating temperature of typically 50 °C
• vertical installation, min.	-40 °C; = Tmin	-40 °C; = Tmin
• vertical installation, max.	40 °C; = Tmax; display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off	40 °C; = Tmax; display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off
Altitude during operation relating to sea level		
• Installation altitude above sea level, max.	2 000 m	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity		
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance		
• Coolants and lubricants		
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems		
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *
• Use on land craft, rail vehicles and special-purpose vehicles		
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *
• Usage in industrial process technology		
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark		
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating		
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A

Article number	**6AG2511-1AK02-1AB0** SIPLUS S7-1500 CPU 1511-1 PN T1 RAIL	**6AG2511-1AK02-4AB0** SIPLUS S7-1500 CPU 1511-1 PN TX RAIL
Configuration/header		
Configuration / programming / header		
• Programming language		
- LAD	Yes	Yes
- FBD	Yes	Yes
- STL	Yes	Yes
- SCL	Yes	Yes
- GRAPH	Yes	Yes
Know-how protection		
• User program protection/password protection	Yes	Yes
• Copy protection	Yes	Yes
• Block protection	Yes	Yes
Access protection		
• Password for display	Yes	Yes
• Protection level: Write protection	Yes	Yes
• Protection level: Read/write protection	Yes	Yes
• Protection level: Complete protection	Yes	Yes
Dimensions		
Width	35 mm	70 mm
Height	147 mm	147 mm
Depth	129 mm	129 mm
Weights		
Weight, approx.	405 g	590 g
Other		
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

	Version	Article No.
	SIPLUS S7-1500 CPU 1511-1 PN T1 RAIL Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic 150 KB work memory for program, 1 MB for data, PROFINET IO IRT interface; SIMATIC Memory Card required For areas with extreme exposure to media (conformal coating); ambient temperature -25 ... +55 °C (+70 °C for 10 min.)	**6AG2511-1AK02-1AB0**
	SIPLUS S7-1500 CPU 1511-1 PN TX RAIL Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic Without display; 150 KB work memory for program, 1 MB for data, PROFINET IO IRT interface; SIMATIC Memory Card required For areas with extreme exposure to media (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2511-1AK02-4AB0**
	Accessories	
	SIMATIC Memory Card	
	4 MB	**6ES7954-8LC03-0AA0**
	12 MB	**6ES7954-8LE03-0AA0**
	24 MB	**6ES7954-8LF03-0AA0**
	256 MB	**6ES7954-8LL03-0AA0**
	2 GB	**6ES7954-8LP03-0AA0**
	32 GB	**6ES7954-8LT03-0AA0**

*** You can order this quantity or a multiple thereof.**

SIPLUS S7-1500 CPU 1516-3 PN/DP RAIL

Overview

- The CPU with a large program and data memory in the SIPLUS extreme RAIL S7-1500 Controller product range for applications with demanding requirements regarding program scope and networking.
- Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic.
- High processing speed for binary and floating-point arithmetic.
- Used as central controller in production lines with central and distributed I/O.
- PROFINET IO IRT interface with 2-port switch.
- PROFINET IO controller for operating distributed I/O on PROFINET.
- PROFINET I-Device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or non-Siemens PROFINET IO controller.
- Additional PROFINET interface with separate IP address for network separation, for connecting further PROFINET IO RT devices, or for high-speed communication as an I-Device.
- PROFIBUS DP master interface.
- UA Server and Client as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/systems with the functions:
  - OPC UA Data Access
  - OPC UA Security
  - OPC UA Methods Call
  - Support of OPC UA Companion Specifications
  - OPC UA Alarms and Conditions
- Central and distributed isochronous mode on PROFIBUS and PROFINET.
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders, output cams/cam tracks and probes.
- Integrated web server for diagnostics with the option of creating user-defined web pages.

Note:

SIMATIC Memory Card required for operation of the CPU

Application

The SIPLUS S7-1500 CPU 1516-3 PN/DP TX RAIL is the railway controller CPU with a large program and data memory for demanding tasks in applications that also contain distributed automation structures alongside central I/O.

It can be used as a PROFINET IO Controller or as distributed intelligence (PROFINET I-Device). The integrated PROFINET IO IRT interface is designed as a 2-port switch so that a linear topology can be set up.

The additional integrated PROFINET interface with separate IP address can be used, for example, for network separation.

Distributed I/O can be connected via PROFIBUS via the integrated PROFIBUS interface.

In addition, the CPU offers comprehensive control functionalities as well as the ability to connect drives via standardized PLCopen blocks.

Design

The SIPLUS S7-1500 CPU 1516-3 PN/DP TX RAIL has:

- A powerful processor:
  The CPU achieves command execution times as low as 10 ns per binary instruction.
- A large work memory:
  1 MB for program, 5 MB for data
- SIMATIC Memory Cards as load memory;
  permit additional functions such as datalog and archives
- Flexible expansion capability:
  single-tier configuration with max. 32 modules (CPU + 31 modules)
- Display with the functions for
  - Display of overview information such as IP address of the integrated interface, station name, plant designation, location designation, etc.
  - Display and acknowledgement of diagnostic and user messages
  - Display of module information
  - Showing display settings
  - Display of a user-definable logo
  - Setting of IP addresses
  - Setting of date and time
  - Selection of the operating mode
  - Resetting of the CPU to factory settings
  - Backup and restoring of the project
  - Disabling/enabling of the display
  - Enabling of protection levels
- PROFINET IO IRT interface for connecting distributed I/O via PROFINET
- PROFINET interface for network separation
- PROFIBUS DP interface for connecting distributed I/O via PROFIBUS

Function

- Performance
  - Faster command processing, depending on the CPU type, language extensions and new data types
  - Even shorter response times of the CPUs due to considerably faster backplane bus
  - High-performance network connection:
    Each CPU is equipped with PROFINET IO IRT (2-port switch) as standard interface. In addition, the CPU 1516-3 PN/DP features a second PROFINET interface, e.g. for network separation, for connecting further PROFINET IO RT devices, or for high-speed communication as an I-Device.
- Integrated technology
  - Connection of analog and PROFIdrive-capable drives via standardized blocks (PLCopen)
  - Support of speed-controlled and positioning axes as well as external encoders, precise position gearing between axes, output cams/output cam tracks and probes
  - Trace functions for all CPU tags, both for diagnostics in real time as well as for sporadic error detection; can also be called via the web server of the CPU
  - Comprehensive control functionalities, e.g. easily configurable blocks for automatic optimization of the control parameters for optimum control quality
- Security Integrated
  - Password-based know-how protection against unauthorized read-out and modification of program blocks
  - Copy protection for tying individual blocks to the serial number of the SIMATIC Memory Card: The block can only run if the configured memory card is inserted into the CPU.
  - 4-level authorization concept:
    Communication to the operating panels can also be restricted.
  - Manipulation protection:
    The controller recognizes changed or unauthorized transmissions of the engineering data.
- Design and handling
  - Display of overview information:
    E.g. Station name, plant designation, location identifier, etc., diagnostic information, module information, display settings.
  - Possible operations on the display:
    Set addresses of the CPU or connected Ethernet communications processors, set date and time, select operating mode of CPU, reset CPU to factory settings, disable/enable display, activate protection levels, acknowledge messages, back up and restore projects
- Integrated system diagnostics
  - System diagnostics information is displayed consistently and in plain text in the TIA Portal, operating panels and web server, even for messages from the drives, and is updated even if the CPU is in STOP mode.
  - Integrated into the firmware of the CPU, no special configuration is required
- SIMATIC Memory Card (required for operation of the CPU)
  - Used as a plug-in load memory or for updating the firmware.
  - Also for storing additional documents or csv files (for recipes and archives)
  - Creation of data blocks for storage/reading of data via SFCs of the user program
- Datalog (archives) and recipes
  - Storage of csv files for recipes and archives on the SIMATIC Memory Card;
    easy access to plant-relevant operating data using Office tools or via a web server
  - Easy access to machine configuration data by means of a web browser or SD card reader (two-way data exchange from and to the controller)
- Programming
  - Programming with STEP 7 Professional

Technical specifications

Article number	**6AG2516-3AN02-4AB0** SIPLUS S7-1500 CPU 1516-3 PN/DP RAIL
General information	
Product type designation	CPU 1516-3 PN/DP
Engineering with • STEP 7 TIA Portal configurable/integrated from version	see entry ID: 109746275
Display	
Screen diagonal [cm]	6.1 cm
Supply voltage	
Rated value (DC)	24 V
Memory	
Work memory • integrated (for program) • integrated (for data)	 1 Mbyte 5 Mbyte
Load memory • Plug-in (SIMATIC Memory Card), max.	 32 Gbyte
CPU processing times	
for bit operations, typ.	10 ns
for word operations, typ.	12 ns
for fixed point arithmetic, typ.	16 ns
for floating point arithmetic, typ.	64 ns
Counters, timers and their retentivity	
S7 counter • Number	 2 048
IEC counter • Number	 Any (only limited by the main memory)
S7 times • Number	 2 048
IEC timer • Number	 Any (only limited by the main memory)

SIPLUS S7-1500 CPU 1516-3 PN/DP RAIL

Article number	**6AG2516-3AN02-4AB0** SIPLUS S7-1500 CPU 1516-3 PN/DP RAIL
Data areas and their retentivity	
Flag	
• Size, max.	16 kbyte
Address area	
I/O address area	
• Inputs	32 kbyte; All inputs are in the process image
• Outputs	32 kbyte; All outputs are in the process image
Time of day	
Clock	
• Type	Hardware clock
1. Interface	
Interface types	
• RJ 45 (Ethernet)	Yes; X1
• Number of ports	2
• integrated switch	Yes
Protocols	
• IP protocol	Yes; IPv4
• PROFINET IO Controller	Yes
• PROFINET IO Device	Yes
• SIMATIC communication	Yes
• Open IE communication	Yes; Optionally also encrypted
• Web server	Yes
• Media redundancy	Yes
PROFINET IO Controller	
• Services	
- PG/OP communication	Yes
- Isochronous mode	Yes
- Direct data exchange	Yes; Requirement: IRT and isochronous mode (MRPD optional)
- IRT	Yes
- PROFIenergy	Yes; per user program
- Prioritized startup	Yes; Max. 32 PROFINET devices
- Number of connectable IO Devices, max.	256; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
- Of which IO devices with IRT, max.	64
- Number of connectable IO Devices for RT, max.	256
- of which in line, max.	256
- Number of IO Devices that can be simultaneously activated/deactivated, max.	8; in total across all interfaces
- Number of IO Devices per tool, max.	8
- Updating times	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data
PROFINET IO Device	
• Services	
- PG/OP communication	Yes
- Isochronous mode	No
- IRT	Yes
- PROFIenergy	Yes; per user program
- Shared device	Yes
- Number of IO Controllers with shared device, max.	4
- Asset management record	Yes; per user program
2. Interface	
Interface types	
• RJ 45 (Ethernet)	Yes; X2
• Number of ports	1
• integrated switch	No
Protocols	
• IP protocol	Yes; IPv4
• PROFINET IO Controller	Yes
• PROFINET IO Device	Yes
• SIMATIC communication	Yes
• Open IE communication	Yes; Optionally also encrypted
• Web server	Yes
• Media redundancy	No

Article number	**6AG2516-3AN02-4AB0** SIPLUS S7-1500 CPU 1516-3 PN/DP RAIL
PROFINET IO Controller	
• Services	
- PG/OP communication	Yes
- Isochronous mode	No
- Direct data exchange	No
- IRT	No
- PROFIenergy	Yes; per user program
- Prioritized startup	No
- Number of connectable IO Devices, max.	32; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
- Number of connectable IO Devices for RT, max.	32
- of which in line, max.	32
- Number of IO Devices that can be simultaneously activated/deactivated, max.	8; in total across all interfaces
- Number of IO Devices per tool, max.	8
- Updating times	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data
PROFINET IO Device	
• Services	
- PG/OP communication	Yes
- Isochronous mode	No
- IRT	No
- PROFIenergy	Yes; per user program
- Prioritized startup	No
- Shared device	Yes
- Number of IO Controllers with shared device, max.	4
- Asset management record	Yes; per user program
3. Interface	
Interface types	
• RS 485	Yes; X3
• Number of ports	1
Protocols	
• PROFIBUS DP master	Yes
• PROFIBUS DP slave	No
• SIMATIC communication	Yes
PROFIBUS DP master	
• Number of DP slaves, max.	125; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
Protocols	
Number of connections	
• Number of connections, max.	256; via integrated interfaces of the CPU and connected CPs / CMs
Redundancy mode	
• Media redundancy	
- MRP	Yes; as MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50
- MRPD	Yes; Requirement: IRT
- Switchover time on line break, typ.	200 ms; For MRP, bumpless for MRPD
- Number of stations in the ring, max.	50
SIMATIC communication	
• S7 routing	Yes
OPC UA	
• OPC UA Client	Yes
• OPC UA Server	Yes; Data access (read, write, subscribe), method call, custom address space
Supported technology objects	
Motion Control	Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER
• Number of available Motion Control resources for technology objects	2 400
• Required Motion Control resources	
- per speed-controlled axis	40
- per positioning axis	80
- per synchronous axis	160
- per external encoder	80
- per output cam	20
- per cam track	160
- per probe	40

SIPLUS S7-1500 CPU 1516-3 PN/DP RAIL

Article number	**6AG2516-3AN02-4AB0** SIPLUS S7-1500 CPU 1516-3 PN/DP RAIL
Controller	
• PID_Compact	Yes; Universal PID controller with integrated optimization
• PID_3Step	Yes; PID controller with integrated optimization for valves
• PID-Temp	Yes; PID controller with integrated optimization for temperature
Counting and measuring	
• High-speed counter	Yes
Standards, approvals, certificates	
Railway application	
• EN 50121-3-2	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155); display: 50 °C, the display is switched off at an operating temperature of typically 50 °C
• vertical installation, min.	-40 °C; = Tmin
• vertical installation, max.	40 °C; = Tmax; display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity	
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance	
• Coolants and lubricants	
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems	
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *
• Use on land craft, rail vehicles and special-purpose vehicles	
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *
• Usage in industrial process technology	
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark	
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!

Article number	**6AG2516-3AN02-4AB0** SIPLUS S7-1500 CPU 1516-3 PN/DP RAIL
Conformal coating	
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A
Configuration / header	
Configuration / programming / header	
• Programming language	
- LAD	Yes
- FBD	Yes
- STL	Yes
- SCL	Yes
- GRAPH	Yes
Know-how protection	
• User program protection/password protection	Yes
• Copy protection	Yes
• Block protection	Yes
Access protection	
• Password for display	Yes
• Protection level: Write protection	Yes
• Protection level: Read/write protection	Yes
• Protection level: Complete protection	Yes
Dimensions	
Width	105 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	830 g
Other	
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

	Version	Article No.
	SIPLUS S7-1500 CPU 1516-3 PN/DP TX RAIL Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic Without display; 1 MB work memory for program, 5 MB for data, PROFINET IO IRT interface, PROFINET/PROFIBUS interface; SIMATIC Memory Card required For areas with extreme exposure to media (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2516-3AN01-4AB0**
	SIPLUS S7-1500 CPU 1516-3 PN/DP RAIL Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic Heat sink, no usable power unit, CPU with 1 MB work memory for program and 5 MB for data, PROFINET IRT interface, PROFINET/PROFIBUS interface; SIMATIC Memory Card required For areas with extreme exposure to media (conformal coating); ambient temperature -40 ... +70 °C, OT4 with ST1/2, (+85 °C for 10 min.)	**6AG2516-3AN02-4AB0**
	Accessories	
	SIMATIC Memory Card	
	4 MB	**6ES7954-8LC03-0AA0**
	12 MB	**6ES7954-8LE03-0AA0**
	24 MB	**6ES7954-8LF03-0AA0**
	256 MB	**6ES7954-8LL03-0AA0**
	2 GB	**6ES7954-8LP03-0AA0**
	32 GB	**6ES7954-8LT03-0AA0**

*** You can order this quantity or a multiple thereof.**

SIPLUS S7-1500 CPU 1515F-2 PN RAIL

Overview

- The CPU for applications with medium to high requirements for program/data memory in the S7-1500 controller product range
- Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic
- Can be used for safety functions up to SIL 3 according to IEC 61508 and up to PL e according to ISO 13849
- Medium to high processing speed for binary and floating-point arithmetic
- Used as central PLC in production lines with central and distributed I/O
- Supports PROFIsafe in centralized and distributed configurations
- PROFINET IO IRT interface with 2-port switch
- Additional PROFINET interface with separate IP address
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or non-Siemens PROFINET I/O controller
- Isochronous mode
- Integrated Motion Control functionalities for controlling speed-controlled and positioning axes, support for external encoders
- Integrated web server with the option of creating user-defined web pages

Note

SIMATIC Memory Card required for operation of the CPU

Application

SIPLUS S7-1500 CPU 1515F-2 PN RAIL is the CPU with a medium program and data memory for standard and fail-safe applications that also contain distributed automation structures alongside central I/O. It can be used as a PROFINET IO controller or as distributed intelligence (PROFINET I-Device). The integrated PROFINET IO IRT interface is designed as a 2-port switch, enabling a linear topology to be set up in the system. The additional integrated PROFINET interface with separate IP address can be used, for example, for network separation. In addition, the CPU offers comprehensive control functionalities as well as the option to connect drives via standardized PLCopen blocks.

Design

SIPLUS S7-1500 CPU 1515F-2 PN T2 RAIL features:

- A powerful processor:
  The CPU achieves command execution times as low as 30 ns per binary instruction.
- Large work memory:
  750 KB for program, 3 MB for data
- SIMATIC Memory Cards as load memory;
  permit additional functions such as datalog and archives
- Flexible expansion capability:
  single-tier configuration with max. 32 modules (CPU + 31 modules)
- Display with functions for
  - Displaying overview information such as IP address of the integrated interface, station name, plant designation, location identifier, etc.
  - Displaying safety mode, collective signature and date of the last download with signature change
  - Displaying diagnostic information
  - Displaying module information
  - Showing display settings
  - Displaying a user-definable logo
  - Setting IP addresses
  - Setting the date and time
  - Selecting the operating mode
  - Resetting the CPU to factory settings
  - Disabling/enabling the display
  - Enabling protection levels
- PROFINET IO IRT interface for connecting distributed I/O via PROFINET
- PROFINET interface for network separation

Function

- Performance
  - Faster command processing, depending on the CPU type, language extensions and new data types
  - Even shorter response times of the CPUs due to considerably faster backplane bus
  - Powerful network connection:
    Each CPU is equipped with PROFINET IO IRT (2-port switch) as standard interface.
- Integrated technology
  - Connection of analog and PROFIdrive-capable drives via standardized blocks (PLCopen)
  - Support of speed-controlled and positioning axes as well as external encoders
  - Trace functions for all CPU tags, both for diagnostics in real time and for sporadic error detection
  - Comprehensive control functionalities, e.g. easy to configure blocks for automatic optimization of the control parameters for optimum control quality
- Security Integrated
  - Password-based know-how protection against unauthorized read-out and modification of program blocks
  - Copy protection for tying individual blocks to the serial number of the SIMATIC Memory Card: The block can only run if the configured memory card is inserted in the CPU.
  - 4-level authorization concept:
    Communication to the operator panels can also be restricted.
  - Manipulation protection:
    The controller recognizes changed or unauthorized transmissions of the engineering data.
- Design and handling
  - Display of overview information:
    E.g. Station name, plant designation, location identifier, etc., diagnostic information, module information, display settings.
  - Operator control options on the display:
    set addresses of the CPU or connected Ethernet communications processors, set date and time, select operating mode of CPU, reset CPU to factory settings, disable/enable display, activate protection levels.
- Integrated system diagnostics
  - System diagnostics information is displayed consistently and in plain text in the display, TIA Portal, operator panels and web server, even for messages from the drives, and updated even if the CPU is in STOP mode.
  - Integrated in the firmware of the CPU, no special configuration is required

- SIMATIC Memory Card (required for operation of the CPU)
  - Used as a plug-in load memory or for updating the firmware.
  - Also for storing additional documents or csv files (for recipes and archives)
  - Storage of data blocks and storage/reading of data via SFCs of the user program
- Datalog (archives) and recipes
  - Storage of csv files for recipes and archives on the SIMATIC Memory Card;
    easy access to plant-relevant operating data using Office tools or via a web server
  - Easy access to configuration data of the machine by means of a web browser or SD card reader (two-way data exchange from and to the PLC)
- Programming of the standard program section
  - Programming with STEP 7 Professional, V13 and higher
  - Migration tool for migrating from SIMATIC S7-300/S7-400 to S7-1500, converts the standard program code largely automatically. Non-convertible code is logged and can be manually adapted.
  - S7-1200 basic programs can be transferred to S7-1500 by copy-paste.
- Programming of the fail-safe program section
  - Programming of the safety-related program section with the "STEP 7 Safety Advanced" option package

Technical specifications

Article number	**6AG2515-2FM02-4AB0** SIPLUS S7-1500 CPU 1515F-2 PN RAIL
General information	
Product type designation	CPU 1515F-2 PN
Engineering with • STEP 7 TIA Portal configurable/integrated from version	 see entry ID: 109746275
Display	
Screen diagonal [cm]	6.1 cm
Supply voltage	
Rated value (DC)	24 V
Memory	
Work memory • integrated (for program) • integrated (for data)	 750 kbyte 3 Mbyte
Load memory • Plug-in (SIMATIC Memory Card), max.	 32 Gbyte
CPU processing times	
for bit operations, typ.	30 ns
for word operations, typ.	36 ns
for fixed point arithmetic, typ.	48 ns
for floating point arithmetic, typ.	192 ns
Counters, timers and their retentivity	
S7 counter • Number	 2 048
IEC counter • Number	 Any (only limited by the main memory)
S7 times • Number	 2 048
IEC timer • Number	 Any (only limited by the main memory)
Data areas and their retentivity	
Flag • Size, max.	 16 kbyte
Address area	
I/O address area • Inputs • Outputs	 32 kbyte; All inputs are in the process image 32 kbyte; All outputs are in the process image
Time of day	
Clock • Type	 Hardware clock
1. Interface	
Interface types • RJ 45 (Ethernet) • Number of ports • integrated switch	 Yes; X1 2 Yes
Protocols • IP protocol • PROFINET IO Controller • PROFINET IO Device • SIMATIC communication • Open IE communication • Web server • Media redundancy	 Yes; IPv4 Yes Yes Yes Yes; Optionally also encrypted Yes Yes; MRP Automanager according to IEC 62439-2 Edition 2.0

SIPLUS S7-1500 CPU 1515F-2 PN RAIL

Article number	**6AG2515-2FM02-4AB0** SIPLUS S7-1500 CPU 1515F-2 PN RAIL
PROFINET IO Controller	
• Services	
- PG/OP communication	Yes
- Isochronous mode	Yes
- Direct data exchange	Yes; Requirement: IRT and isochronous mode (MRPD optional)
- IRT	Yes
- PROFIenergy	Yes
- Prioritized startup	Yes; Max. 32 PROFINET devices
- Number of connectable IO Devices, max.	256; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
- Of which IO devices with IRT, max.	64
- Number of connectable IO Devices for RT, max.	256
- of which in line, max.	256
- Number of IO Devices that can be simultaneously activated/deactivated, max.	8; in total across all interfaces
- Number of IO Devices per tool, max.	8
- Updating times	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data
PROFINET IO Device	
• Services	
- PG/OP communication	Yes
- Isochronous mode	No
- IRT	Yes
- PROFIenergy	Yes; per user program
- Shared device	Yes
- Number of IO Controllers with shared device, max.	4
- Asset management record	Yes; per user program
2. Interface	
Interface types	
• RJ 45 (Ethernet)	Yes; X2
• Number of ports	1
• integrated switch	No
Protocols	
• IP protocol	Yes; IPv4
• PROFINET IO Controller	Yes
• PROFINET IO Device	Yes
• SIMATIC communication	Yes
• Open IE communication	Yes
• Web server	Yes
• Media redundancy	No
PROFINET IO Controller	
• Services	
- PG/OP communication	Yes
- Isochronous mode	No
- Direct data exchange	No
- IRT	No
- PROFIenergy	Yes
- Prioritized startup	No
- Number of connectable IO Devices, max.	32; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
- Number of connectable IO Devices for RT, max.	32
- of which in line, max.	32
- Number of IO Devices that can be simultaneously activated/deactivated, max.	8; in total across all interfaces
- Number of IO Devices per tool, max.	8
- Updating times	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data
PROFINET IO Device	
• Services	
- PG/OP communication	Yes
- Isochronous mode	No
- IRT	No
- PROFIenergy	Yes
- Prioritized startup	No
- Shared device	Yes
- Number of IO Controllers with shared device, max.	4
- Asset management record	Yes; per user program
Protocols	
Number of connections	
• Number of connections, max.	192; via integrated interfaces of the CPU and connected CPs / CMs
Redundancy mode	
• Media redundancy	
- MRP	Yes; MRP Automanager acc. to IEC 62439-2 Edition 2.0; MRP Manager; MRP Client; max. number of devices in the ring: 50
- MRPD	Yes; Requirement: IRT
- Switchover time on line break, typ.	200 ms; For MRP, bumpless for MRPD
- Number of stations in the ring, max.	50
OPC UA	
• OPC UA Client	Yes
• OPC UA Server	Yes; Data access (read, write, subscribe), method call, custom address space

Article number	**6AG2515-2FM02-4AB0** SIPLUS S7-1500 CPU 1515F-2 PN RAIL
Supported technology objects	
Motion Control	Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER
• Number of available Motion Control resources for technology objects	2 400
• Required Motion Control resources	
- per speed-controlled axis	40
- per positioning axis	80
- per synchronous axis	160
- per external encoder	80
- per output cam	20
- per cam track	160
- per probe	40
Controller	
• PID_Compact	Yes; Universal PID controller with integrated optimization
• PID_3Step	Yes; PID controller with integrated optimization for valves
• PID-Temp	Yes; PID controller with integrated optimization for temperature
Counting and measuring	
• High-speed counter	Yes
Standards, approvals, certificates	
Highest safety class achievable in safety mode	
• SIL in accordance with EN 50126, 50128, 50129	SIL 2; a higher safety integrity level is possible if tested and approved for the specific application under consideration of all local regulations.
Probability of failure (for service life of 20 years and repair time of 100 hours)	
• Low demand mode: PFDavg in accordance with SIL3	< 2.00E-05
• High demand/continuous mode: PFH in accordance with SIL3	< 1.00E-09
Railway application	
• EN 50121-3-2	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155); display: 50 °C, the display is switched off at an operating temperature of typically 50 °C
• vertical installation, min.	-40 °C; = Tmin
• vertical installation, max.	40 °C; = Tmax; display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity	
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance	
• Coolants and lubricants	
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems	
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *
• Use on land craft, rail vehicles and special-purpose vehicles	
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *
• Usage in industrial process technology	
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark	
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!

SIPLUS S7-1500 CPU 1515F-2 PN RAIL

Article number	**6AG2515-2FM02-4AB0** SIPLUS S7-1500 CPU 1515F-2 PN RAIL
Conformal coating	
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A
Configuration / header	
Configuration / programming / header	
• Programming language	
- LAD	Yes; incl. failsafe
- FBD	Yes; incl. failsafe
- STL	Yes
- SCL	Yes
- GRAPH	Yes
Know-how protection	
• User program protection/password protection	Yes
• Copy protection	Yes
• Block protection	Yes
Access protection	
• Password for display	Yes
• Protection level: Write protection	Yes; Specific write protection both for Standard and for Failsafe
• Protection level: Read/write protection	Yes
• Protection level: Complete protection	Yes
Dimensions	
Width	105 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	820 g
Other	
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

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Selection and ordering data

	Version	Article No.
	SIPLUS S7-1500 CPU 1515F-2 PN RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic Fail-safe CPU, 750 KB work memory for program, 3 MB for data, PROFINET IRT interface with 2-port switch; PROFINET RT interface; 30 NS bit performance SIMATIC Memory Card required For areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +55 °C (+70 °C for 10 min.)	**6AG2515-2FM02-4AB0**
	Accessories	
	SIMATIC Memory Card	
	4 MB	**6ES7954-8LC03-0AA0**
	12 MB	**6ES7954-8LE03-0AA0**
	24 MB	**6ES7954-8LF03-0AA0**
	256 MB	**6ES7954-8LL03-0AA0**
	2 GB	**6ES7954-8LP03-0AA0**
	32 GB	**6ES7954-8LT03-0AA0**

*** You can order this quantity or a multiple thereof.**

Overview

- The CPU with a large program and data memory in the S7-1500 Controller product range for fail-safe applications with high requirements regarding program scope and networking.
- Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic
- Can be used for failsafe functions up to SIL 3 according to IEC 61508 and up to PLe according to ISO 13849.
- High processing speed for binary and floating-point arithmetic
- Supports PROFIsafe in centralized and distributed configuration.
- PROFINET IO IRT interface with 2-port switch.
- Additional PROFINET interface with separate IP address.
- PROFINET IO controller for operating distributed I/O on PROFINET.
- PROFINET I-Device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or non-Siemens PROFINET IO controller.
- PROFIBUS DP master interface.
- Isochronous mode on PROFIBUS and PROFINET.
- Integrated Motion Control functionalities for controlling speed-controlled and positioning axes, support for external encoders.
- Integrated web server with the option of creating user-defined web pages.

Note:

SIMATIC Memory Card required for operation of the CPU

Application

The SIPLUS CPU 1516F-3 PN/DP RAIL is the CPU with a large program and data memory for demanding standard and fail-safe applications that also contain distributed automation structures alongside central I/O.

It can be used as a PROFINET IO Controller or as distributed intelligence (PROFINET I-Device). The integrated PROFINET IO IRT interface is designed as a 2-port switch so that a linear topology can be set up in the system. The additional integrated PROFINET interface with separate IP address can be used, for example, for network separation. Distributed I/O can be connected via PROFIBUS (or PROFIsafe) via the integrated PROFIBUS interface. In addition, the CPU offers comprehensive control functionalities as well as the ability to connect drives via standardized PLCopen blocks.

Design

The SIPLUS CPU 1516F-3 PN/DP RAIL has:

- A powerful processor:
  The CPU achieves a command execution time as low as 10 ns per binary command.
- Extensive work memory:
  1.5 MB for program, 5 MB for data
- SIMATIC Memory Cards as load memory;
  permit additional functions such as datalog and archives
- Flexible expansion possibilities:
  single-tier configuration with max. 32 modules (CPU + 31 modules)
- Display with functions for:
  - Displaying overview information such as IP address of the integrated interface, station name, plant designation, location identifier, etc.
  - Displaying safety mode, overall signature and date of the last download with signature change
  - Display of diagnostic information
  - Display of module information
  - Showing display settings
  - Display of a user-definable logo
  - Setting IP addresses
  - Setting of date and time
  - Selection of operating mode
  - Resetting of the CPU to factory settings
  - Disabling/enabling of display
  - Enabling of protection levels
  - Display of safety mode, overall signature and date of the last download with signature change.
- PROFINET IO IRT interface for connecting distributed I/O via PROFINET
- PROFINET interface for network separation
- PROFIBUS DP interface for connecting distributed I/O via PROFIBUS
- Supports PROFIsafe in centralized and distributed configuration

Function

Thanks to a variety of innovations and integrated functions, the SIMATIC S7-1500 CPUs offer added value with regard to performance and engineering efficiency. A host of features support users in programming, commissioning, and servicing the S7-1500:

- Performance
  - Faster command processing, depending on the CPU type, language extensions and new data types
  - Even shorter response times of the CPUs due to considerably faster backplane bus
  - High-performance network connection:
    PROFINET IO IRT (2-port switch) as standard interface.
    Additional PROFINET interface integrated, e.g. for network separation.
- Integrated technology
  - Connection of analog and PROFIdrive-capable drives via standardized blocks (PLCopen)
  - Support of speed-controlled and positioning axes as well as external encoders
  - Trace functions for all CPU tags, both for diagnostics in real time as well as for sporadic error detection
  - Comprehensive control functionalities, e.g. easily configurable blocks for automatic optimization of the control parameters for optimum control quality
- Security Integrated
  - Password-based know-how protection against unauthorized reading and modification of program blocks
  - Copy protection for tying individual blocks to the serial number of the SIMATIC Memory Card:
    The block can only run if the configured memory card is inserted in the CPU.
    4-level authorization concept:
    Communication to the HMI devices can also be restricted.
  - Manipulation protection:
    The controller recognizes changed or unauthorized transmissions of the engineering data.
- Design and handling
  - Display of overview information:
    e.g. station name, plant identifier, location ID, diagnostic information, module information, display settings, etc.
  - Possible operations on the display:
    set addresses, set date and time, select operating mode of CPU, reset CPU to factory settings, disable/enable display, activate protection levels.

SIPLUS S7-1500 CPU 1516F-3 PN/DP RAIL

- Integrated system diagnostics
  - System diagnostics information is displayed consistently and in plain text in the display, TIA Portal, HMI devices and Web server, even for messages from the drives, and updated even if the CPU is in STOP mode.
  - Integrated in the firmware of the CPU, no special configuration is required
- SIMATIC Memory Card (required for operation of the CPU)
  - Used as plug-in load memory or for updating the firmware.
  - Also for storing additional documents or csv files (for recipes and archives)
  - Creation of data blocks for storage/reading of data via SFCs of the user program
- Datalog (archives) and recipes
  - Storage of csv files for recipes and archives on the SIMATIC Memory Card; easy access to plant-relevant operating data using Office tools or via a Web server
  - Easy access to configuration data of the machine by means of a Web browser or SD card reader (two-way data exchange from and to the controller)
- Programming of the standard program section
  - Programming with STEP 7 from V13 or higher.
- Programming of the failsafe program section
  - Programming of the safety-related program section with the option package "STEP 7 Safety Advanced".

Technical specifications

Article number	**6AG2516-3FN02-2AB0** SIPLUS S7-1500 CPU 1516F-3 PN/DP RAIL	**6AG2516-3FN02-4AB0** SIPLUS S7-1500 CPU 1516F-3 PN/DP RAIL
General information		
Product type designation	CPU 1516F-3 PN/DP	CPU 1516F-3 PN/DP
Engineering with • STEP 7 TIA Portal configurable/integrated from version	see entry ID: 109746275	see entry ID: 109746275
Display		
Screen diagonal [cm]	6.1 cm	6.1 cm
Supply voltage		
Rated value (DC)	24 V	24 V
Memory		
Work memory • integrated (for program) • integrated (for data)	 1.5 Mbyte 5 Mbyte	 1.5 Mbyte 5 Mbyte
Load memory • Plug-in (SIMATIC Memory Card), max.	 32 Gbyte	 32 Gbyte
CPU processing times		
for bit operations, typ.	10 ns	10 ns
for word operations, typ.	12 ns	12 ns
for fixed point arithmetic, typ.	16 ns	16 ns
for floating point arithmetic, typ.	64 ns	64 ns
Counters, timers and their retentivity		
S7 counter • Number	 2 048	 2 048
IEC counter • Number	 Any (only limited by the main memory)	 Any (only limited by the main memory)
S7 times • Number	 2 048	 2 048
IEC timer • Number	 Any (only limited by the main memory)	 Any (only limited by the main memory)
Data areas and their retentivity		
Flag • Size, max.	 16 kbyte	 16 kbyte
Address area		
I/O address area • Inputs • Outputs	 32 kbyte; All inputs are in the process image 32 kbyte; All outputs are in the process image	 32 kbyte; All inputs are in the process image 32 kbyte; All outputs are in the process image
Time of day		
Clock • Type	 Hardware clock	 Hardware clock
1. Interface		
Interface types • RJ 45 (Ethernet) • Number of ports • integrated switch	 Yes; X1 2 Yes	 Yes; X1 2 Yes
Protocols • IP protocol • PROFINET IO Controller • PROFINET IO Device • SIMATIC communication • Open IE communication • Web server • Media redundancy	 Yes; IPv4 Yes Yes Yes Yes; Optionally also encrypted Yes Yes; MRP Automanager according to IEC 62439-2 Edition 2.0	 Yes; IPv4 Yes Yes Yes Yes; Optionally also encrypted Yes Yes; MRP Automanager according to IEC 62439-2 Edition 2.0

Article number	**6AG2516-3FN02-2AB0** SIPLUS S7-1500 CPU 1516F-3 PN/DP RAIL	**6AG2516-3FN02-4AB0** SIPLUS S7-1500 CPU 1516F-3 PN/DP RAIL
PROFINET IO Controller		
• Services		
- PG/OP communication	Yes	Yes
- Isochronous mode	Yes	Yes
- Direct data exchange	Yes; Requirement: IRT and isochronous mode (MRPD optional)	Yes; Requirement: IRT and isochronous mode (MRPD optional)
- IRT	Yes	Yes
- PROFIenergy	Yes	Yes
- Prioritized startup	Yes; Max. 32 PROFINET devices	Yes; Max. 32 PROFINET devices
- Number of connectable IO Devices, max.	256; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	256; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
- Of which IO devices with IRT, max.	64	64
- Number of connectable IO Devices for RT, max.	256	256
- of which in line, max.	256	256
- Number of IO Devices that can be simultaneously activated/deactivated, max.	8; in total across all interfaces	8; in total across all interfaces
- Number of IO Devices per tool, max.	8	8
- Updating times	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data
PROFINET IO Device		
• Services		
- PG/OP communication	Yes	Yes
- Isochronous mode	No	No
- IRT	Yes	Yes
- PROFIenergy	Yes; per user program	Yes; per user program
- Shared device	Yes	Yes
- Number of IO Controllers with shared device, max.	4	4
- Asset management record	Yes; per user program	Yes; per user program
2. Interface		
Interface types		
• RJ 45 (Ethernet)	Yes; X2	Yes; X2
• Number of ports	1	1
• integrated switch	No	No
Protocols		
• IP protocol	Yes; IPv4	Yes; IPv4
• PROFINET IO Controller	Yes	Yes
• PROFINET IO Device	Yes	Yes
• SIMATIC communication	Yes	Yes
• Open IE communication	Yes; Optionally also encrypted	Yes; Optionally also encrypted
• Web server	Yes	Yes
• Media redundancy	No	No
PROFINET IO Controller		
• Services		
- PG/OP communication	Yes	Yes
- Isochronous mode	No	No
- Direct data exchange	No	No
- IRT	No	No
- PROFIenergy	Yes	Yes
- Prioritized startup	No	No
- Number of connectable IO Devices, max.	32; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	32; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
- Number of connectable IO Devices for RT, max.	32	32
- of which in line, max.	32	32
- Number of IO Devices that can be simultaneously activated/deactivated, max.	8; in total across all interfaces	8; in total across all interfaces
- Number of IO Devices per tool, max.	8	8
- Updating times	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data
PROFINET IO Device		
• Services		
- PG/OP communication	Yes	Yes
- Isochronous mode	No	No
- IRT	No	No
- PROFIenergy	Yes; per user program	Yes; per user program
- Prioritized startup	No	No
- Shared device	Yes	Yes
- Number of IO Controllers with shared device, max.	4	4
- Asset management record	Yes; per user program	Yes; per user program

SIPLUS S7-1500 CPU 1516F-3 PN/DP RAIL

Article number	**6AG2516-3FN02-2AB0** SIPLUS S7-1500 CPU 1516F-3 PN/DP RAIL	**6AG2516-3FN02-4AB0** SIPLUS S7-1500 CPU 1516F-3 PN/DP RAIL
3. Interface		
Interface types		
• RS 485	Yes; X3	Yes; X3
• Number of ports	1	1
Protocols		
• PROFIBUS DP master	Yes	Yes
• PROFIBUS DP slave	No	No
• SIMATIC communication	Yes	Yes
PROFIBUS DP master		
• Number of DP slaves, max.	125; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	125; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
Protocols		
Number of connections		
• Number of connections, max.	256; via integrated interfaces of the CPU and connected CPs / CMs	256; via integrated interfaces of the CPU and connected CPs / CMs
Redundancy mode		
• Media redundancy		
- Media redundancy	only via 1st interface (X1)	only via 1st interface (X1)
- MRP	Yes; MRP Automanager acc. to IEC 62439-2 Edition 2.0; MRP Manager; MRP Client; max. number of devices in the ring: 50	Yes; MRP Automanager acc. to IEC 62439-2 Edition 2.0; MRP Manager; MRP Client; max. number of devices in the ring: 50
- MRPD	Yes; Requirement: IRT	Yes; Requirement: IRT
- Switchover time on line break, typ.	200 ms; For MRP, bumpless for MRPD	200 ms; For MRP, bumpless for MRPD
- Number of stations in the ring, max.	50	50
SIMATIC communication		
• S7 routing	Yes	Yes
OPC UA		
• OPC UA Client	Yes	Yes
• OPC UA Server	Yes; Data access (read, write, subscribe), method call, custom address space	Yes; Data access (read, write, subscribe), method call, custom address space
Supported technology objects		
Motion Control	Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER	Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER
• Number of available Motion Control resources for technology objects	2 400	2 400
• Required Motion Control resources		
- per speed-controlled axis	40	40
- per positioning axis	80	80
- per synchronous axis	160	160
- per external encoder	80	80
- per output cam	20	20
- per cam track	160	160
- per probe	40	40
Controller		
• PID_Compact	Yes; Universal PID controller with integrated optimization	Yes; Universal PID controller with integrated optimization
• PID_3Step	Yes; PID controller with integrated optimization for valves	Yes; PID controller with integrated optimization for valves
• PID-Temp	Yes; PID controller with integrated optimization for temperature	Yes; PID controller with integrated optimization for temperature
Counting and measuring		
• High-speed counter	Yes	Yes
Standards, approvals, certificates		
Highest safety class achievable in safety mode		
• SIL in accordance with EN 50126, 50128, 50129	SIL 2; a higher safety integrity level is possible if tested and approved for the specific application under consideration of all local regulations.	SIL 2; a higher safety integrity level is possible if tested and approved for the specific application under consideration of all local regulations.
Probability of failure (for service life of 20 years and repair time of 100 hours)		
• Low demand mode: PFDavg in accordance with SIL3	< 2.00E-05	< 2.00E-05
• High demand/continuous mode: PFH in accordance with SIL3	< 1.00E-09	< 1.00E-09

Article number	**6AG2516-3FN02-2AB0** SIPLUS S7-1500 CPU 1516F-3 PN/DP RAIL	**6AG2516-3FN02-4AB0** SIPLUS S7-1500 CPU 1516F-3 PN/DP RAIL
Railway application		
• EN 50121-3-2	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT2, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support
Ambient conditions		
Ambient temperature during operation		
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	60 °C; = Tmax; +70 °C for 10 min (OT2, ST1/ST2 acc. to EN 50155); display: 50 °C, the display is switched off at an operating temperature of typically 50 °C	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155); display: 50 °C, the display is switched off at an operating temperature of typically 50 °C
• vertical installation, min.	-40 °C; = Tmin	-40 °C; = Tmin
• vertical installation, max.	40 °C; = Tmax; display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off	40 °C; = Tmax; display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off
Altitude during operation relating to sea level		
• Installation altitude above sea level, max.	2 000 m	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity		
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance		
• Coolants and lubricants		
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems		
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *
• Use on land craft, rail vehicles and special-purpose vehicles		
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *
• Usage in industrial process technology		
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark		
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating		
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A

SIPLUS S7-1500 CPU 1516F-3 PN/DP RAIL

Article number	**6AG2516-3FN02-2AB0** SIPLUS S7-1500 CPU 1516F-3 PN/DP RAIL	**6AG2516-3FN02-4AB0** SIPLUS S7-1500 CPU 1516F-3 PN/DP RAIL
Configuration / header		
Configuration / programming / header		
• Programming language		
- LAD	Yes; incl. failsafe	Yes; incl. failsafe
- FBD	Yes; incl. failsafe	Yes; incl. failsafe
- STL	Yes	Yes
- SCL	Yes	Yes
- GRAPH	Yes	Yes
Know-how protection		
• User program protection/password protection	Yes	Yes
• Copy protection	Yes	Yes
• Block protection	Yes	Yes
Access protection		
• Password for display	Yes	Yes
• Protection level: Write protection	Yes; Specific write protection both for Standard and for Failsafe	Yes; Specific write protection both for Standard and for Failsafe
• Protection level: Read/write protection	Yes	Yes
• Protection level: Complete protection	Yes	Yes
Dimensions		
Width	70 mm	105 mm
Height	147 mm	147 mm
Depth	129 mm	129 mm
Weights		
Weight, approx.	560 g	830 g
Other		
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

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Selection and ordering data

	Version	Article No.
	SIPLUS CPU 1516F-3 PN/DP RAIL OT2 Approved in accordance with railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic Fail-safe CPU, 1.5 MB work memory for program, 5 MB for data, PROFINET IRT interface with 2-port switch, PROFINET RT interface, PROFIBUS interface; SIMATIC Memory Card required For areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +55 °C (+70 °C for 10 min.)	**6AG2516-3FN02-2AB0**
	SIPLUS CPU 1516F-3 PN/DP RAIL OT4 Approved in accordance with railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic Fail-safe CPU, 1.5 MB work memory for program, 5 MB for data, PROFINET IRT interface with 2-port switch, PROFINET RT interface, PROFIBUS interface; SIMATIC Memory Card required For areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2516-3FN02-4AB0**
	Accessories	
	SIMATIC Memory Card	
	4 MB	**6ES7954-8LC03-0AA0**
	12 MB	**6ES7954-8LE03-0AA0**
	24 MB	**6ES7954-8LF03-0AA0**
	256 MB	**6ES7954-8LL03-0AA0**
	2 GB	**6ES7954-8LP03-0AA0**
	32 GB	**6ES7954-8LT03-0AA0**

*** You can order this quantity or a multiple thereof.**

Overview

- The CPU for applications with medium/high requirements for program scope, networking and processing speed, and with increased requirements for availability
- Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic
- High processing speed for binary and floating-point arithmetic
- PROFINET IO RT interface with 2-port switch
- Additional PROFINET interface with separate IP address
- PROFINET IO controller for operating distributed I/O on PROFINET

Note:

SIMATIC Memory Card required for operation of the CPU.

Application

The SIPLUS S7-1500 CPU 1515R-2 PN RAIL is the CPU with a large program and data memory for applications which have higher requirements for availability compared with standard CPUs. It can be used as the PROFINET IO controller. The integrated PROFINET IO RT interface is configured as a 2-port switch, enabling a ring topology required for SIPLUS S7-1500R to be set up in the system. The additional integrated PROFINET interface with separate IP address can be used, for example, for network separation.

Design

The SIPLUS S7-1500CPU 1515R-2 PN RAIL features:

- A powerful processor:
  The CPU achieves a command execution time as low as 60 ns per binary command.
- Large work memory:
  500 KB for program, 3 MB for data
- SIMATIC Memory Cards as load memory
- Display with functions for:
  - Display of overview information such as station name, higher level designation, location designation, etc.
  - Display of diagnostic information
  - Display of module information
  - Showing display settings
  - Setting IP addresses
  - Setting date and time
  - Displaying operating mode (redundant or non-redundant)
  - Displaying status (stop, primary or backup)
  - Resetting of CPU to factory settings
  - Disabling/enabling the display
  - Enabling protection levels
- PROFINET IO RT interface for connecting distributed I/O via PROFINET

Function

- Performance
  - Faster command processing, depending on the CPU type, language extensions and new data types
  - Even shorter response times of the CPUs due to considerably faster backplane bus
  - Powerful network connection:
    Each CPU is equipped with PROFINET IO RT (2-port switch) as the standard interface.
- Security Integrated
  - Password-based know-how protection against unauthorized read-out and modification of program blocks
  - Copy protection for tying individual blocks to the serial number of the SIMATIC Memory Card: The block can only run if the configured memory card is inserted into the CPU.
  - 4-level authorization concept:
    Communication to the operator panels can also be restricted.
  - Manipulation protection:
    The controller recognizes changed or unauthorized transmissions of the engineering data.
- Design and handling
  - Display of overview information:
    E.g. Station name, plant identifier, location designation, etc., diagnostic information, module information, display settings.
  - Possible operations on the display:
    set addresses, set date and time, select operating mode of CPU, reset CPU to factory settings, disable/enable display, activate protection levels.
- Integrated system diagnostics
  - System diagnostics information is displayed consistently and in plain text in the display, TIA Portal, operator panels and web server, even for messages from the drives, and updated even if the CPU is in STOP mode.
  - Integrated in the firmware of the CPU, no special configuration is required
- SIMATIC Memory Card (required for operation of the CPU)
  - Used as a plug-in load memory or for updating the firmware.
  - Also for storing additional documents or csv files (for recipes and archives)
- Programming of the standard program section
  - Programming with STEP 7 V15.1

SIPLUS S7-1500 CPU 1515R-2 PN RAIL

Technical specifications

Article number	**6AG2515-2RM00-4AB0** SIPLUS S7-1500 CPU 1515R-2 PN TX RAIL
General information	
Product type designation	CPU 1515R-2 PN
Engineering with • STEP 7 TIA Portal configurable/integrated from version	 see entry ID: 109746275
Supply voltage	
Rated value (DC)	24 V
Memory	
Work memory • integrated (for program) • integrated (for data)	 500 kbyte 3 Mbyte
Load memory • Plug-in (SIMATIC Memory Card), max.	 32 Gbyte
CPU processing times	
for bit operations, typ.	60 ns
for word operations, typ.	72 ns
for fixed point arithmetic, typ.	96 ns
for floating point arithmetic, typ.	384 ns
Counters, timers and their retentivity	
S7 counter • Number	 2 048
IEC counter • Number	 Any (only limited by the main memory)
S7 times • Number	 2 048
IEC timer • Number	 Any (only limited by the main memory)
Data areas and their retentivity	
Flag • Size, max.	 16 kbyte
Address area	
I/O address area • Inputs • Outputs	 32 kbyte; All inputs are in the process image 32 kbyte; All outputs are in the process image
1. Interface	
Interface types • RJ 45 (Ethernet) • Number of ports • integrated switch	 Yes; X1 2 Yes
Protocols • IP protocol • PROFINET IO Controller • PROFINET IO Device • SIMATIC communication • Open IE communication • Web server • Media redundancy	 Yes; IPv4 Yes No Yes; Only Server Yes No Yes
PROFINET IO Controller • Services - PG/OP communication - Isochronous mode - IRT - PROFIenergy - Number of connectable IO Devices, max. - Updating times	 Yes No No Yes 64 The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data
2. Interface	
Interface types • RJ 45 (Ethernet) • Number of ports • integrated switch	 Yes; X2 1 No
Protocols • IP protocol • PROFINET IO Controller • PROFINET IO Device • SIMATIC communication • Open IE communication • Web server • Media redundancy	 Yes; IPv4 No No Yes; Only Server Yes No No

Article number	**6AG2515-2RM00-4AB0** SIPLUS S7-1500 CPU 1515R-2 PN TX RAIL
Protocols	
Number of connections	
• Number of connections, max.	108
Redundancy mode	
• Media redundancy	
- MRP	Yes; Manager Auto is permanently set in TIA. Max. 50 nodes are possible, 16 are recommended
- MRPD	No
- Switchover time on line break, typ.	200 ms; PROFINET MRP
- Number of stations in the ring, max.	50; Only 16 are recommended, however
SIMATIC communication	
• S7 routing	No
OPC UA	
• OPC UA Client	No
• OPC UA Server	No
Supported technology objects	
Motion Control	No
Controller	
• PID_Compact	No
• PID_3Step	No
• PID-Temp	No
Counting and measuring	
• High-speed counter	No
Standards, approvals, certificates	
Railway application	
• EN 50121-3-2	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)
• vertical installation, min.	-40 °C; = Tmin
• vertical installation, max.	40 °C; = Tmax
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity	
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance	
• Coolants and lubricants	
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems	
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *
• Use on land craft, rail vehicles and special-purpose vehicles	
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *
• Usage in industrial process technology	
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark	
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating	
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A

SIPLUS S7-1500 CPU 1515R-2 PN RAIL

Article number	**6AG2515-2RM00-4AB0** SIPLUS S7-1500 CPU 1515R-2 PN TX RAIL
Configuration / header	
Configuration / programming / header	
• Programming language	
- LAD	Yes
- FBD	Yes
- STL	Yes
- SCL	Yes
- CFC	No
- GRAPH	No
Know-how protection	
• User program protection/password protection	Yes
• Copy protection	No
• Block protection	Yes
Access protection	
• Protection level: Write protection	Yes
• Protection level: Read/write protection	Yes
• Protection level: Complete protection	Yes
Dimensions	
Width	105 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	1 100 g
Other	
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

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Selection and ordering data

	Version	Article No.
	SIPLUS CPU 1515R-2 PN TX RAIL Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic SIPLUS S7-1500R CPU, 500 KB work memory for program, 3 MB for data, PROFINET RT interface with 2-port switch, PROFINET interface; SIMATIC Memory Card required For areas with extreme exposure to media (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2515-2RM00-4AB0**
	Accessories	
	SIMATIC Memory Card	
	4 MB	**6ES7954-8LC03-0AA0**
	12 MB	**6ES7954-8LE03-0AA0**
	24 MB	**6ES7954-8LF03-0AA0**
	256 MB	**6ES7954-8LL03-0AA0**
	2 GB	**6ES7954-8LP03-0AA0**
	32 GB	**6ES7954-8LT03-0AA0**

*** You can order this quantity or a multiple thereof.**

Overview

- 16-channel digital input module
- Approved in accordance with the railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic
- For flexible adaptation of the controller to the corresponding task
- For subsequent expansion of the system with additional inputs

Application

The digital module inputs records 24 V DC signals in the system and forwards them to the controller. Switches and 2-wire proximity switches can be connected.

Input modules have settable parameters and diagnostic functions and can thus be adapted flexibly to the respective process requirements.

Design

- Installation on the S7-1500 mounting rail using one single screw
- Standardized 40-pin front connector using screw terminal or push-in technology
- Standardized, harmonized front connector assignment for easier wiring
- Connectable core cross-sections: 0.25 mm^2 to 1.5 mm^2 (AWG24 to 16)
- Integrated potential bridges for flexible creation of potential groups
- Front connector can be set to prewiring position
- Front flap with expandable cable compartment, even if fully wired
- Unambiguous labeling on front of module:
  - Module type
  - Article No.
  - Hardware and firmware version
  - Channel numbers labeling
  - Cabling diagram

Included in the scope of delivery:

- One labeling strip for manual labeling
- One U connector
- Printed front door

Function

- Uniform display and diagnostics concept:
  - Module status display for ERROR (red LED) and RUN (green LED)
  - Channel status display for signal state log. "0" and log. "1" (green LED) or indication of wire break (red LED)
  - Display for monitoring the 24 V DC supply voltage (green LED)
- Supported functions:
  - Identification and maintenance data IM0 to IM3
  - Firmware update
  - Module-granular shared device and MSI (modular shared input);
    in combination with PROFINET these allow assignment to several IO controllers
  - Channel-specific parameter assignment (only HF modules)
  - Hardware interrupts (only HF modules)
  - Channel-granular diagnostics (only HF modules)
  - Isochronous mode (dependent on the module)

SIPLUS extreme RAIL digital input modules

Technical specifications

Article number	**6AG2521-1BH00-4AB0** SIPLUS S7-1500 DI 16x24VDC HF TX RAIL	**6AG2521-7EH00-4AB0** SIPLUS S7-1500 DI 16x110VDC HF TX RAIL
General information		
Product type designation	DI 16x24VDC HF	DI 16x110VDC HF
Product function		
• Isochronous mode	Yes	No
• Prioritized startup	Yes	Yes
Operating mode		
• DI	Yes	Yes
• Counter	Yes	No
• Oversampling		No
• MSI	Yes	Yes
Supply voltage		
Rated value (DC)	24 V	
Reverse polarity protection	Yes	
Digital inputs		
Number of digital inputs	16	16; > +60 °C number of simultaneously controllable inputs max. 4 (no adjacent points)
Digital inputs, parameterizable	Yes	Yes
Source/sink input	P-reading	P-reading
Input characteristic curve in accordance with IEC 61131, type 3	Yes	Yes; At 24 V DC
Digital input functions, parameterizable		
• Gate start/stop	Yes	
• Freely usable digital input	Yes	
Input voltage		
• Rated value (DC)	24 V	24 V; 48 V, 72 V, 96 V, 110 V, 125 V
• Rated value (AC)		24 V; 48 V, 125 V (50 - 60 Hz)
• for signal "0"	-30 to +5 V	-5 ... +5 V
• for signal "1"	+11 to +30V	+11 V DC to +146 V DC, as well as +154 V DC for 1 s according to EN 50155
Input current		
• for signal "1", typ.	2.5 mA	3 mA; At 24 V DC
Input delay (for rated value of input voltage)		
• for standard inputs		
- parameterizable	Yes; 0.05 / 0.1 / 0.4 / 1.6 / 3.2 / 12.8 / 20 ms	Yes; 0.05 / 0.1 / 0.4 / 1.6 / 3.2 / 12.8 / 20 ms parameterizable with DC, 20 ms fixed with AC
• for interrupt inputs		
- parameterizable	Yes	Yes
• for technological functions		
- parameterizable	Yes	No
Encoder		
Connectable encoders		
• 2-wire sensor	Yes	Yes
- permissible quiescent current (2-wire sensor), max.	1.5 mA	1.5 mA
Isochronous mode		
Filtering and processing time (TCI), min.	80 µs; At 50 µs filter time	
Bus cycle time (TDP), min.	250 µs	
Interrupts/diagnostics/status information		
Diagnostics function	Yes	Yes
Alarms		
• Diagnostic alarm	Yes	Yes
• Hardware interrupt	Yes	Yes
Diagnoses		
• Monitoring the supply voltage	Yes	No
• Wire-break	Yes; to I < 350 µA	Yes; To I < 550 µA
• Short-circuit	No	No
• Fuse blown	No	
Diagnostics indication LED		
• RUN LED	Yes; green LED	Yes; green LED
• ERROR LED	Yes; red LED	Yes; red LED
• Monitoring of the supply voltage (PWR-LED)	Yes; green LED	No
• Channel status display	Yes; green LED	Yes; green LED
• for channel diagnostics	Yes; red LED	Yes; red LED
• for module diagnostics	Yes; red LED	Yes; red LED
Potential separation		
Potential separation channels		
• between the channels and backplane bus	Yes	Yes

Article number	**6AG2521-1BH00-4AB0** SIPLUS S7-1500 DI 16x24VDC HF TX RAIL	**6AG2521-7EH00-4AB0** SIPLUS S7-1500 DI 16x110VDC HF TX RAIL
Standards, approvals, certificates		
Suitable for safety functions	No	No
Railway application		
• EN 50121-3-2	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV3 (channels to backplane bus and ground); OV2 (between the channels); pollution degree PD2; rated impulse voltage UNi = 1.5 kV; UNm = 125 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support
Ambient conditions		
Ambient temperature during operation		
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)
• vertical installation, min.	-40 °C; = Tmin	-40 °C; = Tmin
• vertical installation, max.	40 °C; = Tmax	40 °C; = Tmax
Altitude during operation relating to sea level		
• Installation altitude above sea level, max.	2 000 m	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity		
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance		
• Coolants and lubricants		
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems		
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *
• Use on land craft, rail vehicles and special-purpose vehicles		
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *
• Usage in industrial process technology		
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark		
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating		
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A

SIPLUS extreme RAIL digital input modules

Article number	**6AG2521-1BH00-4AB0** SIPLUS S7-1500 DI 16x24VDC HF TX RAIL	**6AG2521-7EH00-4AB0** SIPLUS S7-1500 DI 16x110VDC HF TX RAIL
Dimensions		
Width	35 mm	35 mm
Height	147 mm	147 mm
Depth	129 mm	129 mm
Weights		
Weight, approx.	240 g	240 g
Other		
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

Version	Article No.
SIPLUS extreme SM 521 RAIL digital input modules Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic	
SIPLUS S7-1500 DI 16 x 24 V DC HF TX RAIL 16 inputs, 24 V DC, isolated, configurable diagnostics and hardware interrupts; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2521-1BH00-4AB0**
SIPLUS S7-1500 DI 16 x 110 V DC HF TX RAIL 16 inputs, 24 ... 125 V UC, input delay 0.05 ... 20 ms, parameterizable diagnostics and hardware interrupts; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2521-7EH00-4AB0**

*** You can order this quantity or a multiple thereof.**

Overview

- 8 and 16-channel digital output modules
- Approved in accordance with the railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic
- For flexible adaptation of the controller to the corresponding task
- For subsequent expansion of the system with additional outputs

Application

Digital output modules switch 24 V DC or 230 V AC voltages in the plant and thus transfer internal signals from the controller to the plant. Solenoid valves, DC contactors, and indicator lights can be connected.

The output modules have settable parameters and diagnostic functions and can thus be adapted flexibly to the respective process requirements.

Design

- Installation on the S7-1500 mounting rail using one single screw
- Standardized 40-pin front connector using screw terminal or push-in technology
- Standardized, harmonized front connector assignment for easier wiring
- Connectable core cross-sections: 0.25 mm^2 to 1.5 mm^2 (AWG24 to 16)
- Integrated potential bridges for flexible creation of potential groups
- Front connector can be set to prewiring position
- Front flap with expandable cable compartment, even if fully wired
- Unambiguous labeling on front of module:
  - Module type
  - Article No.
  - Hardware and firmware version
  - Channel numbers labeling
  - Cabling diagram

Included in the scope of delivery:

- One labeling strip for manual labeling
- One U connector
- Printed front door

Function

- Uniform display and diagnostics concept:
  - Module status display for ERROR (red LED) and RUN (green LED)
  - Channel status indicator for signal state log. “0” and log. "1" (green LED) or indication of short-circuit (red LED)
  - Display for monitoring the 24 V DC supply voltage (green LED)
- Supported functions:
  - Identification and maintenance data IM0 to IM3
  - Firmware update
  - Channel-granular parameter assignment (HF modules only)
  - Channel-granular diagnostics (HF modules only)
  - Isochronous mode (dependent on the module)
  - Substitute values can be parameterized for the outputs

Technical specifications

Article number	**6AG2522-1BH01-4AB0** SIPLUS S7-1500 DQ 16x24VDC HF TX RAIL	**6AG2522-5EH00-4AB0** SIPLUS S7-1500 DQ 16x110VDC ST TX RAIL	**6AG2522-5HF00-1AB0** SIPLUS S7-1500 DQ 8x230VAC ST 5A T1 RAIL
General information			
Product type designation	DQ 16x24VDC/0.5A HF	DQ 16x110VDC ST	DQ 8x230 V AC/5 A ST (relay)
Product function			
• Isochronous mode	Yes	No	No
• Fast startup			Yes; 500 ms
• Prioritized startup	Yes	Yes	
Operating mode			
• DQ		Yes	
• DQ with energy-saving function		No	
• PWM		No	
• Oversampling		No	
• MSO	Yes	Yes	
Supply voltage			
Rated value (DC)	24 V		24 V
Reverse polarity protection	Yes; through internal protection with 7 A per group		
Digital outputs			
Type of digital output	Transistor	Transistor	Relays
Number of digital outputs	16	16; > +60 °C max. 0.25 A per output	8
Current-sinking		Yes	

SIPLUS extreme RAIL digital output modules

Article number	**6AG2522-1BH01-4AB0** SIPLUS S7-1500 DQ 16x24VDC HF TX RAIL	**6AG2522-5EH00-4AB0** SIPLUS S7-1500 DQ 16x110VDC ST TX RAIL	**6AG2522-5HF00-1AB0** SIPLUS S7-1500 DQ 8x230VAC ST 5A T1 RAIL
Current-sourcing	Yes	Yes	
Digital outputs, parameterizable	Yes	Yes	Yes
Short-circuit protection	Yes; Clocked electronically		No
Open-circuit detection	Yes		
Limitation of inductive shutdown voltage to	L+ (-53 V)	200 V (suppressor diode)	
Controlling a digital input	Yes	Yes	possible
Size of motor starters according to NEMA, max.			5
Switching capacity of the outputs			
• with resistive load, max.	0.5 A	0.5 A	
• on lamp load, max.	5 W	40 W; At 125 V DC, 10 W at 48 V UC, 5 W at 24 V UC	1 500 W; 10 000 operating cycles
• Low energy/fluorescent lamps with electronic control gear			10x 58 W (25 000 operating cycles)
• Fluorescent tubes, conventionally compensated			1x 58 W (25 000 operating cycles)
• Fluorescent tubes, uncompensated			10x 58 W (25 000 operating cycles)
Load resistance range			
• lower limit	48 Ω		
• upper limit	12 kΩ		
Output voltage			
• for signal "1", min.	L+ (-0.8 V)	L+ (-1.0 V)	
Output current			
• for signal "1" rated value	0.5 A	0.5 A	5 A
• for signal "0" residual current, max.	0.5 mA		0 A
Output delay with resistive load			
• "0" to "1", max.	100 µs	5 ms	
• "1" to "0", max.	100 µs; at rated load	5 ms	
Parallel switching of two outputs			
• for logic links	Yes	Yes	Yes
• for uprating	Yes	No	No
• for redundant control of a load	Yes	Yes	Yes
Switching frequency			
• with resistive load, max.	100 Hz	25 Hz	2 Hz
• with inductive load, max.	0.5 Hz; According to IEC 60947-5-1, DC-13	0.5 Hz	0.5 Hz
• on lamp load, max.	10 Hz	10 Hz	2 Hz
Total current of the outputs			
• Current per channel, max.	0.5 A; see additional description in the manual	0.5 A	8 A; see additional description in the manual
• Current per group, max.	4 A; see additional description in the manual	0.5 A	8 A; see additional description in the manual
• Current per module, max.	8 A; see additional description in the manual	8 A	64 A; see additional description in the manual
Relay outputs			
• Number of relay outputs			8
• Rated supply voltage of relay coil L+ (DC)			24 V
• Current consumption of relays (coil current of all relays), max.			80 mA
• external protection for relay outputs			With miniature circuit breaker with characteristic B for: cos φ 1.0: 600 A cos φ 0.5 ... 0.7: 900 A with 8 A Diazed fuse: 1 000 A
• Contact connection (internal)			No
• Number of operating cycles, max.			4 000 000; see additional description in the manual
• Relay approved acc. to UL 508			Yes; 250 V AC/5 A g.p.; 120 V AC TV-4 tungsten; A300, R300
Switching capacity of contacts			
• with inductive load, max.			see additional description in the manual
• with resistive load, max.			see additional description in the manual
Isochronous mode			
Execution and activation time (TCO), min.	70 µs		
Bus cycle time (TDP), min.	250 µs		
Interrupts/diagnostics/status information			
Diagnostics function	Yes	No	Yes
Substitute values connectable	Yes	Yes	Yes
Alarms			
• Diagnostic alarm	Yes	No	Yes
Diagnoses			
• Monitoring the supply voltage	Yes	No	Yes
• Wire-break	Yes	No	No
• Short-circuit	Yes	No	No
• Fuse blown	No		

Article number	**6AG2522-1BH01-4AB0** SIPLUS S7-1500 DQ 16x24VDC HF TX RAIL	**6AG2522-5EH00-4AB0** SIPLUS S7-1500 DQ 16x110VDC ST TX RAIL	**6AG2522-5HF00-1AB0** SIPLUS S7-1500 DQ 8x230VAC ST 5A T1 RAIL
Diagnostics indication LED			
• RUN LED	Yes; green LED	Yes; green LED	Yes; green LED
• ERROR LED	Yes; red LED	Yes; red LED	Yes; red LED
• Monitoring of the supply voltage (PWR-LED)	Yes; green LED	No	Yes; green LED
• Channel status display	Yes; green LED	Yes; green LED	Yes; green LED
• for channel diagnostics	Yes; red LED	No	No
• for module diagnostics	Yes; red LED	Yes; red LED	Yes; red LED
Potential separation			
Potential separation channels			
• between the channels and backplane bus	Yes	Yes	Yes
Standards, approvals, certificates			
Suitable for safety functions	No	No	No
Suitable for safety-related tripping of standard modules			No
Railway application			
• EN 50121-3-2	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV3 (channels to backplane bus and ground); OV2 (between the channels); pollution degree PD2; rated impulse voltage UNi = 1.5 kV; UNm = 125 V DC	Yes; Railway applications - overvoltage category OV3; pollution degree PD2; UNm = 230 V AC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support
Ambient conditions			
Ambient temperature during operation			
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)	-25 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	70 °C; = Tmax; > +60 °C number of simultaneously controllable outputs max. 8x 0.5 A, max. total current per group 2 A; +85 °C for 10 minutes (OT4, ST1/ST2 acc. to EN 50155)	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155)
• vertical installation, min.	-40 °C; = Tmin	-40 °C; = Tmin	-25 °C; = Tmin
• vertical installation, max.	40 °C; = Tmax	40 °C; = Tmax	60 °C; = Tmax
Altitude during operation relating to sea level			
• Installation altitude above sea level, max.	2 000 m	2 000 m	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity			
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance			
• Coolants and lubricants			
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems			
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *

SIPLUS extreme RAIL digital output modules

Article number	6AG2522-1BH01-4AB0 SIPLUS S7-1500 DQ 16x24VDC HF TX RAIL	6AG2522-5EH00-4AB0 SIPLUS S7-1500 DQ 16x110VDC ST TX RAIL	6AG2522-5HF00-1AB0 SIPLUS S7-1500 DQ 8x230VAC ST 5A T1 RAIL
• Use on land craft, rail vehicles and special-purpose vehicles			
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *
• Usage in industrial process technology			
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark			
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating			
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection	Yes; Type 1 protection	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A
Dimensions			
Width	35 mm	35 mm	35 mm
Height	147 mm	147 mm	147 mm
Depth	129 mm	129 mm	129 mm
Weights			
Weight, approx.	230 g	230 g	350 g
Other			
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

Version	Article No.
SIPLUS extreme SM 522 RAIL digital output modules Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic	
SIPLUS S7-1500 DQ 16 x 24 V DC HF TX RAIL 16 outputs, 24 V DC; 0.5 A, isolated; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2522-1BH01-4AB0**
SIPLUS S7-1500 DQ 8 x 230 V AC ST 5A T1 RAIL 8 relay outputs, 230 V AC; 5 A; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -25 ... +55 °C (+70 °C for 10 min.)	**6AG2522-5HF00-1AB0**
SIPLUS S7-1500 DQ 16 x 110 V DC ST TX RAIL 16 outputs, 24 ... 48 V UC, 125 V DC, 0.5 A, isolated; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2522-5EH00-4AB0**

* You can order this quantity or a multiple thereof.

Overview

- 8-channel analog input modules
- Approved in accordance with the railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic
- Optionally with extremely short conversion times
- For the connection of analog sensors without additional amplifiers
- Even solves more complex automation tasks

Application

Analog input modules record process signals such as pressure or temperature and forward them in digitalized format (16-bit format) to the control. They are suitable for measuring current (2-wire and 4-wire transducers), voltage, and resistance, as well as for the connection of resistance thermometers and thermocouples (measurement types depend on the module).

Design

- Installation on the S7-1500 mounting rail using one single screw
- Standardized 40-pin front connector using screw terminal or push-in technology
- Connectable core cross-sections: 0.25 mm^2 to 1.5 mm^2 (AWG24 to 16), regardless of the front connector used
- Front connector can be set to prewiring position
- Front flap with expandable cable compartment, even if fully wired
- Integrated shielding concept
- Unambiguous labeling on front of module:
  - Module type
  - Article No.
  - Hardware and firmware version
  - Channel numbers labeling
  - Cabling diagram

Included in the scope of delivery:

- Infeed element, shield clamp, and shield terminal
- One labeling strip for manual labeling
- One U connector
- Printed front door

Function

- Uniform display and diagnostics concept:
  - Module status display for ERROR (red LED) and RUN (green LED)
  - Channel status display (channel activated or deactivated, green LED) or diagnostics display (red LED)
  - Display for monitoring the 24 V DC supply voltage (green LED)
- Supported functions:
  - Consistently high resolution of 16 bits
  - Identification and maintenance data IM0 to IM3
  - Firmware update
  - Channel-specific parameter assignment
  - Hardware interrupts; two upper and two lower limits can be parameterized
  - Channel-granular diagnostics (depends on measurement type/measuring range)
  - Isochronous mode (dependent on the module)
  - Calibration during runtime

Technical specifications

Article number	**6AG2531-7NF10-4AB0** SIPLUS S7-1500 AI 8xU/I HS TX RAIL	**6AG2531-7KF00-4AB0** SIPLUS S7-1500 AI 8xU/I/RTD/TC TX RAIL
General information		
Product type designation	AI 8xU/I HS	AI 8xU/I/RTD/TC ST
Product function		
• Isochronous mode	Yes	No
• Prioritized startup	Yes	No
• Measuring range scalable	No	No
• Scalable measured values	No	No
• Adjustment of measuring range	No	No
Engineering with		
• STEP 7 TIA Portal configurable/integrated from version	see entry ID: 109746275	see entry ID: 109746275
Operating mode		
• Oversampling	Yes	No
• MSI	Yes	Yes
Supply voltage		
Rated value (DC)	24 V	24 V
Reverse polarity protection	Yes	Yes
Analog inputs		
Number of analog inputs	8; > +60 °C max. 4x ±20 mA or 4x ±10 V permissible	8; > +60 °C max. 2x ±20 mA or 4x ±10 V or 4x RTD permissible
• For current measurement	8	8
• For voltage measurement	8	8
• For resistance/resistance thermometer measurement		4
• For thermocouple measurement		8
permissible input voltage for voltage input (destruction limit), max.	28.8 V	28.8 V
permissible input current for current input (destruction limit), max.	40 mA	40 mA
Technical unit for temperature measurement adjustable		Yes; °C/°F/K
Input ranges (rated values), voltages		
• 0 to +5 V	No	No
• 0 to +10 V	No	No
• 1 V to 5 V	Yes	Yes
• -1 V to +1 V		Yes
• -10 V to +10 V	Yes	Yes
• -2.5 V to +2.5 V	No	Yes
• -25 mV to +25 mV	No	No
• -250 mV to +250 mV	No	Yes
• -5 V to +5 V	Yes	Yes
• -50 mV to +50 mV	No	Yes
• -500 mV to +500 mV	No	Yes
• -80 mV to +80 mV	No	Yes
Input ranges (rated values), currents		
• 0 to 20 mA	Yes	Yes
• -20 mA to +20 mA	Yes	Yes
• 4 mA to 20 mA	Yes	Yes
Input ranges (rated values), thermocouples		
• Type B	No	Yes
• Type C	No	No
• Type E	No	Yes
• Type J	No	Yes
• Type K	No	Yes
• Type L	No	No
• Type N	No	Yes
• Type R	No	Yes
• Type S	No	Yes
• Type T	No	Yes
• Type TXK/TXK(L) to GOST	No	No

Article number	**6AG2531-7NF10-4AB0** SIPLUS S7-1500 AI 8xU/I HS TX RAIL	**6AG2531-7KF00-4AB0** SIPLUS S7-1500 AI 8xU/I/RTD/TC TX RAIL
Input ranges (rated values), resistance thermometer		
• Cu 10	No	No
• Cu 10 according to GOST	No	No
• Cu 50	No	No
• Cu 50 according to GOST	No	No
• Cu 100	No	No
• Cu 100 according to GOST	No	No
• Ni 10	No	No
• Ni 10 according to GOST	No	No
• Ni 100	No	Yes; Standard/climate
• Ni 100 according to GOST	No	No
• Ni 1000	No	Yes; Standard/climate
• Ni 1000 according to GOST	No	No
• LG-Ni 1000	No	Yes; Standard/climate
• Ni 120	No	No
• Ni 120 according to GOST	No	No
• Ni 200	No	No
• Ni 200 according to GOST	No	No
• Ni 500	No	No
• Ni 500 according to GOST	No	No
• Pt 10	No	No
• Pt 10 according to GOST	No	No
• Pt 50	No	No
• Pt 50 according to GOST	No	No
• Pt 100	No	Yes; Standard/climate
• Pt 100 according to GOST	No	No
• Pt 1000	No	Yes; Standard/climate
• Pt 1000 according to GOST	No	No
• Pt 200	No	Yes; Standard/climate
• Pt 200 according to GOST	No	No
• Pt 500	No	Yes; Standard/climate
• Pt 500 according to GOST	No	No
Input ranges (rated values), resistors		
• 0 to 150 ohms	No	Yes
• 0 to 300 ohms	No	Yes
• 0 to 600 ohms	No	Yes
• 0 to 3000 ohms	No	No
• 0 to 6000 ohms	No	Yes
• PTC	No	Yes
Thermocouple (TC)		
Temperature compensation		
• parameterizable		Yes
Cable length		
• shielded, max.	800 m	800 m; for U/I, 200 m for R/RTD, 50 m for TC
Analog value generation for the inputs		
Integration and conversion time/resolution per channel		
• Resolution with overrange (bit including sign), max.	16 bit	16 bit
• Integration time, parameterizable		Yes
• Integration time (ms)		2,5 / 16,67 / 20 / 100 ms
• Basic conversion time, including integration time (ms)		9 / 23 / 27 / 107 ms
- additional conversion time for resistance measurement		150 ohm, 300 ohm, 600 ohm, Pt100, Pt200, Ni100: 2 ms, 6000 ohm, Pt500, Pt1000, Ni1000, LG-Ni1000, PTC: 4 ms
• Interference voltage suppression for interference frequency f1 in Hz		400 / 60 / 50 / 10 Hz
• Basic execution time of the module (all channels released)	62.5 µs; independent of number of activated channels	
Smoothing of measured values		
• parameterizable	Yes	Yes
Encoder		
Connection of signal encoders		
• for voltage measurement	Yes	Yes
• for current measurement as 2-wire transducer	Yes	Yes
- Burden of 2-wire transmitter, max.	820 Ω	820 Ω
• for current measurement as 4-wire transducer	Yes	Yes
• for resistance measurement with two-wire connection	No	Yes; Only for PTC
• for resistance measurement with three-wire connection	No	Yes; All measuring ranges except PTC; internal compensation of the cable resistances
• for resistance measurement with four-wire connection	No	Yes; All measuring ranges except PTC

SIPLUS extreme RAIL analog input modules

Article number	**6AG2531-7NF10-4AB0** SIPLUS S7-1500 AI 8xU/I HS TX RAIL	**6AG2531-7KF00-4AB0** SIPLUS S7-1500 AI 8xU/I/RTD/TC TX RAIL
Errors/accuracies		
Basic error limit (operational limit at 25 °C)		
• Voltage, relative to input range, (+/-)	0.2 %	0.1 %
• Current, relative to input range, (+/-)	0.2 %	0.1 %
• Resistance, relative to input range, (+/-)		0.1 %
• Resistance thermometer, relative to input range, (+/-)		Ptxxx standard: ±0.7 K, Ptxxx climate: ±0.2 K, Nixxx standard: ±0.3 K, Nixxx climate: ±0.15 K
• Thermocouple, relative to input range, (+/-)		Type B: > 600 °C ±1.7 K, type E: > -200 °C ±0.7 K, type J: > -210 °C ±0.8 K, type K: > -200 °C ±1.2 K, type N: > -200 °C ±1.2 K, type R: > 0 °C ±1.9 K, type S: > 0 °C ±1.9 K, type T: > -200 °C ±0.8 K
Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency		
• Series mode interference (peak value of interference < rated value of input range), min.		40 dB
• Common mode voltage, max.	10 V	10 V
• Common mode interference, min.	50 dB at 400 Hz; 60 dB at 60 / 50 / 10 Hz	60 dB
Isochronous mode		
Filtering and processing time (TCI), min.	80 µs	
Bus cycle time (TDP), min.	250 µs	
Interrupts/diagnostics/status information		
Diagnostics function	Yes	Yes
Alarms		
• Diagnostic alarm	Yes	Yes
• Limit value alarm	Yes; two upper and two lower limit values in each case	Yes; two upper and two lower limit values in each case
Diagnoses		
• Monitoring the supply voltage	Yes	Yes
• Wire-break	Yes; only for 1 ... 5 V and 4 ... 20 mA	Yes; Only for 1 to 5 V, 4 to 20 mA, TC, R, and RTD
• Overflow/underflow	Yes	Yes
Diagnostics indication LED		
• RUN LED	Yes; green LED	Yes; green LED
• ERROR LED	Yes; red LED	Yes; red LED
• Monitoring of the supply voltage (PWR-LED)	Yes; green LED	Yes; green LED
• Channel status display	Yes; green LED	Yes; green LED
• for channel diagnostics	Yes; red LED	Yes; red LED
• for module diagnostics	Yes; red LED	Yes; red LED
Potential separation		
Potential separation channels		
• between the channels and backplane bus	Yes	Yes
Standards, approvals, certificates		
Railway application		
• EN 50121-3-2	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support
Ambient conditions		
Ambient temperature during operation		
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)
• vertical installation, min.	-40 °C; = Tmin	-40 °C; = Tmin
• vertical installation, max.	40 °C; = Tmax	40 °C; = Tmax
Altitude during operation relating to sea level		
• Installation altitude above sea level, max.	2 000 m	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity		
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation

Article number	**6AG2531-7NF10-4AB0** SIPLUS S7-1500 AI 8xU/I HS TX RAIL	**6AG2531-7KF00-4AB0** SIPLUS S7-1500 AI 8xU/I/RTD/TC TX RAIL
Resistance		
• Coolants and lubricants		
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems		
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *
• Use on land craft, rail vehicles and special-purpose vehicles		
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *
• Usage in industrial process technology		
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark		
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating		
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A
Dimensions		
Width	35 mm	35 mm
Height	147 mm	147 mm
Depth	129 mm	129 mm
Weights		
Weight, approx.	300 g	310 g
Other		
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

Version	Article No.
SIPLUS extreme SM 531 RAIL analog input modules Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic	
SIPLUS S7-1500 AI 8xU/I HS T1 RAIL 8 analog inputs, ±10 V, ±5 V, 1 ... 5 V or 0/4 ... 20 mA, ±20 mA, 16-bit + sign; incl. infeed element, shield clamp, shield terminal, labeling strips, U connector, printed front door; for areas with extreme exposure to environmental substances (conformal coating) Ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2531-7NF10-4AB0**
SIPLUS S7-1500 AI 8xU/I/RTD/TC T1 RAIL 8 analog inputs, ±10 V, ±5 V, ±2.5 V, ±1 V, ±500 mV, ±250 mV, ±80 mV, ±50 mV, 1 ... 5 V, 0/4 ... 20 mA, ±20 mA, thermocouples type B, E, J, K, N, R, S, T, resistance thermometers Ni 100, Ni 1000, LG-Ni 1000, Pt 100, Pt 1000, Pt 250, Pt 500, resistors 0...150/300/600/6000 ohms, 16-bit; for areas with extreme exposure to environmental substances (conformal coating); Ambient temperature -25 ... +55 °C (+70 °C for 10 min.)	**6AG2531-7KF00-4AB0**

*** You can order this quantity or a multiple thereof.**

SIPLUS extreme RAIL analog output modules

Overview

- 4-channel analog output module
- Approved in accordance with the railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic
- Optionally with extremely short conversion times
- For connecting analog actuators without additional amplifiers
- Even solves more complex automation tasks

Application

Analog output modules convert a 16-bit digital value into a current or a voltage and output this to the process. They are suitable, for example, for controlling proportional valves or small servo drives.

Design

- Installation on the S7-1500 mounting rail using one single screw
- Standardized 40-pin front connector using screw terminal or push-in technology
- Connectable core cross-sections: 0.25 mm^2 to 1.5 mm^2 (AWG24 to 16), regardless of the front connector used
- Front connector can be set to prewiring position
- Front flap with expandable cable compartment, even if fully wired
- Integrated shielding concept
- Unambiguous labeling on front of module:
  - Module type
  - Article No.
  - Hardware and firmware version
  - Channel numbers labeling
  - Cabling diagram

Included in the scope of delivery:

- Infeed element, shield clamp, and shield terminal
- One labeling strip for manual labeling
- One U connector
- Printed front door

Function

- Uniform display and diagnostics concept:
  - Module status display for ERROR (red LED) and RUN (green LED)
  - Channel status display (channel activated or deactivated, green LED) or diagnostics display (red LED)
  - Display for monitoring the 24 V DC supply voltage (green LED)
- Supported functions:
  - Consistently high resolution of 16 bits
  - Identification and maintenance data IM0 to IM3
  - Firmware update
  - Channel-specific parameter assignment
  - Channel-granular diagnostics (depends on measurement type/measuring range)
  - Substitute values can be parameterized for the outputs
  - Calibration during runtime
  - Isochronous mode (dependent on the module)

Technical specifications

Article number	**6AG2532-5HD00-4AB0** SIPLUS S7-1500 AQ 4xU/I ST TX RAIL
General information	
Product type designation	AQ 4xU/I ST
Product function • Isochronous mode • Prioritized startup • Output range scalable	 No No No
Engineering with • STEP 7 TIA Portal configurable/integrated from version	 see entry ID: 109746275
Operating mode • Oversampling • MSO	 No Yes
Supply voltage	
Rated value (DC)	24 V
Reverse polarity protection	Yes
Analog outputs	
Number of analog outputs	4; > +60 °C max. 4x ±10 V permissible
Cycle time (all channels), min.	3.2 ms; independent of number of activated channels

Article number	**6AG2532-5HD00-4AB0** SIPLUS S7-1500 AQ 4xU/I ST TX RAIL
Output ranges, voltage	
• 0 to 10 V	Yes
• 1 V to 5 V	Yes
• -5 V to +5 V	No
• -10 V to +10 V	Yes
Output ranges, current	
• 0 to 20 mA	Yes
• -20 mA to +20 mA	Yes
• 4 mA to 20 mA	Yes
Connection of actuators	
• for voltage output two-wire connection	Yes
• for voltage output four-wire connection	Yes
• for current output two-wire connection	Yes
Load impedance (in rated range of output)	
• with voltage outputs, min.	1 kΩ; 0.5 kOhm at 1 to 5 V
• with voltage outputs, capacitive load, max.	1 µF
• with current outputs, max.	750 Ω
• with current outputs, inductive load, max.	10 mH
Cable length	
• shielded, max.	800 m; for current, 200 m for voltage
Analog value generation for the outputs	
Integration and conversion time/resolution per channel	
• Resolution with overrange (bit including sign), max.	16 bit
• Conversion time (per channel)	0.5 ms
Settling time	
• for resistive load	1.5 ms
• for capacitive load	2.5 ms
• for inductive load	2.5 ms
Errors/accuracies	
Basic error limit (operational limit at 25 °C)	
• Voltage, relative to output range, (+/-)	0.2 %
• Current, relative to output range, (+/-)	0.2 %
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Substitute values connectable	Yes
Alarms	
• Diagnostic alarm	Yes
Diagnoses	
• Monitoring the supply voltage	Yes
• Wire-break	Yes; Only for output type "current"
• Short-circuit	Yes; Only for output type "voltage"
• Overflow/underflow	Yes
Diagnostics indication LED	
• RUN LED	Yes; green LED
• ERROR LED	Yes; red LED
• Monitoring of the supply voltage (PWR-LED)	Yes; green LED
• Channel status display	Yes; green LED
• for channel diagnostics	Yes; red LED
• for module diagnostics	Yes; red LED
Potential separation	
Potential separation channels	
• between the channels and backplane bus	Yes
Standards, approvals, certificates	
Railway application	
• EN 50121-3-2	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)
• vertical installation, min.	-40 °C; = Tmin
• vertical installation, max.	40 °C; = Tmax
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)

SIPLUS extreme RAIL analog output modules

Article number	**6AG2532-5HD00-4AB0** SIPLUS S7-1500 AQ 4xU/I ST TX RAIL
Relative humidity	
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance	
• Coolants and lubricants	
- Resistant to commercially available coolants and ubricants	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems	
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *
• Use on land craft, rail vehicles and special-purpose vehicles	
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *
• Usage in industrial process technology	
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark	
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating	
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A
Dimensions	
Width	35 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	310 g
Other	
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

Version	Article No.
SIPLUS extreme RAIL SM 532 analog output modules Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic	
SIPLUS S7-1500 AQ 4xU/I ST TX RAIL 4 analog outputs, ±10 V, 1 ... 5 V, 0 ... 10 V or ±20 mA, 0/4 ... 20 mA, 16-bit; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2532-5HD00-4AB0**

* You can order this quantity or a multiple thereof.

Overview

- 8 digital inputs, 16 digital outputs,
  of which up to 16 can be used in different configurations as technological, time-controlled channels
- Inputs for detecting the input edges with µs accuracy
- Outputs for outputting switching signals with µs accuracy
- 32x oversampling
- PWM output
- Counter function
- Outputs can be switched between 0.5 A standard and especially fast 0.1 A high-speed operation

Application

Time-based IO modules read in switching edges at digital inputs with a high time resolution, and supply time information, as well as the status, to the CPU.

For the digital outputs, switching commands with additional time information are transferred from the CPU. The outputs switch at a pre-defined time.

The modules can be used for diverse applications requiring accuracy below the resolution of the PLC or bus cycle. This requires no more than storage of the relevant instructions in the controller.

The following time-based I/O modules are available:

- Timer DIDQ 16x24V
  Time-controlled timer module with 8 inputs and 16 outputs, of which up to 16 with time stamp function; counter function up to 50 kHz, oversampling, pulse width modulation; requires isochronous mode

Design

- Installation on the S7-1500 mounting rail using one single screw
- Standardized 40-pin front connector
- Connectable core cross-sections: 0.25 mm^2 to 1.5 mm^2 (AWG24 to 16)
- Prewiring position of the front connector
- Front flap with expandable cable compartment, even if fully wired
- Integrated shielding concept

Included in the scope of delivery:

- One labeling strip for manual labeling
- One U connector
- Printed front door
- Shield clamp, and shield terminal

Function

- Uniform display and diagnostics concept:
  - Module status display for ERROR (red LED) and RUN (green LED)
  - Channel status indicator for signal state log. "0" and log. "1" (green LED) or diagnostics display (red LED)
  - Display for monitoring the 24 V DC supply voltage (green LED)
- Supported functions:
  - Inputs with time tagging (requires isochronous mode)
  - Outputs with time tagging (requires isochronous mode)
  - 32x oversampling of the inputs (requires isochronous mode)
  - 32x oversampling of the outputs (requires isochronous mode)
  - Counter for 1 track or 2 tracks with 90° phase-shifted signal (does not require isochronous mode)
  - Pulse width modulation (does not require isochronous mode)
  - Inputs can be used as an enabler for inputs or outputs
  - Isochronous mode
- Uniform system functions of SIMATIC S7-1500 and ET 200MP:
  - Identification and maintenance data IM0
  - Firmware update
  - Unambiguous labeling on front of module
  - Uniform front connector

SIPLUS extreme RAIL TM Timer DIDQ 16x24V

Technical specifications

Article number	**6AG2552-1AA00-4AB0** SIPLUS S7-1500 TM TIMER DIDQ 16x24V RAIL
General information	
Product type designation	TM Timer DIDQ 16x24V
Product function	
• I&M data	Yes; I&M 0
• Isochronous mode	Yes
Installation type/mounting	
Rail mounting	Yes; S7-1500 mounting rail
Supply voltage	
Load voltage 1L+	
• Rated value (DC)	24 V
• Reverse polarity protection	Yes; against destruction
Load voltage 2L+	
• Rated value (DC)	24 V
• Reverse polarity protection	Yes; against destruction
Encoder supply	
Number of outputs	8; max. depending on parameterization
24 V encoder supply	
• 24 V	Yes; L+ (-0.8 V)
• Short-circuit protection	Yes
• Output current, max.	1.2 A; Total current of all encoders / channels, max. 0.5 A per output
Digital inputs	
Number of digital inputs	8; max. depending on parameterization
• in groups of	8
Digital inputs, parameterizable	Yes
Input characteristic curve in accordance with IEC 61131, type 3	Yes
Digital input functions, parameterizable	
• Digital input with time stamp	Yes
- Number, max.	8
• Counter	Yes
- Number, max.	4
• Counter for incremental encoder	Yes
- Number, max.	4
• Digital input with oversampling	Yes
- Number, max.	8
• HW enable for digital input	Yes
- Number, max.	4
• HW enable for digital output	Yes
- Number, max.	4
Input voltage	
• Type of input voltage	DC
• Rated value (DC)	24 V
• for signal "0"	-5 ... +5 V
• for signal "1"	+11 to +30V
• permissible voltage at input, min.	-30 V; -5 V continuous, -30 V brief reverse polarity protection
• permissible voltage at input, max.	30 V
Input current	
• for signal "1", typ.	2.5 mA
Input delay (for rated value of input voltage)	
• Minimum pulse width for program reactions	3 µs for parameterization "none"
for standard inputs	
• parameterizable	Yes; none / 0.05 / 0.1 / 0.4 / 0.8 ms
• at "0" to "1", min.	4 µs; for parameterization "none"
• at "1" to "0", min.	4 µs; for parameterization "none"
Digital outputs	
Type of digital output	Transistor
Number of digital outputs	16; max. depending on parameterization
• in groups of	8
Digital outputs, parameterizable	Yes
Short-circuit protection	Yes; electronic/thermal
Limitation of inductive shutdown voltage to	-0.8 V
Controlling a digital input	Yes
Digital output functions, parameterizable	
• Digital output with time stamp	Yes
- Number, max.	16
• PWM output	Yes
- Number, max.	16
• Digital output with oversampling	Yes
- Number, max.	16
Switching capacity of the outputs	
• with resistive load, max.	0.5 A; 0.1 A with High Speed output
• on lamp load, max.	5 W; 1 W with High Speed output

Article number	**6AG2552-1AA00-4AB0** SIPLUS S7-1500 TM TIMER DIDQ 16x24V RAIL
Load resistance range	
• lower limit	48 Ω; 240 ohm with High Speed output
• upper limit	12 kΩ
Output voltage	
• Type of output voltage	DC
• for signal "0", max.	1 V; With High Speed output
• for signal "1", min.	23.2 V; L+ (-0.8 V)
Output current	
• for signal "1" rated value	0.5 A; 0.1 A with High Speed output, observe derating
• for signal "0" residual current, max.	0.5 mA
Output delay with resistive load	
• "0" to "1", max.	1 µs; With High Speed output, 5 µs with Standard output
• "1" to "0", max.	1 µs; With High Speed output, 6 µs with Standard output
Switching frequency	
• with resistive load, max.	10 kHz
• on lamp load, max.	10 Hz
Total current of the outputs	
• Current per group, max.	4 A
• Current per module, max.	8 A; Observe derating
Encoder	
Connectable encoders	
• Incremental encoder (asymmetrical)	Yes
• 24 V initiator	Yes
• 2-wire sensor	Yes
- permissible quiescent current (2-wire sensor), max.	1.5 mA
Encoder signals, incremental encoder (asymmetrical)	
• Input voltage	24 V
• Input frequency, max.	50 kHz
• Counting frequency, max.	200 kHz; with quadruple evaluation
• Cable length, shielded, max.	600 m; Depending on input frequency, encoder and cable quality; max. 200 m at 50 kHz
• Incremental encoder with A/B tracks, 90° phase offset	Yes
• pulse encoder	Yes
Interface types	
• Input characteristic curve in accordance with IEC 61131, type 3	Yes
Isochronous mode	
Bus cycle time (TDP), min.	250 µs
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Substitute values connectable	Yes
Alarms	
• Diagnostic alarm	Yes
Diagnoses	
• Monitoring the supply voltage	Yes
• Short-circuit	Yes
Diagnostics indication LED	
• RUN LED	Yes; green LED
• ERROR LED	Yes; red LED
• MAINT LED	Yes; Yellow LED
• Monitoring of the supply voltage (PWR-LED)	Yes; green LED
• Channel status display	Yes; green LED
• for channel diagnostics	Yes; red LED
Integrated Functions	
Counter	Yes
• Number of counters	4
• Counting frequency, max.	200 kHz; with quadruple evaluation
Counting functions	
• Continuous counting	Yes
Position detection	
• Incremental acquisition	Yes
Potential separation	
Potential separation channels	
• between the channels and backplane bus	Yes
Standards, approvals, certificates	
Railway application	
• EN 50121-3-2	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support

SIPLUS extreme RAIL TM Timer DIDQ 16x24V

Article number	**6AG2552-1AA00-4AB0** SIPLUS S7-1500 TM TIMER DIDQ 16x24V RAIL
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	60 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)
• vertical installation, min.	-40 °C; = Tmin
• vertical installation, max.	40 °C; = Tmax; Note derating
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity	
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance	
• Coolants and lubricants	
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems	
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *
• Use on land craft, rail vehicles and special-purpose vehicles	
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *
• Usage in industrial process technology	
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark	
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating	
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A
Decentralized operation	
to SIMATIC S7-1500	Yes
Dimensions	
Width	35 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	320 g
Other	
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

Version	Article No.
SIPLUS S7-1500 TM Timer DIDQ 16x24 V RAIL DI/DQ 16x24 V RAIL • Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic Time-controlled digital inputs and outputs max. 8 DI, 16 DQ of which max. 16 with time stamp, counting, PWM, oversampling for areas with extreme exposure to media (conformal coating); ambient temperature -40 ... +70 °C, OT4 with ST 1/2, (+85 °C for 10 min.)	**6AG2552-1AA00-4AB0**

*** You can order this quantity or a multiple thereof.**

Overview

- Module for serial communication connections
- Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic
- Physical transmission media:
  - RS 232C, max. 115.2 Kbps
  - RS 422/RS 485, max. 115.2 kbps
- Protocols supported
  - Freeport: User-parameterizable frame format for universal communication
  - 3964(R) for improved transmission reliability
  - Modbus RTU Master
  - Modbus RTU Slave
  - USS, implemented through instructions

Application

Communications modules enable connection with an external communication partner to exchange data. Comprehensive parameterization options make it possible to adapt the control flexibly to the communication partner.
Modbus RTU master creates a Modbus RTU network for up to 30 Modbus slaves.

The following communication module is available:

- SIPLUS S7-1500 CM PtP RS232 HF TX RAIL; communication module with RS232 interface for the Freeport, 3964(R), USS and Modbus RTU protocols; 9-pin D-sub connector, max. 115.2 Kbps, 4 KB frame length, 8 KB receive buffer
- SIPLUS S7-1500 CM PtP RS422/485 HF TX RAIL; communication module with RS422 and RS485 interface for the protocols Freeport, 3964(R), USS and Modbus RTU; 15-pin sub D socket, max. 115.2 Kbit/s, 4 KB frame length, 8 KB receive buffer

Design

- Mounting on the S7-1500 mounting rail using one single screw
- Unique sub D connector, cannot be interchanged
- Front flap with expandable cable compartment

Included in the scope of delivery:

- One U connector
- Front door

Function

- Uniform display and diagnostics concept:
  - Module status display for ERROR (red LED) and RUN (green LED)
  - Communication display for sending and receiving
- Protocols supported:
  - Freeport: User-parameterizable frame format for universal communication
  - 3964(R) for improved transmission reliability
  - Modbus RTU Master
  - Modbus RTU Slave
  - USS, implemented through instructions
- Interface properties:
  - RS 232 with auxiliary signals
  - RS 422 for full-duplex connections
  - RS485 for half-duplex and multi-point connections
  - Transmission rates from 300 to 115 200 bps
  - Connection via D-sub connector
- Uniform system functions of SIMATIC ET 200MP:
  - Identification and maintenance data IM0
  - Firmware update
  - Unambiguous labeling on front of module

Technical specifications

Article number	**6AG2541-1AB00-4AB0** SIPLUS S7-1500 CM PTP RS422/485 TX RAIL	**6AG2541-1AD00-4AB0** SIPLUS S7-1500 CM PtP RS232 HF TX RAIL
General information		
Product type designation	CM PtP RS 422 / 485 HF	CM PtP RS 232 HF
Product function • I&M data • Fast startup	 Yes; I&M 0 Yes	 Yes; I&M 0 Yes
Engineering with • STEP 7 TIA Portal configurable/integrated from version	 see entry ID: 109746275	 see entry ID: 109746275
Installation type/mounting		
Rail mounting	Yes; S7-1500 mounting rail	Yes; S7-1500 mounting rail
Interface types		
RS 232 • Transmission rate, max. • Cable length, max. • RS 232 auxiliary signals		 115.2 kbit/s 15 m RTS, CTS, DTR, DSR, RI, DCD
RS 485 • Transmission rate, max. • Cable length, max.	 115.2 kbit/s 1 200 m	
RS 422 • Transmission rate, max. • Cable length, max. • 4-wire full duplex connection • 4-wire multipoint connection	 115.2 kbit/s 1 200 m Yes No	

SIPLUS extreme RAIL CM PtP

Article number	**6AG2541-1AB00-4AB0** SIPLUS S7-1500 CM PTP RS422/485 TX RAIL	**6AG2541-1AD00-4AB0** SIPLUS S7-1500 CM PtP RS232 HF TX RAIL
Protocols		
Integrated protocols		
• Freeport		
- Telegram length, max.	4 kbyte	4 kbyte
- Bits per character	7 or 8	7 or 8
- Number of stop bits	1 or 2 bit	1 or 2 bit
- Parity	None, even, odd, always 1, always 0, any	None, even, odd, always 1, always 0, any
• 3964 (R)		
- Telegram length, max.	4 kbyte	4 kbyte
- Bits per character	7 or 8	7 or 8
- Number of stop bits	1 or 2 bit	1 or 2 bit
- Parity	None, even, odd, always 1, always 0, any	None, even, odd, always 1, always 0, any
• Modbus RTU master		
- Address area	1 to 247, extended 1 to 65535	1 to 247, extended 1 to 65535
- Number of slaves, max.	32	1
• MODBUS RTU slave		
- Address area	1 to 247, extended 1 to 65535	1 to 247, extended 1 to 65535
Telegram buffer		
• Buffer memory for telegrams	8 kbyte	8 kbyte
• Number of telegrams which can be buffered	255	255
Interrupts/diagnostics/status information		
Diagnostics function	Yes	Yes
Alarms		
• Diagnostic alarm	Yes	Yes
• Hardware interrupt	No	No
Diagnoses		
• Wire-break	Yes	Yes
Diagnostics indication LED		
• RUN LED	Yes; green LED	Yes; green LED
• ERROR LED	Yes; red LED	Yes; red LED
• Receive RxD	Yes; Yellow LED	Yes; Yellow LED
• Transmit TxD	Yes; Yellow LED	Yes; Yellow LED
Potential separation		
between backplane bus and interface	Yes	Yes
Standards, approvals, certificates		
Railway application		
• EN 50121-3-2	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support
Ambient conditions		
Ambient temperature during operation		
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)
• vertical installation, min.	-40 °C; = Tmin	-40 °C; = Tmin
• vertical installation, max.	40 °C; = Tmax	40 °C; = Tmax
Altitude during operation relating to sea level		
• Installation altitude above sea level, max.	2 000 m	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity		
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation

Article number	**6AG2541-1AB00-4AB0** SIPLUS S7-1500 CM PTP RS422/485 TX RAIL	**6AG2541-1AD00-4AB0** SIPLUS S7-1500 CM PtP RS232 HF TX RAIL
Resistance		
• Coolants and lubricants		
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems		
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *
• Use on land craft, rail vehicles and special-purpose vehicles		
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *
• Usage in industrial process technology		
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark		
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating		
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A
Decentralized operation		
to SIMATIC S7-300	Yes	Yes
to SIMATIC S7-400	Yes	Yes
to SIMATIC S7-1500	Yes	Yes
to standard PROFINET controller	Yes	Yes
Dimensions		
Width	35 mm	35 mm
Height	147 mm	147 mm
Depth	127 mm	127 mm
Weights		
Weight, approx.	0.22 kg	0.22 kg
Other		
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

Version	Article No.
SIPLUS S7-1500 CM PtP RS422/485 HF TX RAIL communications module Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic High Feature communications module with 1 RS 422/485 interface, and Freeport, 3964(R), USS and Modbus RTU protocols, 15-pin D-sub female connector, max. 115.2 kbps; For areas with extreme exposure to environmental substances (conformal coating); Ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2541-1AB00-4AB0**
SIPLUS S7-1500 CM PtP RS232 HF TX RAIL communications module Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic High Feature communications module with 1 RS232 interface, and Freeport, 3964(R), USS and Modbus RTU protocols, 9-pin D-sub connector, max. 115.2 Kbps; for areas with extreme exposure to environmental substances (conformal coating); Ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2541-1AD00-4AB0**

*** You can order this quantity or a multiple thereof.**

SIPLUS extreme RAIL F-digital input modules

Overview

SIPLUS extreme RAIL digital fail-safe input module:

F-DI 16x24 V DC

Important properties:

- 16-channel fail-safe digital input module for ET 200MP/S7-1500
- Approved in accordance with the railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic
- For fail-safe reading of sensor information (1 or 2 channels)
- Provides integral discrepancy evaluation for 2-out-of-2 signals
- 4 internal sensor supplies (incl. test function) onboard
- Certified up to SIL 3 (IEC 61508), PL e (ISO 13849)
- LED display for error, operation, supply voltage and status
- Clear module labeling
  - Plain text identification of the module type
  - Complete Article No.
  - 2D matrix code (order and serial number)
  - Connection diagram
  - Hardware and firmware version
- Optional labeling accessories
  - Labeling sheets, yellow
- The modules support PROFIsafe in both PROFIBUS and PROFINET configurations. Can be used with all fail-safe SIPLUS extreme RAIL S7-1500 F-CPUs in the central configuration, as well as with all other SIPLUS extreme RAIL S7 F-CPUs, as an ET 200MP distributed I/O.

Application

Using fail-safe ET 200MP/S7-1500 modules makes it possible to implement safety-related application requirements as an integral part of the overall automation. The safety functions required for fail-safe operation are integrated in the modules. Communication with the fail-safe SIMATIC S7 CPUs is performed by means of PROFIsafe.

The modules can be operated both in centralized and distributed configurations.

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Technical specifications

Article number	**6AG2526-1BH00-1AB0** SIPLUS S7-1500 F-DI 16x24VDC T1 RAIL
General information	
Product type designation	F-DI 16x24VDC
Operating mode • DI	 Yes
Supply voltage	
Rated value (DC)	24 V
Reverse polarity protection	Yes
Encoder supply	
Number of outputs	4
Short-circuit protection	Yes; Electronic (response threshold 0.7 A to 1.8 A)
24 V encoder supply • 24 V • Short-circuit protection • Output current, max.	 Yes; min. L+ (-1.5 V) Yes 300 mA; Max. 100 mA when mounted vertically
Digital inputs	
Number of digital inputs	16
Source/sink input	Yes; P-reading
Input characteristic curve in accordance with IEC 61131, type 1	Yes
Input voltage • Rated value (DC) • for signal "0" • for signal "1"	 24 V -30 to +5 V +15 to +30 V
Input current • for signal "1", typ.	 3.7 mA
Input delay (for rated value of input voltage) • for standard inputs - parameterizable	 Yes

Article number	**6AG2526-1BH00-1AB0** SIPLUS S7-1500 F-DI 16x24VDC T1 RAIL
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Alarms	
• Diagnostic alarm	Yes
• Hardware interrupt	No
Diagnoses	
• Monitoring the supply voltage	Yes
• Wire-break	No
• Short-circuit	Yes
• Group error	Yes
Diagnostics indication LED	
• RUN LED	Yes; green LED
• ERROR LED	Yes; red LED
• Channel status display	Yes; green LED
• for channel diagnostics	Yes; red LED
• for module diagnostics	Yes; red LED
Potential separation	
Potential separation channels	
• between the channels and backplane bus	Yes
Standards, approvals, certificates	
Suitable for safety functions	Yes
Highest safety class achievable in safety mode	
• Performance level according to ISO 13849-1	PLe
• SIL acc. to IEC 61508	SIL 3
• SIL in accordance with EN 50126, 50128, 50129	SIL 2; a higher safety integrity level is possible if tested and approved for the specific application under consideration of all local regulations.
Railway application	
• EN 50121-3-2	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-30 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155)
• vertical installation, min.	-30 °C; = Tmin
• vertical installation, max.	40 °C; = Tmax
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity	
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance	
• Coolants and lubricants	
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems	
• to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *
• Use on land craft, rail vehicles and special-purpose vehicles	
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *
• Usage in industrial process technology	
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark	
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating	
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A

SIPLUS extreme RAIL F-digital input modules

Article number	**6AG2526-1BH00-1AB0** SIPLUS S7-1500 F-DI 16x24VDC T1 RAIL
Dimensions	
Width	35 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	280 g
Other	
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

	Version	Article No.
	SIPLUS S7-1500 F-DI 16x24VDC HF T1 RAIL Approved in accordance with the railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic 16 inputs, 24 V DC, PROFISAFE; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -25 ... +55 °C (+70 °C for 10 min.)	**6AG2526-1BH00-1AB0**

* You can order this quantity or a multiple thereof.

Overview

SIPLUS extreme RAIL digital fail-safe output module:
F-DQ 8x24 V DC 2 A PPM

Important properties:

- 8-channel digital fail-safe output module for ET 200MP/S7-1500
- Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic
- Fail-safe 2-channel activation (parameterizable PM/PP switching) of actuators
- Actuators can be controlled up to 2 A
- Certified up to SIL 3 (IEC 61508), PL e (ISO 13849)
- LED display for error, operation, supply voltage and status
- Clear module labeling
  - Plain text identification of the module type
  - Complete Article No.
  - 2D matrix code (order and serial number)
  - Connection diagram
  - Hardware and firmware version
- Optional labeling accessories
  - Labeling sheets, yellow
- The module supports PROFIsafe in both PROFIBUS and PROFINET configurations.
- Can be used with all fail-safe SIMATIC S7-1500 F-CPUs in the central configuration, as well as ET 200MP distributed I/O with all other SIMATIC S7 F-CPUs

Application

Using fail-safe ET 200MP/S7-1500 modules makes it possible to implement safety-related application requirements as an integral part of the overall automation. The safety functions required for fail-safe operation are integrated in the modules. Communication with the fail-safe SIMATIC S7 CPUs is performed by means of PROFIsafe.

The modules can be operated both in centralized and distributed configurations.

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Technical specifications

Article number	**6AG2526-2BF00-1AB0** SIPLUS S7-1500 F-DQ 8x24VDC 2A T1 RAIL
General information	
Product type designation	F-DQ 8x24VDC/2A PPM
Operating mode • DQ	 Yes
Supply voltage	
Rated value (DC)	24 V
Reverse polarity protection	Yes
Digital outputs	
Type of digital output	Transistor
Number of digital outputs	8
Current-sinking	Yes
Current-sourcing	Yes
Short-circuit protection	Yes
Open-circuit detection	Yes
Overload protection	Yes
Limitation of inductive shutdown voltage to	PM-switching: -24 V + (-47 V), PP-switching: -24 V
Switching capacity of the outputs • with resistive load, max. • on lamp load, max.	 2 A 10 W
Load resistance range • lower limit • upper limit	 12 Ω 2 000 Ω
Output voltage • for signal "1", min.	 24 V; L+ (-0.5 V)
Output current • for signal "1" rated value • for signal "0" residual current, max.	 2 A 0.5 A; Current-sourcing, or current sourcing and sinking switches individually, current sinking: max. 1 mA
Switching frequency • with resistive load, max. • with inductive load, max. • on lamp load, max.	 30 Hz 0.1 Hz 10 Hz

SIPLUS extreme RAIL F-digital output modules

Article number	**6AG2526-2BF00-1AB0** SIPLUS S7-1500 F-DQ 8x24VDC 2A T1 RAIL
Total current of the outputs	
• Current per channel, max.	2 A
Total current of the outputs (per module)	
• horizontal installation	
- up to 40 °C, max.	16 A
- up to 60 °C, max.	8 A
• vertical installation	
- up to 40 °C, max.	8 A
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Substitute values connectable	No
Alarms	
• Diagnostic alarm	Yes
Diagnoses	
• Monitoring the supply voltage	Yes
• Wire-break	Yes
• Short-circuit	Yes
• Group error	Yes
Diagnostics indication LED	
• RUN LED	Yes; green LED
• ERROR LED	Yes; red LED
• Monitoring of the supply voltage (PWR-LED)	Yes
• Channel status display	Yes; green LED
• for channel diagnostics	Yes; red LED
• for module diagnostics	Yes; red LED
Potential separation	
Potential separation channels	
• between the channels and backplane bus	Yes
Standards, approvals, certificates	
Suitable for safety functions	Yes
Highest safety class achievable in safety mode	
• Performance level according to ISO 13849-1	PLe
• SIL acc. to IEC 61508	SIL 3
• SIL in accordance with EN 50126, 50128, 50129	SIL 2; a higher safety integrity level is possible if tested and approved for the specific application under consideration of all local regulations.
Railway application	
• EN 50121-3-2	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-30 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155)
• vertical installation, min.	-30 °C; = Tmin
• vertical installation, max.	40 °C; = Tmax
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity	
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance	
• Coolants and lubricants	
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems	
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *
• Use on land craft, rail vehicles and special-purpose vehicles	
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *

Article number	**6AG2526-2BF00-1AB0** SIPLUS S7-1500 F-DQ 8x24VDC 2A T1 RAIL
• Usage in industrial process technology	
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark	
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating	
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A
Dimensions	
Width	35 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	300 g
Other	
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

	Version	Article No.
	SIPLUS S7-1500 F DQ 8 x 24 V DC 2A T1 RAIL 8 outputs, 24 V DC, 2 A, PROFISAFE, sinking/sourcing; for areas with extreme exposure to environmental substances (conformal coating); Ambient temperature -25 ... +55 °C (+70 °C for 10 min.)	**6AG2526-2BF00-1AB0**

*** You can order this quantity or a multiple thereof.**

SIPLUS extreme RAIL standard CPUs

Overview

Two graded-performance standard CPUs based on SIPLUS extreme RAIL ET 200SP:

- SIPLUS ET 200SP CPU 1510SP-1 PN RAIL
- SIPLUS ET 200SP CPU 1512SP-1 PN RAIL

Characteristics	SIPLUS ET 200SP CPU 1510SP-1 PN RAIL	SIPLUS ET 200SP CPU 1512SP-1 PN RAIL
Work memory for program, integrated	100 KB	200 KB
Work memory for data, integrated	750 KB	1.0 MB
Load memory	Plug-in via SIMATIC Memory Card	Plug-in via SIMATIC Memory Card
Command execution times		
• Bit operations	0.072 µs	0.048 µs
• Word operations	0.086 µs	0.058 µs
• Fixed-point operations	0.115 µs	0.077 µs
• Floating-point operations	0.461 µs	0.307 µs
Bit memories, timers, counters		
S7 counters/timers	2 048 each	2 048 each
IEC counters	Arbitrary (only limited by the work memory)	Arbitrary (only limited by the work memory)
IEC timers	Arbitrary (only limited by the work memory)	Arbitrary (only limited by the work memory)
Bit memories	16 KB	16 KB
I/O address range		
Inputs	32 KB (all inputs are stored in the process image)	32 KB (all inputs are stored in the process image)
Outputs	32 KB (all outputs are stored in the process image)	32 KB (all outputs are stored in the process image)
Motion		
No. of axes	Up to 6	Up to 6
Communication		
PtP	Yes (via CM)	Yes (via CM)
PROFINET IO	1 x PN IO IRT (3-port switch)	1 x PN IO IRT (3-port switch)
PROFIBUS DP	Yes (via CM DP)	Yes (via CM DP)
Web server	Yes	Yes

Application

A range of performance-graded CPUs are available for the SIPLUS extreme RAIL ET 200SP:

Standard CPUs

- SIPLUS ET 200SP CPU 1510SP-1 PN RAIL:
  For smaller applications with average requirements regarding the program scope and processing speed, for distributed setup via PROFINET IO or PROFIBUS DP.
- SIPLUS ET 200SP CPU 1512SP-1 PN RAIL:
  For applications with average requirements regarding the program scope and processing speed, for distributed setup via PROFINET IO or PROFIBUS DP.

Technical specifications

Article number	**6AG2510-1DJ01-1AB0** SIPLUS ET 200SP CPU 1510SP-1 PN RAIL	**6AG2510-1DJ01-4AB0** SIPLUS ET 200SP CPU 1510SP-1 PN RAIL	**6AG2512-1DK01-1AB0** SIPLUS ET 200SP CPU 1512SP-1 PN RAIL	**6AG2512-1DK01-4AB0** SIPLUS ET 200SP CPU 1512SP-1 PN RAIL
General information				
Product type designation	CPU 1510SP-1 PN	CPU 1510SP-1 PN	CPU 1512SP-1 PN	CPU 1512SP-1 PN
Engineering with • STEP 7 TIA Portal configurable/integrated from version	see entry ID: 109746275	see entry ID: 109746275	see entry ID: 109746275	see entry ID: 109746275
Supply voltage				
Rated value (DC)	24 V	24 V	24 V	24 V
Memory				
Work memory • integrated (for program) • integrated (for data)	100 kbyte 750 kbyte	100 kbyte 750 kbyte	200 kbyte 1 Mbyte	200 kbyte 1 Mbyte
Load memory • Plug-in (SIMATIC Memory Card), max.	32 Gbyte	32 Gbyte	32 Gbyte	32 Gbyte
CPU processing times				
for bit operations, typ.	72 ns	72 ns	48 ns	48 ns
for word operations, typ.	86 ns	86 ns	58 ns	58 ns
for fixed point arithmetic, typ.	115 ns	115 ns	77 ns	77 ns
for floating point arithmetic, typ.	461 ns	461 ns	307 ns	307 ns
Counters, timers and their retentivity				
S7 counter • Number	2 048	2 048	2 048	2 048
IEC counter • Number	Any (only limited by the main memory)	Any (only limited by the main memory)	Any (only limited by the main memory)	Any (only limited by the main memory)
S7 times • Number	2 048	2 048	2 048	2 048
IEC timer • Number	Any (only limited by the main memory)	Any (only limited by the main memory)	Any (only limited by the main memory)	Any (only limited by the main memory)
Data areas and their retentivity				
Flag • Size, max.	16 kbyte	16 kbyte	16 kbyte	16 kbyte
Address area				
I/O address area • Inputs • Outputs	32 kbyte; All inputs are in the process image 32 kbyte; All outputs are in the process image	32 kbyte; All inputs are in the process image 32 kbyte; All outputs are in the process image	32 kbyte; All inputs are in the process image 32 kbyte; All outputs are in the process image	32 kbyte; All inputs are in the process image 32 kbyte; All outputs are in the process image
Address space per module • Address space per module, max.	288 byte; For input and output data respectively	288 byte; For input and output data respectively	288 byte; For input and output data respectively	288 byte; For input and output data respectively
Address space per station • Address space per station, max.	2 560 byte; for central inputs and outputs; depending on configuration; 2 048 bytes for ET 200SP modules + 512 bytes for ET 200AL modules	2 560 byte; for central inputs and outputs; depending on configuration; 2 048 bytes for ET 200SP modules + 512 bytes for ET 200AL modules	2 560 byte; for central inputs and outputs; depending on configuration; 2 048 bytes for ET 200SP modules + 512 bytes for ET 200AL modules	2 560 byte; for central inputs and outputs; depending on configuration; 2 048 bytes for ET 200SP modules + 512 bytes for ET 200AL modules
Time of day				
Clock • Type	Hardware clock	Hardware clock	Hardware clock	Hardware clock
1. Interface				
Interface types • RJ 45 (Ethernet) • Number of ports • integrated switch • BusAdapter (PROFINET)	Yes; X1 P3; opt. X1 P1 and X1 P2 via BusAdapter BA 2x RJ45 3; 1. integr. + 2. via BusAdapter Yes Yes; compatible BusAdapters: BA 2x RJ45, BA 2x FC, BA 2x M12	Yes; X1 P3 1 No	Yes; X1 P3; opt. X1 P1 and X1 P2 via BusAdapter BA 2x RJ45 3; 1. integr. + 2. via BusAdapter Yes Yes; compatible BusAdapters: BA 2x RJ45, BA 2x M12, BA 2x FC, BA 2x LC, BA LC/RJ45, BA LC/FC, BA 2x SCRJ, BA SCRJ/RJ45, BA SCRJ/FC,	Yes; X1 P3 1 No

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SIPLUS extreme RAIL standard CPUs

Article number	**6AG2510-1DJ01-1AB0** SIPLUS ET 200SP CPU 1510SP-1 PN RAIL	**6AG2510-1DJ01-4AB0** SIPLUS ET 200SP CPU 1510SP-1 PN RAIL	**6AG2512-1DK01-1AB0** SIPLUS ET 200SP CPU 1512SP-1 PN RAIL	**6AG2512-1DK01-4AB0** SIPLUS ET 200SP CPU 1512SP-1 PN RAIL
Protocols				
• IP protocol	Yes; IPv4	Yes; IPv4	Yes; IPv4	Yes; IPv4
• PROFINET IO Controller	Yes	Yes	Yes	Yes
• PROFINET IO Device	Yes	Yes	Yes	Yes
• SIMATIC communication	Yes	Yes	Yes	Yes
• Open IE communication	Yes; Optionally also encrypted	Yes; Optionally also encrypted	Yes; Optionally also encrypted	Yes; Optionally also encrypted
• Web server	Yes	Yes	Yes	Yes
• Media redundancy	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0	No	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0	No
PROFINET IO Controller				
• Services				
- PG/OP communication	Yes	Yes	Yes	Yes
- Isochronous mode	Yes	Yes	Yes	Yes
- Direct data exchange	Yes; Requirement: IRT and isochronous mode (MRPD optional)	Yes; Requirement: IRT and isochronous mode (MRPD optional)	Yes; Requirement: IRT and isochronous mode (MRPD optional)	Yes; Requirement: IRT and isochronous mode (MRPD optional)
- IRT	Yes	Yes	Yes	Yes
- PROFIenergy	Yes; per user program	Yes; per user program	Yes; per user program	Yes; per user program
- Prioritized startup	Yes; Max. 32 PROFINET devices	Yes; Max. 32 PROFINET devices	Yes; Max. 32 PROFINET devices	Yes; Max. 32 PROFINET devices
- Number of connectable IO Devices, max.	64; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	64; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	128; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	128; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
- Of which IO devices with IRT, max.	64	64	64	64
- Number of connectable IO Devices for RT, max.	64	64	128	128
- of which in line, max.	64	64	128	128
- Number of IO Devices that can be simultaneously activated/deactivated, max.	8; in total across all interfaces	8; in total across all interfaces	8; in total across all interfaces	8; in total across all interfaces
- Number of IO Devices per tool, max.	8	8	8	8
- Updating times	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data
PROFINET IO Device				
• Services				
- PG/OP communication	Yes	Yes	Yes	Yes
- Isochronous mode	No	No	No	No
- IRT	Yes	Yes	Yes	Yes
- PROFIenergy	Yes; per user program	Yes; per user program	Yes; per user program	Yes; per user program
- Shared device	Yes	Yes	Yes	Yes
- Number of IO Controllers with shared device, max.	4	4	4	4
- activation/deactivation of I-devices	Yes; per user program	Yes; per user program	Yes; per user program	Yes; per user program
- Asset management record	Yes; per user program	Yes; per user program	Yes; per user program	Yes; per user program
2. Interface				
Interface types				
• RS 485	Yes; Via CM DP module	Yes; Via CM DP module	Yes; Via CM DP module	Yes; Via CM DP module
• Number of ports	1	1	1	1
Protocols				
• PROFIBUS DP master	Yes	Yes	Yes	Yes
• PROFIBUS DP slave	Yes	Yes	Yes	Yes
• SIMATIC communication	Yes	Yes	Yes	Yes
PROFIBUS DP master				
• Number of DP slaves, max.	125; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	125; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	125; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	125; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
Protocols				
Number of connections				
• Number of connections, max.	96; via integrated interfaces of the CPU and connected CPs / CMs	96; via integrated interfaces of the CPU and connected CPs / CMs	128; via integrated interfaces of the CPU and connected CPs / CMs	128; via integrated interfaces of the CPU and connected CPs / CMs

Article number	**6AG2510-1DJ01-1AB0** SIPLUS ET 200SP CPU 1510SP-1 PN RAIL	**6AG2510-1DJ01-4AB0** SIPLUS ET 200SP CPU 1510SP-1 PN RAIL	**6AG2512-1DK01-1AB0** SIPLUS ET 200SP CPU 1512SP-1 PN RAIL	**6AG2512-1DK01-4AB0** SIPLUS ET 200SP CPU 1512SP-1 PN RAIL
Redundancy mode				
• Media redundancy				
- Media redundancy	Yes; only via BusAdapter	No	Yes; only via BusAdapter	No
- MRP	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client	No	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client	No
- MRP interconnection, supported	Yes; as MRP ring node according to IEC 62439-2 Edition 3.0	No	Yes; as MRP ring node according to IEC 62439-2 Edition 3.0	No
- MRPD	Yes; Requirement: IRT	No	Yes; Requirement: IRT	No
- Switchover time on line break, typ.	200 ms; For MRP, bumpless for MRPD		200 ms; For MRP, bumpless for MRPD	
- Number of stations in the ring, max.	50		50	
SIMATIC communication				
• S7 routing	Yes	Yes	Yes	Yes
OPC UA				
• OPC UA Client	Yes	Yes	Yes	Yes
• OPC UA Server	Yes; Data access (read, write, subscribe), method call, custom address space	Yes; Data access (read, write, subscribe), method call, custom address space	Yes; Data access (read, write, subscribe), method call, custom address space	Yes; Data access (read, write, subscribe), method call, custom address space
• Alarms and Conditions	Yes	Yes	Yes	Yes
Supported technology objects				
Motion Control	Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool	Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool	Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool	Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool
• Number of available Motion Control resources for technology objects	800	800	800	800
• Required Motion Control resources				
- per speed-controlled axis	40	40	40	40
- per positioning axis	80	80	80	80
- per synchronous axis	160	160	160	160
- per external encoder	80	80	80	80
- per output cam	20	20	20	20
- per cam track	160	160	160	160
- per probe	40	40	40	40
Controller				
• PID_Compact	Yes; Universal PID controller with integrated optimization	Yes; Universal PID controller with integrated optimization	Yes; Universal PID controller with integrated optimization	Yes; Universal PID controller with integrated optimization
• PID_3Step	Yes; PID controller with integrated optimization for valves	Yes; PID controller with integrated optimization for valves	Yes; PID controller with integrated optimization for valves	Yes; PID controller with integrated optimization for valves
• PID-Temp	Yes; PID controller with integrated optimization for temperature	Yes; PID controller with integrated optimization for temperature	Yes; PID controller with integrated optimization for temperature	Yes; PID controller with integrated optimization for temperature
Counting and measuring				
• High-speed counter	Yes	Yes	Yes	Yes
Standards, approvals, certificates				
Railway application				
• EN 50121-3-2	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support

Article number	**6AG2510-1DJ01-1AB0** SIPLUS ET 200SP CPU 1510SP-1 PN RAIL	**6AG2510-1DJ01-4AB0** SIPLUS ET 200SP CPU 1510SP-1 PN RAIL	**6AG2512-1DK01-1AB0** SIPLUS ET 200SP CPU 1512SP-1 PN RAIL	**6AG2512-1DK01-4AB0** SIPLUS ET 200SP CPU 1512SP-1 PN RAIL
Ambient conditions				
Ambient temperature during operation				
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155)	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155)	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)
• vertical installation, min.	-40 °C; = Tmin	-40 °C; = Tmin	-40 °C; = Tmin	-40 °C; = Tmin
• vertical installation, max.	50 °C; = Tmax	50 °C; = Tmax	50 °C; = Tmax	50 °C; = Tmax
Altitude during operation relating to sea level				
• Installation altitude above sea level, max.	2 000 m	2 000 m	2 000 m	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... + 2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... + 2 000 m)
Relative humidity				
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance				
• Coolants and lubricants				
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air	No	Yes; Incl. diesel and oil droplets in the air	No
• Use in stationary industrial systems				
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *
- Against mechanical environmental conditions acc. to EN 60721-3-3	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)		Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	
• Use on land craft, rail vehicles and special-purpose vehicles				
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *
- Against mechanical environmental conditions acc. to EN 60721-3-5	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)		Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	
- against mechanical environmental conditions in agriculture acc. to ISO 15003	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)		Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	
• Usage in industrial process technology				
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark				
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!

Article number	**6AG2510-1DJ01-1AB0** SIPLUS ET 200SP CPU 1510SP-1 PN RAIL	**6AG2510-1DJ01-4AB0** SIPLUS ET 200SP CPU 1510SP-1 PN RAIL	**6AG2512-1DK01-1AB0** SIPLUS ET 200SP CPU 1512SP-1 PN RAIL	**6AG2512-1DK01-4AB0** SIPLUS ET 200SP CPU 1512SP-1 PN RAIL
Conformal coating				
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection	Yes; Type 1 protection	Yes; Type 1 protection	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A
Configuration / header				
Configuration / programming / header				
• Programming language				
- LAD	Yes	Yes	Yes	Yes
- FBD	Yes	Yes	Yes	Yes
- STL	Yes	Yes	Yes	Yes
- SCL	Yes	Yes	Yes	Yes
- GRAPH	Yes	Yes	Yes	Yes
Know-how protection				
• User program protection/password protection	Yes	Yes	Yes	Yes
• Copy protection	Yes	Yes	Yes	Yes
• Block protection	Yes	Yes	Yes	Yes
Access protection				
• protection of confidential configuration data	Yes	Yes	Yes	Yes
• Protection level: Write protection	Yes	Yes	Yes	Yes
• Protection level: Read/write protection	Yes	Yes	Yes	Yes
• Protection level: Complete protection	Yes	Yes	Yes	Yes
Dimensions				
Width	100 mm	100 mm	100 mm	100 mm
Height	117 mm	117 mm	117 mm	117 mm
Depth	75 mm	75 mm	75 mm	75 mm
Weights				
Weight, approx.	310 g	470 g	310 g	470 g
Other				
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

More information

Additional information and downloads

Manuals

The manuals for ET 200SP can be downloaded free of charge from the Internet (SIMATIC Customer Support).
http://support.automation.siemens.com/WW/view/en/84133942

General information

http://www.siemens.com/et200sp

SIMATIC Selection Tool

http://www.siemens.com/tia-selection-tool

Overview

- SIPLUS ET 200SP CPU 1510SP-1 PN RAIL for SIPLUS extreme RAIL ET 200SP based on SIPLUS S7-1500 CPU 1511-1 PN
- Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic
- For high-performance control solutions using ET 200SP
- Increase in availability of systems and machines
- PROFINET IO controller for up to 64 IO devices
- PROFINET I-Device for connecting the CPU as an intelligent PROFINET device with a SIMATIC or third-party PROFINET IO controller
- PROFINET shared I-device for 4 controllers
- PROFINET IO IRT interface with integrated 3-port switch
- Isochronous mode on PROFINET
- With multiple communication options:
  PG/OP communication, PROFINET IO, open IE communication (TCP, ISO-on-TCP and UDP), web server and S7 communication (with loadable FBs)
- Optional PROFIBUS DP master for 125 PROFIBUS DP slaves (with CM DP module 6ES7545-5DA00-0AB0)
- Optional PROFIBUS DP slave (with CM DP module 6ES7545-5DA00-0AB0)
- Configuration control (option handling)
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders

Note

SIMATIC Memory Card required for operation of the CPU.
BusAdapter not included in scope of delivery and to be ordered separately.

Application

SIPLUS ET 200SP CPU 1510SP-1 PN RAIL is a cost-effective, entry-level CPU for applications with average requirements in terms of processing performance and response speed in discrete production technology. SIPLUS ET 200SP CPU 1510SP-1 PN RAIL can be used as a PROFINET IO controller or as distributed intelligence (PROFINET I-Device). The integrated PROFINET IO IRT interface is designed as a 3-port switch enabling configuration of a linear topology in the system via port 1 and 2, such that a PG/PC or HMI device can also be connected via port 3.

When used as an I-device, the SIPLUS ET 200SP CPU 1510SP-1 PN RAIL facilitates distributed preprocessing of process data locally and only delivers the information actually required to the higher-level controller. This has the following advantages:

- Less load on central controller
- Short response times to critical local signals
- Less load on the bus system due to smaller data volumes
- Faster commissioning due to pre-tested units and parallel commissioning
- Increased availability and flexibility thanks to autonomous machine units
- Transparent configuration

The SIPLUS ET 200SP CPU 1510SP-1 PN RAIL operates completely independently of the central controller. If it fails, the SIPLUS ET 200SP CPU 1510SP-1 PN RAIL continues to run.

The bit-modular design of the ET 200SP I/O system, together with SIPLUS ET 200SP CPU 1510SP-1 PN RAIL, enables functionally oriented station design.

In addition, the CPU offers comprehensive control functionalities via easy-to-configure blocks as well as the ability to connect drives via standardized PLC-open blocks.

Design

The SIPLUS ET 200SP CPU 1510SP-1 PN CPU RAIL is directly snapped onto the standard DIN rail and features:

- A powerful processor:
  The CPU achieves command execution times as low as 72 ns per binary instruction.
- A large work memory:
  100 KB for program, 750 KB for data
- SIMATIC Memory Cards as load memories
  Permits additional functions such as firmware updates, datalog and archives
- Bit-modular expandability for maximum flexibility
  Up to 64 I/O modules (I/O, technology, and communication modules) in any combination. Station width up to 1 m.
- Mixed configuration with ET 200AL
  Possible to integrate up to 16 I/O modules of the ET 200AL (IP65/IP67) I/O system in a scalable I/O system ET 200SP (IP20) installation via a "BU-Send" BaseUnit and a "BA-Send" BusAdapter.
- PROFINET IO IRT interface with 3 integrated switch ports:
  - Port 1 and 2 via BusAdapter (SIPLUS ET 200SP CPU 1510SP-1 PN CPU RAIL is supplied without the BusAdapter and can also be operated without it.
    An appropriate BusAdapter can be ordered separately if needed)
  - Port 3 via integrated RJ45 socket
- Integrated communication functions:
  - PG/OP communication
  - PROFINET IO
  - Open IE communication (TCP, ISO-on-TCP and UDP)
  - OPC UA server (data access)
  - Web server
  - S7 communication
  - S7 routing
  - Data set routing
- Maintenance-free data backup without battery
- Diagnostics displays for errors (Error), operation (RUN/Stop), maintenance (MT), power supply (PWR) and one link LED per port

- Optional labeling using light gray or yellow labeling strips. Choice of 2 materials:
  - Foil and roll with 500 strips, for thermal transfer roll printers
  - Paper (280 g/m^2), DIN A4 sheets with 100 strips each, for laser printers
- The ET 200SP CPU can be equipped with a reference ID label
- Different PROFINET connection types by means of Bus-Adapter
  - SIMATIC BusAdapters with an RJ45 interface, e.g. Bus-Adapter BA 2xRJ45, can be used in standard applications with moderate mechanical and low EMC loads
  - For machines and systems in which higher mechanical and/or EMC loads act on the devices, SIMATIC BusAdapters with connection via FastConnect (FC) are recommended.
  - The use of SIMATIC BusAdapters with a FO cable connection (SCRJ, LC) is not possible with the SIPLUS ET 200SP CPU 1510SP-1 PN CPU RAIL.
- Dark BaseUnit as first BaseUnit behind the ET 200SP CPU when using an AC I/O module or an AI Energy Meter ST as the first I/O module

Scope of delivery:

SIPLUS ET 200SP CPU 1510SP-1 PN CPU RAIL including server module, 24 V DC connector and cover for BusAdapter port (BusAdapter must be ordered separately)

Function

- Performance
  - High-speed command processing
  - Powerful network connection:
    CPU is equipped with a PROFINET IO IRT (3-port switch) as the standard interface
- Integrated technology
  - Connection of analog and PROFIdrive-capable drives via standardized blocks (PLCopen)
  - Support of speed-controlled and positioning axes as well as external encoders
  - Precise position gearing for synchronous operation between axes
  - Trace functions for all CPU tags, both for diagnostics in real time as well as for sporadic error detection
  - Comprehensive control functionalities, e.g. easily configurable blocks for automatic optimization of the control parameters for optimum control quality
- Isochronous mode
  - Synchronous coupling of distributed signal acquisition, signal transmission, and program execution to the PROFINET cycle with constant bus cycle time
- Security Integrated
  - Password-based know-how protection against unauthorized read-out and modification of program blocks
  - Copy protection for tying individual blocks to the serial number of the SIMATIC Memory Card: The block can only run if the configured memory card is inserted into the CPU.
  - 4-level authorization concept:
    Communication to the HMI devices can also be restricted.
  - Manipulation protection:
    The controller recognizes changed or unauthorized transmissions of the engineering data.
- Integrated system diagnostics
  - System diagnostics information is displayed consistently and in plain text in the TIA Portal, HMI devices and Web server, even for messages from the drives, and is updated even if the CPU is in STOP mode.
  - Integrated into the firmware of the CPU, no special configuration is required
- Configuration control (option handling) in central setup
  - Various hardware configurations can be stored in the controller:
    Modification of the configuration in the user program (startup OB100)
    Retrofitting of options at end of configuration
    Use of placeholder modules is possible.
- SIMATIC Memory Card (required for operation of the CPU)
  - Used as a plug-in load memory or for updating the firmware.
  - Also for storing additional documents or csv files (for recipes and archives)
  - Creation of data blocks for storage/reading of data via SFCs of the user program
- Datalog (archives) and recipes
  - Storage of csv files for recipes and archives on the SIMATIC Memory Card;
    easy access to plant-relevant operating data using Office tools or via a Web server
  - Easy access to machine configuration data by means of a Web browser or SD card reader (two-way data exchange from and to the controller)
- Programming
  - Programming with STEP 7 Professional, V13 update 3 and higher

Technical specifications

Article number	**6AG2510-1DJ01-1AB0** SIPLUS ET 200SP CPU 1510SP-1 PN RAIL	**6AG2510-1DJ01-4AB0** SIPLUS ET 200SP CPU 1510SP-1 PN RAIL
General information		
Product type designation	CPU 1510SP-1 PN	CPU 1510SP-1 PN
Engineering with • STEP 7 TIA Portal configurable/integrated from version	see entry ID: 109746275	see entry ID: 109746275
Supply voltage		
Rated value (DC)	24 V	24 V
Memory		
Work memory • integrated (for program) • integrated (for data)	 100 kbyte 750 kbyte	 100 kbyte 750 kbyte
Load memory • Plug-in (SIMATIC Memory Card), max.	 32 Gbyte	 32 Gbyte
CPU processing times		
for bit operations, typ.	72 ns	72 ns
for word operations, typ.	86 ns	86 ns
for fixed point arithmetic, typ.	115 ns	115 ns
for floating point arithmetic, typ.	461 ns	461 ns
Counters, timers and their retentivity		
S7 counter • Number	 2 048	 2 048
IEC counter • Number	 Any (only limited by the main memory)	 Any (only limited by the main memory)
S7 times • Number	 2 048	 2 048
IEC timer • Number	 Any (only limited by the main memory)	 Any (only limited by the main memory)
Data areas and their retentivity		
Flag • Size, max.	 16 kbyte	 16 kbyte
Address area		
I/O address area • Inputs • Outputs	 32 kbyte; All inputs are in the process image 32 kbyte; All outputs are in the process image	 32 kbyte; All inputs are in the process image 32 kbyte; All outputs are in the process image
Address space per module • Address space per module, max.	 288 byte; For input and output data respectively	 288 byte; For input and output data respectively
Address space per station • Address space per station, max.	 2 560 byte; for central inputs and outputs; depending on configuration; 2 048 bytes for ET 200SP modules + 512 bytes for ET 200AL modules	 2 560 byte; for central inputs and outputs; depending on configuration; 2 048 bytes for ET 200SP modules + 512 bytes for ET 200AL modules
Time of day		
Clock • Type	 Hardware clock	 Hardware clock
1. Interface		
Interface types • RJ 45 (Ethernet) • Number of ports • integrated switch • BusAdapter (PROFINET)	 Yes; X1 P3; opt. X1 P1 and X1 P2 via BusAdapter BA 2x RJ45 3; 1. integr. + 2. via BusAdapter Yes Yes; compatible BusAdapters: BA 2x RJ45, BA 2x FC, BA 2x M12	 Yes; X1 P3 1 No
Protocols • IP protocol • PROFINET IO Controller • PROFINET IO Device • SIMATIC communication • Open IE communication • Web server • Media redundancy	 Yes; IPv4 Yes Yes Yes Yes; Optionally also encrypted Yes Yes; MRP Automanager according to IEC 62439-2 Edition 2.0	 Yes; IPv4 Yes Yes Yes Yes; Optionally also encrypted Yes No

Article number	**6AG2510-1DJ01-1AB0** SIPLUS ET 200SP CPU 1510SP-1 PN RAIL	**6AG2510-1DJ01-4AB0** SIPLUS ET 200SP CPU 1510SP-1 PN RAIL
PROFINET IO Controller		
• Services		
- PG/OP communication	Yes	Yes
- Isochronous mode	Yes	Yes
- Direct data exchange	Yes; Requirement: IRT and isochronous mode (MRPD optional)	Yes; Requirement: IRT and isochronous mode (MRPD optional)
- IRT	Yes	Yes
- PROFIenergy	Yes; per user program	Yes; per user program
- Prioritized startup	Yes; Max. 32 PROFINET devices	Yes; Max. 32 PROFINET devices
- Number of connectable IO Devices, max.	64; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	64; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
- Of which IO devices with IRT, max.	64	64
- Number of connectable IO Devices for RT, max.	64	64
- of which in line, max.	64	64
- Number of IO Devices that can be simultaneously activated/deactivated, max.	8; in total across all interfaces	8; in total across all interfaces
- Number of IO Devices per tool, max.	8	8
- Updating times	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data
PROFINET IO Device		
• Services		
- PG/OP communication	Yes	Yes
- Isochronous mode	No	No
- IRT	Yes	Yes
- PROFIenergy	Yes; per user program	Yes; per user program
- Shared device	Yes	Yes
- Number of IO Controllers with shared device, max.	4	4
- activation/deactivation of I-devices	Yes; per user program	Yes; per user program
- Asset management record	Yes; per user program	Yes; per user program
2. Interface		
Interface types		
• RS 485	Yes; Via CM DP module	Yes; Via CM DP module
• Number of ports	1	1
Protocols		
• PROFIBUS DP master	Yes	Yes
• PROFIBUS DP slave	Yes	Yes
• SIMATIC communication	Yes	Yes
PROFIBUS DP master		
• Number of DP slaves, max.	125; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	125; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
Protocols		
Number of connections		
• Number of connections, max.	96; via integrated interfaces of the CPU and connected CPs / CMs	96; via integrated interfaces of the CPU and connected CPs / CMs
Redundancy mode		
• Media redundancy		
- Media redundancy	Yes; only via BusAdapter	No
- MRP	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client	No
- MRP interconnection, supported	Yes; as MRP ring node according to IEC 62439-2 Edition 3.0	No
- MRPD	Yes; Requirement: IRT	No
- Switchover time on line break, typ.	200 ms; For MRP, bumpless for MRPD	
- Number of stations in the ring, max.	50	
SIMATIC communication		
• S7 routing	Yes	Yes
OPC UA		
• OPC UA Client	Yes	Yes
• OPC UA Server	Yes; Data access (read, write, subscribe), method call, custom address space	Yes; Data access (read, write, subscribe), method call, custom address space
• Alarms and Conditions	Yes	Yes
Supported technology objects		
Motion Control	Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool	Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool
• Number of available Motion Control resources for technology objects	800	800
• Required Motion Control resources		
- per speed-controlled axis	40	40
- per positioning axis	80	80
- per synchronous axis	160	160
- per external encoder	80	80
- per output cam	20	20
- per cam track	160	160
- per probe	40	40

Article number	**6AG2510-1DJ01-1AB0** SIPLUS ET 200SP CPU 1510SP-1 PN RAIL	**6AG2510-1DJ01-4AB0** SIPLUS ET 200SP CPU 1510SP-1 PN RAIL
Controller		
• PID_Compact	Yes; Universal PID controller with integrated optimization	Yes; Universal PID controller with integrated optimization
• PID_3Step	Yes; PID controller with integrated optimization for valves	Yes; PID controller with integrated optimization for valves
• PID-Temp	Yes; PID controller with integrated optimization for temperature	Yes; PID controller with integrated optimization for temperature
Counting and measuring		
• High-speed counter	Yes	Yes
Standards, approvals, certificates		
Railway application		
• EN 50121-3-2	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support
Ambient conditions		
Ambient temperature during operation		
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155)	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)
• vertical installation, min.	-40 °C; = Tmin	-40 °C; = Tmin
• vertical installation, max.	50 °C; = Tmax	50 °C; = Tmax
Altitude during operation relating to sea level		
• Installation altitude above sea level, max.	2 000 m	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity		
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance		
• Coolants and lubricants		
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air	No
• Use in stationary industrial systems		
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *
- Against mechanical environmental conditions acc. to EN 60721-3-3	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	
• Use on land craft, rail vehicles and special-purpose vehicles		
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *
- Against mechanical environmental conditions acc. to EN 60721-3-5	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	
- against mechanical environmental conditions in agriculture acc. to ISO 15003	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	
• Usage in industrial process technology		
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)

Article number	**6AG2510-1DJ01-1AB0** SIPLUS ET 200SP CPU 1510SP-1 PN RAIL	**6AG2510-1DJ01-4AB0** SIPLUS ET 200SP CPU 1510SP-1 PN RAIL
• Remark - Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating		
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A
Configuration / header		
Configuration / programming / header		
• Programming language		
- LAD	Yes	Yes
- FBD	Yes	Yes
- STL	Yes	Yes
- SCL	Yes	Yes
- GRAPH	Yes	Yes
Know-how protection		
• User program protection/password protection	Yes	Yes
• Copy protection	Yes	Yes
• Block protection	Yes	Yes
Access protection		
• protection of confidential configuration data	Yes	Yes
• Protection level: Write protection	Yes	Yes
• Protection level: Read/write protection	Yes	Yes
• Protection level: Complete protection	Yes	Yes
Dimensions		
Width	100 mm	100 mm
Height	117 mm	117 mm
Depth	75 mm	75 mm
Weights		
Weight, approx.	310 g	470 g
Other		
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

Version	Article No.
SIPLUS ET 200SP CPU 1510SP-1 PN T1 RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic Work memory 100 KB for program, 750 KB for data, PROFINET IO IRT interface; SIMATIC Memory Card required For areas with extreme exposure to environmental substances (conformal coating); Ambient temperature -25 ... +55 °C (+70 °C for 10 min.)	**6AG2510-1DJ01-1AB0**
SIPLUS ET 200SP CPU 1510SP-1 PN TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic Work memory 100 KB for program, 750 KB for data, PROFINET IO IRT interface; SIMATIC Memory Card required For areas with extreme exposure to environmental substances (conformal coating); Ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2510-1DJ01-4AB0**
Accessories	
SIPLUS ET 200SP BA 2XRJ45 TX RAIL BusAdapter For PROFINET interface modules in Standard function class or above; max. cable length 50 m; For areas with extreme exposure to environmental substances (conformal coating) Ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6AR00-4AA0**
SIPLUS ET 200SP BA 2XFC TX RAIL BusAdapter For PROFINET interface modules in Standard function class or above; for increased vibration and EMC load rating; max. cable length 50 m; for areas with extreme exposure to environmental substances (conformal coating); Ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6AF00-4AA0**
SIPLUS Mounting Kit ET 200SP Mounting accessories for use with increased mechanical vibration and shock loads. Not approved for SIPLUS CPU 6AG2510-1DJ01-4AB0 and BusAdapter BA 2xRJ45	**6AG1193-6AA00-0AA0**

*** You can order this quantity or a multiple thereof.**

Overview

- SIPLUS ET 200SP CPU 1512SP-1 PN RAIL for SIPLUS extreme RAIL ET 200SP based on SIPLUS S7-1500 CPU 1513-1 PN
- Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic
- For applications with average requirements regarding the program scope and processing speed, for distributed setup via PROFINET IO or PROFIBUS DP
- Increase in availability of systems and machines
- PROFINET IO controller for up to 128 IO devices
- PROFINET I-Device for connecting the CPU as an intelligent PROFINET device with a SIMATIC or third-party PROFINET IO controller
- PROFINET shared I-device for 4 controllers
- PROFINET IO IRT interface with integrated 3-port switch
- Isochronous mode on PROFINET
- With multiple communication options:
  PG/OP communication, PROFINET IO, open IE communication (TCP, ISO-on-TCP and UDP), web server and S7 communication (with loadable FBs)
- Optional PROFIBUS DP master for 125 PROFIBUS DP slaves (with CM DP module 6ES7545-5DA00-0AB0)
- Optional PROFIBUS DP slave (with CM DP module 6ES7545-5DA00-0AB0)
- Configuration control (option handling)
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders

Note

SIMATIC Memory Card required for operation of the CPU.
BusAdapter not included in scope of delivery and to be ordered separately.

Application

SIPLUS ET 200SP CPU 1512SP-1 PN RAIL is designed for applications with average requirements in terms of processing performance and response speed in discrete production technology. SIPLUS ET 200SP CPU 1512SP-1 PN RAIL can be used as a PROFINET IO controller or as distributed intelligence (PROFINET I-Device). The integrated PROFINET IO IRT interface is designed as a 3-port switch enabling configuration of a linear topology in the system via port 1 and 2, such that a PG/PC or HMI device can also be connected via port 3.

When used as an I-device, the SIPLUS ET 200SP CPU 1512SP-1 PN RAIL facilitates local preprocessing of process data and only delivers the information actually required to the higher-level controller. This has the following advantages:

- Less load on central controller
- Short response times to critical local signals
- Less load on the bus system due to smaller data volumes
- Faster commissioning due to pre-tested units and parallel commissioning
- Increased availability and flexibility thanks to autonomous machine units
- Transparent configuration

The SIPLUS ET 200SP CPU 1512SP-1 PN RAIL operates completely independently of the central controller. If it fails, the SIPLUS ET 200SP CPU 1512SP-1 PN RAIL continues to run.

The bit-modular design of the ET 200SP I/O system, together with SIPLUS ET 200SP CPU 1512SP-1 PN RAIL, enables functionally oriented station design.

In addition, the CPU offers comprehensive control functionalities via easy-to-configure blocks as well as the ability to connect drives via standardized PLC-open blocks.

Design

The SIPLUS ET 200SP CPU 1512SP-1 PN CPU RAIL is directly snapped onto the standard DIN rail and features:

- Powerful processor:
  CPU achieves command execution times as low as 48 ns per binary instruction.
- Large work memory:
  200 KB for programs, 1 MB for data
- SIMATIC Memory Cards as load memories
  Permits additional functions such as firmware updates, datalog and archives
- Bit-modular expandability for maximum flexibility
  Up to 64 I/O modules (I/O, technology, and communication modules) in any combination. Station width up to 1 m.
- Mixed configuration with ET 200AL
  Possible to integrate up to 16 I/O modules of the ET 200AL (IP65/IP67) I/O system in a scalable I/O system ET 200SP (IP20) installation via a "BU-Send" BaseUnit and a "BA-Send" BusAdapter.
- PROFINET IO IRT interface with 3 integrated switch ports:
  - Port 1 and 2 via BusAdapter
    (SIPLUS ET 200SP CPU 1512SP-1 PN CPU RAIL is supplied without the BusAdapter and can also be operated without it. An appropriate BusAdapter can be ordered separately if needed)
  - Port 3 integrated RJ45 socket
- Integrated communication functions:
  - PG/OP communication
  - PROFINET IO
  - Open IE communication (TCP, ISO-on-TCP and UDP)
  - OPC UA server (data access)
  - Web server
  - S7 communication
  - S7 routing
  - Data set routing
- Maintenance-free data backup without battery
- Diagnostics displays for errors (Error), operation (RUN/Stop), maintenance (MT), power supply (PWR) and one link LED per port

- Optional labeling using light gray or yellow labeling strips. Choice of 2 materials:
  - Foil and roll with 500 strips, for thermal transfer roll printers
  - Paper (280 g/m^2), DIN A4 sheets with 100 strips each, for laser printers
- The ET 200SP CPU can be equipped with an equipment labeling plate.
- Different PROFINET connection types by means of BusAdapter
  - SIMATIC BusAdapters with an RJ45 interface, e.g. BusAdapter BA 2xRJ45, can be used in standard applications with moderate mechanical and low EMC loads
  - For machines and systems in which higher mechanical and/or EMC loads act on the devices, a SIMATIC BusAdapter with connection via FastConnect (FC) or FO cable (SCRJ or LC) is recommended. Likewise, all SIMATIC BusAdapters with an FO cable connection (SCRJ, LC) can be used with increased loads.
  - BusAdapters with connections for FO cables can be used to cover high potential differences between two stations and/or with high EMC loads.
- Dark BaseUnit as first BaseUnit behind the ET 200SP CPU when using an AC I/O module or an AI Energy Meter ST as the first I/O module.

Scope of delivery:

CPU 1512SP-1 PN including server module, 24 V DC connector and cover for BusAdapter port (BusAdapter must be ordered separately).

Function

- Performance
  - High-speed command processing
  - Powerful network connection:
    CPU is equipped with a PROFINET IO IRT (3-port switch) as the standard interface
- Integrated technology
  - Connection of analog and PROFIdrive-capable drives via standardized blocks (PLCopen)
  - Support of speed-controlled and positioning axes as well as external encoders
  - Precise position gearing for synchronous operation between axes
  - Trace functions for all CPU tags, both for diagnostics in real time as well as for sporadic error detection
  - Comprehensive control functionalities, e.g. easily configurable blocks for automatic optimization of the control parameters for optimum control quality
- Isochronous mode
  - Synchronous coupling of distributed signal acquisition, signal transmission, and program execution to the PROFINET cycle with constant bus cycle time
- Security Integrated
  - Password-based know-how protection against unauthorized read-out and modification of program blocks
  - Copy protection for tying individual blocks to the serial number of the SIMATIC Memory Card: The block can only run if the configured memory card is inserted into the CPU.
  - 4-level authorization concept: Communication to the HMI devices can also be restricted.
  - Manipulation protection: The controller recognizes changed or unauthorized transmissions of the engineering data.
- Integrated system diagnostics
  - System diagnostics information is displayed consistently and in plain text in the TIA Portal, HMI devices and Web server, even for messages from the drives, and is updated even if the CPU is in STOP mode.
  - Integrated into the firmware of the CPU, no special configuration is required
- Configuration control (option handling) in central setup
  - Various hardware configurations can be stored in the controller:
    Modification of the configuration in the user program (startup OB100)
    Retrofitting of options at end of configuration
    Use of placeholder modules is possible.
- SIMATIC Memory Card (required for operation of the CPU)
  - Used as a plug-in load memory or for updating the firmware.
  - Also for storing additional documents or csv files (for recipes and archives)
  - Creation of data blocks for storage/reading of data via SFCs of the user program
- Datalog (archives) and recipes
  - Storage of csv files for recipes and archives on the SIMATIC Memory Card;
    easy access to plant-relevant operating data using Office tools or via a Web server
  - Easy access to machine configuration data by means of a Web browser or SD card reader (two-way data exchange from and to the controller)
- Programming
  - Programming with STEP 7 Professional, V13 update 3 and higher

Technical specifications

Article number	**6AG2512-1DK01-1AB0** SIPLUS ET 200SP CPU 1512SP-1 PN RAIL	**6AG2512-1DK01-4AB0** SIPLUS ET 200SP CPU 1512SP-1 PN RAIL
General information		
Product type designation	CPU 1512SP-1 PN	CPU 1512SP-1 PN
Engineering with • STEP 7 TIA Portal configurable/integrated from version	see entry ID: 109746275	see entry ID: 109746275
Supply voltage		
Rated value (DC)	24 V	24 V
Memory		
Work memory • integrated (for program) • integrated (for data)	200 kbyte 1 Mbyte	200 kbyte 1 Mbyte
Load memory • Plug-in (SIMATIC Memory Card), max.	32 Gbyte	32 Gbyte
CPU processing times		
for bit operations, typ.	48 ns	48 ns
for word operations, typ.	58 ns	58 ns
for fixed point arithmetic, typ.	77 ns	77 ns
for floating point arithmetic, typ.	307 ns	307 ns
Counters, timers and their retentivity		
S7 counter • Number	2 048	2 048
IEC counter • Number	Any (only limited by the main memory)	Any (only limited by the main memory)
S7 times • Number	2 048	2 048
IEC timer • Number	Any (only limited by the main memory)	Any (only limited by the main memory)
Data areas and their retentivity		
Flag • Size, max.	16 kbyte	16 kbyte
Address area		
I/O address area • Inputs • Outputs	32 kbyte; All inputs are in the process image 32 kbyte; All outputs are in the process image	32 kbyte; All inputs are in the process image 32 kbyte; All outputs are in the process image
Address space per module • Address space per module, max.	288 byte; For input and output data respectively	288 byte; For input and output data respectively
Address space per station • Address space per station, max.	2 560 byte; for central inputs and outputs; depending on configuration; 2 048 bytes for ET 200SP modules + 512 bytes for ET 200AL modules	2 560 byte; for central inputs and outputs; depending on configuration; 2 048 bytes for ET 200SP modules + 512 bytes for ET 200AL modules
Time of day		
Clock • Type	Hardware clock	Hardware clock
1. Interface		
Interface types • RJ 45 (Ethernet) • Number of ports • integrated switch • BusAdapter (PROFINET)	Yes; X1 P3; opt. X1 P1 and X1 P2 via BusAdapter BA 2x RJ45 3; 1. integr. + 2. via BusAdapter Yes Yes; compatible BusAdapters: BA 2x RJ45, BA 2x M12, BA 2x FC, BA 2x LC, BA LC/RJ45, BA LC/FC, BA 2x SCRJ, BA SCRJ/RJ45, BA SCRJ/FC,	Yes; X1 P3 1 No No
Protocols • IP protocol • PROFINET IO Controller • PROFINET IO Device • SIMATIC communication • Open IE communication • Web server • Media redundancy	Yes; IPv4 Yes Yes Yes Yes; Optionally also encrypted Yes Yes; MRP Automanager according to IEC 62439-2 Edition 2.0	Yes; IPv4 Yes Yes Yes Yes; Optionally also encrypted Yes No

Article number	**6AG2512-1DK01-1AB0** SIPLUS ET 200SP CPU 1512SP-1 PN RAIL	**6AG2512-1DK01-4AB0** SIPLUS ET 200SP CPU 1512SP-1 PN RAIL
PROFINET IO Controller		
• Services		
- PG/OP communication	Yes	Yes
- Isochronous mode	Yes	Yes
- Direct data exchange	Yes; Requirement: IRT and isochronous mode (MRPD optional)	Yes; Requirement: IRT and isochronous mode (MRPD optional)
- IRT	Yes	Yes
- PROFIenergy	Yes; per user program	Yes; per user program
- Prioritized startup	Yes; Max. 32 PROFINET devices	Yes; Max. 32 PROFINET devices
- Number of connectable IO Devices, max.	128; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	128; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
- Of which IO devices with IRT, max.	64	64
- Number of connectable IO Devices for RT, max.	128	128
- of which in line, max.	128	128
- Number of IO Devices that can be simultaneously activated/deactivated, max.	8; in total across all interfaces	8; in total across all interfaces
- Number of IO Devices per tool, max.	8	8
- Updating times	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data
PROFINET IO Device		
• Services		
- PG/OP communication	Yes	Yes
- Isochronous mode	No	No
- IRT	Yes	Yes
- PROFIenergy	Yes; per user program	Yes; per user program
- Shared device	Yes	Yes
- Number of IO Controllers with shared device, max.	4	4
- activation/deactivation of I-devices	Yes; per user program	Yes; per user program
- Asset management record	Yes; per user program	Yes; per user program
2. Interface		
Interface types		
• RS 485	Yes; Via CM DP module	Yes; Via CM DP module
• Number of ports	1	1
Protocols		
• PROFIBUS DP master	Yes	Yes
• PROFIBUS DP slave	Yes	Yes
• SIMATIC communication	Yes	Yes
PROFIBUS DP master		
• Number of DP slaves, max.	125; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	125; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
Protocols		
Number of connections		
• Number of connections, max.	128; via integrated interfaces of the CPU and connected CPs / CMs	128; via integrated interfaces of the CPU and connected CPs / CMs
Redundancy mode		
• Media redundancy		
- Media redundancy	Yes; only via BusAdapter	No
- MRP	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client	No
- MRP interconnection, supported	Yes; as MRP ring node according to IEC 62439-2 Edition 3.0	No
- MRPD	Yes; Requirement: IRT	No
- Switchover time on line break, typ.	200 ms; For MRP, bumpless for MRPD	
- Number of stations in the ring, max.	50	
SIMATIC communication		
• S7 routing	Yes	Yes
OPC UA		
• OPC UA Client	Yes	Yes
• OPC UA Server	Yes; Data access (read, write, subscribe), method call, custom address space	Yes; Data access (read, write, subscribe), method call, custom address space
• Alarms and Conditions	Yes	Yes
Supported technology objects		
Motion Control	Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool	Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool
• Number of available Motion Control resources for technology objects	800	800
• Required Motion Control resources		
- per speed-controlled axis	40	40
- per positioning axis	80	80
- per synchronous axis	160	160
- per external encoder	80	80
- per output cam	20	20
- per cam track	160	160
- per probe	40	40

Article number	**6AG2512-1DK01-1AB0** SIPLUS ET 200SP CPU 1512SP-1 PN RAIL	**6AG2512-1DK01-4AB0** SIPLUS ET 200SP CPU 1512SP-1 PN RAIL
Controller		
• PID_Compact	Yes; Universal PID controller with integrated optimization	Yes; Universal PID controller with integrated optimization
• PID_3Step	Yes; PID controller with integrated optimization for valves	Yes; PID controller with integrated optimization for valves
• PID-Temp	Yes; PID controller with integrated optimization for temperature	Yes; PID controller with integrated optimization for temperature
Counting and measuring		
• High-speed counter	Yes	Yes
Standards, approvals, certificates		
Railway application		
• EN 50121-3-2	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support
Ambient conditions		
Ambient temperature during operation		
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155)	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)
• vertical installation, min.	-40 °C; = Tmin	-40 °C; = Tmin
• vertical installation, max.	50 °C; = Tmax	50 °C; = Tmax
Altitude during operation relating to sea level		
• Installation altitude above sea level, max.	2 000 m	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity		
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance		
• Coolants and lubricants		
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air	No
• Use in stationary industrial systems		
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *
- Against mechanical environmental conditions acc. to EN 60721-3-3	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	
• Use on land craft, rail vehicles and special-purpose vehicles		
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *
- Against mechanical environmental conditions acc. to EN 60721-3-5	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	
- against mechanical environmental conditions in agriculture acc. to ISO 15003	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	
• Usage in industrial process technology		
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)

Article number	**6AG2512-1DK01-1AB0** SIPLUS ET 200SP CPU 1512SP-1 PN RAIL	**6AG2512-1DK01-4AB0** SIPLUS ET 200SP CPU 1512SP-1 PN RAIL
• Remark - Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating		
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A
Configuration / header		
Configuration / programming / header		
• Programming language		
- LAD	Yes	Yes
- FBD	Yes	Yes
- STL	Yes	Yes
- SCL	Yes	Yes
- GRAPH	Yes	Yes
Know-how protection		
• User program protection/password protection	Yes	Yes
• Copy protection	Yes	Yes
• Block protection	Yes	Yes
Access protection		
• protection of confidential configuration data	Yes	Yes
• Protection level: Write protection	Yes	Yes
• Protection level: Read/write protection	Yes	Yes
• Protection level: Complete protection	Yes	Yes
Dimensions		
Width	100 mm	100 mm
Height	117 mm	117 mm
Depth	75 mm	75 mm
Weights		
Weight, approx.	310 g	470 g
Other		
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

	Version	Article No.
	SIPLUS ET 200SP CPU 1512SP-1 PN T1 RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic Work memory 200 KB for program, 1 MB for data, PROFINET IO IRT interface; SIMATIC Memory Card required For areas with extreme exposure to environmental substances (conformal coating); Ambient temperature -25 ... +60 °C (+70 °C for 10 min.)	**6AG2512-1DK01-1AB0**
	SIPLUS ET 200SP CPU 1512SP-1 PN TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic Work memory 100 KB for program, 750 KB for data, PROFINET IO IRT interface; SIMATIC Memory Card required For areas with extreme exposure to environmental substances (conformal coating); Ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2512-1DK01-4AB0**
	Accessories	
	SIPLUS ET 200SP BA 2XRJ45 TX RAIL BusAdapter For PROFINET interface modules in Standard function class or above; max. cable length 50 m; For areas with extreme exposure to environmental substances (conformal coating) Ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6AR00-4AA0**
	SIPLUS ET 200SP BA 2XFC TX RAIL BusAdapter For PROFINET interface modules in Standard function class or above; for increased vibration and EMC load rating; max. cable length 50 m; for areas with extreme exposure to environmental substances (conformal coating); Ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6AF00-4AA0**
	SIPLUS Mounting Kit ET 200SP Mounting accessories for use with increased mechanical vibration and shock loads. Not approved for SIPLUS CPU 6AG2510-1DJ01-4AB0 and BusAdapter BA 2xRJ45	**6AG1193-6AA00-0AA0**

*** You can order this quantity or a multiple thereof.**

SIPLUS extreme RAIL fail-safe CPUs

Overview

- 2 fail-safe, performance graded CPUs based on SIPLUS extreme RAIL ET 200SP:
  - SIPLUS ET 200SP CPU 1510SP F-1 PN T1 RAIL
  - SIPLUS ET 200SP CPU 1512SP F-1 PN T1 RAIL

Features	SIPLUS ET 200SP CPU 1510SP F-1 PN T1 RAIL	SIPLUS ET 200SP CPU 1512SP F-1 PN T1 RAIL
Work memory for program, integrated	150 KB	300 KB
Work memory for data, integrated	750 KB	1 MB
Load memory	Plug-in via SIMATIC Memory Card, max. 32 GB	Plug-in via SIMATIC Memory Card, max. 32 GB
Command execution times		
• Bit operations	72 ns	48 ns
• Word operations	86 ns	58 ns
• Fixed-point operations	115 ns	77 ns
• Floating-point operations	461 ns	307 ns
Integral interfaces		
• PROFINET IO IRT	1 x PN IO IRT (3-port switch)	1 x PN IO IRT (3-port switch)
• PROFIBUS DP	Yes (via CM DP)	Yes (via CM DP)
Standards, approvals, certificates	SIL 2 acc. to EN 50126, 50128, 50129	SIL 2 acc. to EN 50126, 50128, 50129

Application

A range of fail-safe, performance-graded CPUs are available for the SIPLUS extreme RAIL ET 200SP:

Fail-safe CPUs

- SIPLUS ET 200SP CPU 1510SP F-1 PN T1 RAIL:
  The entry-level CPU for standard and fail-safe applications with average requirements in terms of processing performance and response speed in discrete production technology. SIPLUS ET 200SP CPU 1510SP F-1 PN T1 RAIL can be used as a PROFINET IO controller or as distributed intelligence (PROFINET I-Device).
- SIPLUS ET 200SP CPU 1512SP F-1 PN T1 RAIL:
  The CPU for standard and fail-safe applications with average requirements in terms of processing performance and response speed in discrete production technology. SIPLUS ET 200SP CPU 1512SP F-1 PN T1 RAIL can be used as a PROFINET IO controller or as distributed intelligence (PROFINET I-Device).

Technical specifications

Article number	**6AG2510-1SJ01-1AB0** SIPLUS ET 200SP CPU 1510 F-1 PN RAIL	**6AG2512-1SK01-1AB0** SIPLUS ET 200SP CPU 1512 F-1 PN RAIL
General information		
Product type designation	CPU 1510SP F-1 PN	CPU 1512SP F-1 PN
Engineering with • STEP 7 TIA Portal configurable/integrated from version	see entry ID: 109746275	see entry ID: 109746275
Supply voltage		
Rated value (DC)	24 V	24 V
Memory		
Work memory • integrated (for program) • integrated (for data)	 150 kbyte 750 kbyte	 300 kbyte 1 Mbyte
Load memory • Plug-in (SIMATIC Memory Card), max.	 32 Gbyte	 32 Gbyte
CPU processing times		
for bit operations, typ.	72 ns	48 ns
for word operations, typ.	86 ns	58 ns
for fixed point arithmetic, typ.	115 ns	77 ns
for floating point arithmetic, typ.	461 ns	307 ns
Counters, timers and their retentivity		
S7 counter • Number	 2 048	 2 048
IEC counter • Number	 Any (only limited by the main memory)	 Any (only limited by the main memory)
S7 times • Number	 2 048	 2 048
IEC timer • Number	 Any (only limited by the main memory)	 Any (only limited by the main memory)
Data areas and their retentivity		
Flag • Size, max.	 16 kbyte	 16 kbyte

Article number	**6AG2510-1SJ01-1AB0** SIPLUS ET 200SP CPU 1510 F-1 PN RAIL	**6AG2512-1SK01-1AB0** SIPLUS ET 200SP CPU 1512 F-1 PN RAIL
Address area		
I/O address area		
• Inputs	32 kbyte; All inputs are in the process image	32 kbyte; All inputs are in the process image
• Outputs	32 kbyte; All outputs are in the process image	32 kbyte; All outputs are in the process image
Address space per module		
• Address space per module, max.	288 byte; For input and output data respectively	288 byte; For input and output data respectively
Address space per station		
• Address space per station, max.	2 560 byte; for central inputs and outputs; depending on configuration; 2 048 bytes for ET 200SP modules + 512 bytes for ET 200AL modules	2 560 byte; for central inputs and outputs; depending on configuration; 2 048 bytes for ET 200SP modules + 512 bytes for ET 200AL modules
Time of day		
Clock		
• Type	Hardware clock	Hardware clock
1. Interface		
Interface types		
• RJ 45 (Ethernet)	Yes; X1 P3; opt. X1 P1 and X1 P2 via BusAdapter BA 2x RJ45	Yes; X1 P3; opt. X1 P1 and X1 P2 via BusAdapter BA 2x RJ45
• Number of ports	3; 1. integr. + 2. via BusAdapter	3; 1. integr. + 2. via BusAdapter
• integrated switch	Yes	Yes
• BusAdapter (PROFINET)	Yes; compatible BusAdapters: BA 2x RJ45, BA 2x FC, BA 2x M12	Yes; compatible BusAdapters: BA 2x RJ45, BA 2x FC, BA 2x M12
Protocols		
• IP protocol	Yes; IPv4	Yes; IPv4
• PROFINET IO Controller	Yes	Yes
• PROFINET IO Device	Yes	Yes
• SIMATIC communication	Yes	Yes
• Open IE communication	Yes; Optionally also encrypted	Yes; Optionally also encrypted
• Web server	Yes	Yes
• Media redundancy	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0
PROFINET IO Controller		
• Services		
- PG/OP communication	Yes	Yes
- Isochronous mode	Yes	Yes
- Direct data exchange	Yes; Requirement: IRT and isochronous mode (MRPD optional)	Yes; Requirement: IRT and isochronous mode (MRPD optional)
- IRT	Yes	Yes
- PROFIenergy	Yes; per user program	Yes; per user program
- Prioritized startup	Yes; Max. 32 PROFINET devices	Yes; Max. 32 PROFINET devices
- Number of connectable IO Devices, max.	64; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	128; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
- Of which IO devices with IRT, max.	64	64
- Number of connectable IO Devices for RT, max.	64	128
- of which in line, max.	64	128
- Number of IO Devices that can be simultaneously activated/deactivated, max.	8; in total across all interfaces	8; in total across all interfaces
- Number of IO Devices per tool, max.	8	8
- Updating times	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data
PROFINET IO Device		
• Services		
- PG/OP communication	Yes	Yes
- Isochronous mode	No	No
- IRT	Yes	Yes
- PROFIenergy	Yes; per user program	Yes; per user program
- Shared device	Yes	Yes
- Number of IO Controllers with shared device, max.	4	4
- activation/deactivation of I-devices	Yes; per user program	Yes; per user program
- Asset management record	Yes; per user program	Yes; per user program
2. Interface		
Interface types		
• RS 485	Yes; Via CM DP module	Yes; Via CM DP module
• Number of ports	1	1
Protocols		
• PROFIBUS DP master	Yes	Yes
• PROFIBUS DP slave	Yes	Yes
• SIMATIC communication	Yes	Yes
PROFIBUS DP master		
• Number of DP slaves, max.	125; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	125; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET

SIPLUS extreme RAIL fail-safe CPUs

Article number	**6AG2510-1SJ01-1AB0** SIPLUS ET 200SP CPU 1510 F-1 PN RAIL	**6AG2512-1SK01-1AB0** SIPLUS ET 200SP CPU 1512 F-1 PN RAIL
Protocols		
Number of connections		
• Number of connections, max.	96; via integrated interfaces of the CPU and connected CPs / CMs	128; via integrated interfaces of the CPU and connected CPs / CMs
Redundancy mode		
• Media redundancy		
- Media redundancy	Yes; only via BusAdapter	Yes; only via BusAdapter
- MRP	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client
- MRP interconnection, supported	Yes; as MRP ring node according to IEC 62439-2 Edition 3.0	Yes; as MRP ring node according to IEC 62439-2 Edition 3.0
- MRPD	Yes; Requirement: IRT	Yes; Requirement: IRT
- Switchover time on line break, typ.	200 ms; For MRP, bumpless for MRPD	200 ms; For MRP, bumpless for MRPD
- Number of stations in the ring, max.	50	50
SIMATIC communication		
• S7 routing	Yes	Yes
OPC UvA		
• OPC UA Client	Yes	Yes
• OPC UA Server	Yes; Data access (read, write, subscribe), method call, custom address space	Yes; Data access (read, write, subscribe), method call, custom address space
• Alarms and Conditions	Yes	
Supported technology objects		
Motion Control	Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool	Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool
• Number of available Motion Control resources for technology objects	800	800
• Required Motion Control resources		
- per speed-controlled axis	40	40
- per positioning axis	80	80
- per synchronous axis	160	160
- per external encoder	80	80
- per output cam	20	20
- per cam track	160	160
- per probe	40	40
Controller		
• PID_Compact	Yes; Universal PID controller with integrated optimization	Yes; Universal PID controller with integrated optimization
• PID_3Step	Yes; PID controller with integrated optimization for valves	Yes; PID controller with integrated optimization for valves
• PID-Temp	Yes; PID controller with integrated optimization for temperature	Yes; PID controller with integrated optimization for temperature
Counting and measuring		
• High-speed counter	Yes	Yes
Standards, approvals, certificates		
Highest safety class achievable in safety mode		
• SIL in accordance with EN 50126, 50128, 50129	SIL 2; a higher safety integrity level is possible if tested and approved for the specific application under consideration of all local regulations.	SIL 2; a higher safety integrity level is possible if tested and approved for the specific application under consideration of all local regulations.
Probability of failure (for service life of 20 years and repair time of 100 hours)		
• Low demand mode: PFDavg in accordance with SIL3	< 2.00E-05	< 2.00E-05
• High demand/continuous mode: PFH in accordance with SIL3	< 1.00E-09	< 1.00E-09
Railway application		
• EN 50121-3-2	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support

Article number	**6AG2510-1SJ01-1AB0** SIPLUS ET 200SP CPU 1510 F-1 PN RAIL	**6AG2512-1SK01-1AB0** SIPLUS ET 200SP CPU 1512 F-1 PN RAIL
Ambient conditions		
Ambient temperature during operation		
• horizontal installation, min.	-25 °C; = Tmin (incl. condensation/frost)	-25 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155)	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155)
• vertical installation, min.	-25 °C; = Tmin	-25 °C; = Tmin
• vertical installation, max.	50 °C; = Tmax	50 °C; = Tmax
Altitude during operation relating to sea level		
• Installation altitude above sea level, max.	2 000 m	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity		
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance		
• Coolants and lubricants		
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems		
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *
- Against mechanical environmental conditions acc. to EN 60721-3-3	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Use on land craft, rail vehicles and special-purpose vehicles		
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *
- Against mechanical environmental conditions acc. to EN 60721-3-5	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
- against mechanical environmental conditions in agriculture acc. to ISO 15003	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Usage in industrial process technology		
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark		
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating		
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A
Configuration / header		
Configuration / programming / header		
• Programming language		
- LAD	Yes; incl. failsafe	Yes; incl. failsafe
- FBD	Yes; incl. failsafe	Yes; incl. failsafe
- STL	Yes	Yes
- SCL	Yes	Yes
- GRAPH	Yes	Yes
Know-how protection		
• User program protection/password protection	Yes	Yes
• Copy protection	Yes	Yes
• Block protection	Yes	Yes
Access protection		
• protection of confidential configuration data	Yes	
• Protection level: Write protection	Yes	Yes
• Protection level: Read/write protection	Yes	Yes
• Protection level: Write protection for Failsafe	Yes	
• Protection level: Complete protection	Yes	Yes

SIPLUS extreme RAIL fail-safe CPUs

Article number	**6AG2510-1SJ01-1AB0** SIPLUS ET 200SP CPU 1510 F-1 PN RAIL	**6AG2512-1SK01-1AB0** SIPLUS ET 200SP CPU 1512 F-1 PN RAIL
Dimensions		
Width	100 mm	100 mm
Height	117 mm	117 mm
Depth	75 mm	75 mm
Weights		
Weight, approx.	310 g	310 g
Other		
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

More information

Additional information and downloads

Manuals

The manuals for ET 200SP can be downloaded free of charge from the Internet (SIMATIC Customer Support).
http://support.automation.siemens.com/WW/view/en/84133942

General information

http://www.siemens.com/et200sp

SIMATIC Selection Tool

http://www.siemens.com/tia-selection-tool

Overview

- SIPLUS ET 200SP CPU 1510SP F-1 PN T1 RAIL for SIPLUS extreme RAIL ET 200SP based on S7-1500 CPU 1511F-1 PN
- Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic
- For high-performance control solutions using ET 200SP
- Increase in availability of systems and machines
- Supports PROFIsafe in centralized and distributed configurations
- PROFINET IO controller for up to 64 IO devices
- PROFINET I-Device for connecting the CPU as an intelligent PROFINET device with a SIMATIC or third-party PROFINET IO controller
- PROFINET shared I-device for 4 controllers
- PROFINET IO IRT interface with integrated 3-port switch
- Isochronous mode on PROFINET
- With multiple communication options:
  PG/OP communication, PROFINET IO, open IE communication (TCP, ISO-on-TCP and UDP), web server and S7 communication (with loadable FBs)
- Configuration control (option handling)
- Integrated motion control functions for controlling speed-controlled and positioning axes, support for external encoders

Application

SIPLUS ET 200SP CPU 1510SP F-1 PN T1 RAIL is a cost-effective entry-level CPU for standard and fail-safe applications with average requirements in terms of processing performance and response speed in discrete production technology. SIPLUS ET 200SP CPU 1510SP F-1 PN T1 RAIL can be used as a PROFINET IO controller or as distributed intelligence (PROFINET I-Device). The integrated PROFINET IO IRT interface is designed as a 3-port switch enabling configuration of a linear topology in the system via port 1 and 2, such that a PG/PC or HMI device can also be connected via port 3.

When used as an I-device, the SIPLUS ET 200SP CPU 1510SP F-1 PN T1 RAIL enables distributed preprocessing of process data locally and only delivers the information actually required to the higher-level controller. This has the following advantages:

- Less load on central controller
- Short response times to critical local signals
- Less load on the bus system due to smaller data volumes
- Faster commissioning due to pre-tested units and parallel commissioning
- Increased availability and flexibility due to autonomous machine units
- Easy-to-understand configuration

SIPLUS ET 200SP CPU 1510SP F-1 PN T1 RAIL operates fully independently of the central controller. If the controller fails, the CPU simply continues to operate.

The bit-modular design of the ET 200SP I/O system, together with the SIPLUS ET 200SP CPU 1510SP F-1 PN T1 RAIL, enables functionally oriented station design.

In addition, the CPU offers comprehensive control functionalities via easy-to-configure blocks as well as the ability to connect drives via standardized PLC-open blocks.

Design

SIPLUS ET 200SP CPU 1510SP F-1 PN T1 RAIL is snapped directly onto the standard DIN rail and features:

- A high-performance processor;
  the CPU achieves command execution times as low as 72 ns per binary instruction
- Extensive work memory:
  150 KB for program, 750 KB for data
- SIMATIC Memory Cards as load memory;
  permitting additional functions such as firmware update, datalog and archiving
- Bit-modular expandability for maximum flexibility;
  up to 64 I/O modules (I/O, technology, and communications modules) in any combination. Station width up to 1 m.
- PROFINET IO IRT interface with 3 integrated switch ports:
  - Port 1 and 2 via BusAdapter (SIPLUS ET 200SP CPU 1510SP F-1 PN T1 RAIL is supplied without the BusAdapter and can also be operated without it). The appropriate BusAdapter (BA 2xRJ45 or BA 2xFC) is to be ordered separately if needed.
  - Port 3 via integrated RJ45 socket.
- Integrated communication functions:
  - PG/OP communication
  - PROFINET IO
  - Open IE communication (TCP, ISO-on-TCP and UDP)
  - Web server
  - S7 communication
  - S7 routing
  - Data set routing
- Maintenance-free data backup without battery
- Diagnostics displays for errors (Error), operation (RUN/Stop), maintenance (MT), power supply (PWR) and one link LED per port
- Optional labeling using light gray or yellow labeling strips. There is a choice of 2 materials:
  - Foil and roll with 500 strips, for thermal transfer roll printer
  - Paper (280 g/m^2), DIN A4 sheets with 100 strips each, for laser printer
- The ET 200SP CPU can be equipped with a reference ID label.

- Different PROFINET connection types by means of BusAdapter:
  - Under standard ambient conditions, BA 2xRJ45 for connection via RJ45 plug
  - In the case of mechanical loading during operation and/or an increased EMC requirements BA 2xFC for direct connection of the PROFINET cable
- Dark BaseUnit as first BaseUnit behind the ET 200SP CPU when using an AC I/O module or an AI Energy Meter ST as the first I/O module

Scope of delivery

SIPLUS ET 200SP CPU 1510SP F-1 PN T1 RAIL including server module, 24 V DC connector and cover for BusAdapter port (BusAdapter must be ordered separately)

Function

- Performance
  - High-speed command processing
  - High-performance network connection:
    CPU comes equipped with a PROFINET IO IRT interface (3-port switch) as standard.
- Integrated technology
  - Connection of analog and PROFIdrive-capable drives via standardized blocks (PLCopen)
  - Support of speed-controlled and positioning axes as well as external encoders
  - Precise position gearing for synchronous operation between axes
  - Trace functions for all CPU tags, both for diagnostics in real time and for sporadic error detection
  - Comprehensive control functionalities, e.g. easily configurable blocks for automatic optimization of the control parameters for optimum control quality
- Isochronous mode
  - Synchronous coupling of distributed signal acquisition, signal transmission, and program execution to the PROFINET cycle with constant bus cycle time
- Security Integrated
  - Password-based know-how protection against unauthorized read-out and modification of program blocks
  - Copy protection for tying individual blocks to the serial number of the SIMATIC Memory Card:
    The block can only run if the configured Memory Card is inserted in the CPU.
  - 4-stage authorization concept:
    Communication to operator panels can also be restricted.
  - Manipulation protection:
    The controller recognizes changed or unauthorized transmissions of the engineering data.
- Integrated system diagnostics
  - System diagnostics information is displayed consistently and in plain text in the TIA Portal, operator panels and web server, even for messages from the drives, and updated even if the CPU is in STOP mode.
  - Integrated in the firmware of the CPU, no special configuration is required
- Configuration control (option handling) in central setup
  - Various hardware configurations can be stored in the PLC:
    Modification of the configuration in the user program (startup OB100),
    Retrofitting of options at end of configuration;
    Use of placeholder modules is possible.
- SIMATIC Memory Card (required for operation of the CPU)
  - Used as plug-in load memory or for updating the firmware
  - Also for storing additional documents or csv files (for recipes and archives)
  - Creation of data blocks and storage/reading of data via SFCs of the user program
- Datalog (archives) and recipes
  - Storage of csv files for recipes and archives on the SIMATIC Memory Card;
    easy access to plant-relevant operating data using Office tools and via web server.
  - Easy access to configuration data of the machine by means of a web browser or SD card reader (two-way data exchange from and to the PLC)
- Programming of the standard program section
  - Programming with STEP 7 Professional, V13 SP1 and higher
- Programming of the fail-safe program section
  - Programming of the safety-related program section with the "STEP 7 Safety Advanced" option package.

Technical specifications

Article number	**6AG2510-1SJ01-1AB0** SIPLUS ET 200SP CPU 1510 F-1 PN RAIL
General information	
Product type designation	CPU 1510SP F-1 PN
Engineering with • STEP 7 TIA Portal configurable/integrated from version	see entry ID: 109746275
Supply voltage	
Rated value (DC)	24 V
Memory	
Work memory • integrated (for program) • integrated (for data)	 150 kbyte 750 kbyte
Load memory • Plug-in (SIMATIC Memory Card), max.	 32 Gbyte
CPU processing times	
for bit operations, typ.	72 ns
for word operations, typ.	86 ns
for fixed point arithmetic, typ.	115 ns
for floating point arithmetic, typ.	461 ns

Article number	**6AG2510-1SJ01-1AB0** SIPLUS ET 200SP CPU 1510 F-1 PN RAIL
Counters, timers and their retentivity	
S7 counter	
• Number	2 048
IEC counter	
• Number	Any (only limited by the main memory)
S7 times	
• Number	2 048
IEC timer	
• Number	Any (only limited by the main memory)
Data areas and their retentivity	
Flag	
• Size, max.	16 kbyte
Address area	
I/O address area	
• Inputs	32 kbyte; All inputs are in the process image
• Outputs	32 kbyte; All outputs are in the process image
Address space per module	
• Address space per module, max.	288 byte; For input and output data respectively
Address space per station	
• Address space per station, max.	2 560 byte; for central inputs and outputs; depending on configuration; 2 048 bytes for ET 200SP modules + 512 bytes for ET 200AL modules
Time of day	
Clock	
• Type	Hardware clock
1. Interface	
Interface types	
• RJ 45 (Ethernet)	Yes; X1 P3; opt. X1 P1 and X1 P2 via BusAdapter BA 2x RJ45
• Number of ports	3; 1. integr. + 2. via BusAdapter
• integrated switch	Yes
• BusAdapter (PROFINET)	Yes; compatible BusAdapters: BA 2x RJ45, BA 2x FC, BA 2x M12
Protocols	
• IP protocol	Yes; IPv4
• PROFINET IO Controller	Yes
• PROFINET IO Device	Yes
• SIMATIC communication	Yes
• Open IE communication	Yes; Optionally also encrypted
• Web server	Yes
• Media redundancy	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0
PROFINET IO Controller	
• Services	
- PG/OP communication	Yes
- Isochronous mode	Yes
- Direct data exchange	Yes; Requirement: IRT and isochronous mode (MRPD optional)
- IRT	Yes
- PROFIenergy	Yes; per user program
- Prioritized startup	Yes; Max. 32 PROFINET devices
- Number of connectable IO Devices, max.	64; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
- Of which IO devices with IRT, max.	64
- Number of connectable IO Devices for RT, max.	64
- of which in line, max.	64
- Number of IO Devices that can be simultaneously activated/deactivated, max.	8; in total across all interfaces
- Number of IO Devices per tool, max.	8
- Updating times	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data
PROFINET IO Device	
• Services	
- PG/OP communication	Yes
- Isochronous mode	No
- IRT	Yes
- PROFIenergy	Yes; per user program
- Shared device	Yes
- Number of IO Controllers with shared device, max.	4
- activation/deactivation of I-devices	Yes; per user program
- Asset management record	Yes; per user program
2. Interface	
Interface types	
• RS 485	Yes; Via CM DP module
• Number of ports	1
Protocols	
• PROFIBUS DP master	Yes
• PROFIBUS DP slave	Yes
• SIMATIC communication	Yes
PROFIBUS DP master	
• Number of DP slaves, max.	125; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET

Article number	**6AG2510-1SJ01-1AB0** SIPLUS ET 200SP CPU 1510 F-1 PN RAIL
Protocols	
Number of connections	
• Number of connections, max.	96; via integrated interfaces of the CPU and connected CPs / CMs
Redundancy mode	
• Media redundancy	
- Media redundancy	Yes; only via BusAdapter
- MRP	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client
- MRP interconnection, supported	Yes; as MRP ring node according to IEC 62439-2 Edition 3.0
- MRPD	Yes; Requirement: IRT
- Switchover time on line break, typ.	200 ms; For MRP, bumpless for MRPD
- Number of stations in the ring, max.	50
SIMATIC communication	
• S7 routing	Yes
OPC UA	
• OPC UA Client	Yes
• OPC UA Server	Yes; Data access (read, write, subscribe), method call, custom address space
• Alarms and Conditions	Yes
Supported technology objects	
Motion Control	Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool
• Number of available Motion Control resources for technology objects	800
• Required Motion Control resources	
- per speed-controlled axis	40
- per positioning axis	80
- per synchronous axis	160
- per external encoder	80
- per output cam	20
- per cam track	160
- per probe	40
Controller	
• PID_Compact	Yes; Universal PID controller with integrated optimization
• PID_3Step	Yes; PID controller with integrated optimization for valves
• PID-Temp	Yes; PID controller with integrated optimization for temperature
Counting and measuring	
• High-speed counter	Yes
Standards, approvals, certificates	
Highest safety class achievable in safety mode	
• SIL in accordance with EN 50126, 50128, 50129	SIL 2; a higher safety integrity level is possible if tested and approved for the specific application under consideration of all local regulations.
• Probability of failure (for service life of 20 years and repair time of 100 hours)	
- Low demand mode: PFDavg in accordance with SIL3	< 2.00E-05
- High demand/continuous mode: PFH in accordance with SIL3	< 1.00E-09
Railway application	
• EN 50121-3-2	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-25 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155)
• vertical installation, min.	-25 °C; = Tmin
• vertical installation, max.	50 °C; = Tmax
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity	
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance	
• Coolants and lubricants	
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems	
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *
- Against mechanical environmental conditions acc. to EN 60721-3-3	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)

Article number	**6AG2510-1SJ01-1AB0** SIPLUS ET 200SP CPU 1510 F-1 PN RAIL
• Use on land craft, rail vehicles and special-purpose vehicles	
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *
- Against mechanical environmental conditions acc. to EN 60721-3-5	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
- against mechanical environmental conditions in agriculture acc. to ISO 15003	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Usage in industrial process technology	
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark	
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating	
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A
Configuration / header	
Configuration / programming / header	
• Programming language	
- LAD	Yes; incl. failsafe
- FBD	Yes; incl. failsafe
- STL	Yes
- SCL	Yes
- GRAPH	Yes
Know-how protection	
• User program protection/password protection	Yes
• Copy protection	Yes
• Block protection	Yes
Access protection	
• protection of confidential configuration data	Yes
• Protection level: Write protection	Yes
• Protection level: Read/write protection	Yes
• Protection level: Write protection for Failsafe	Yes
• Protection level: Complete protection	Yes
Dimensions	
Width	100 mm
Height	117 mm
Depth	75 mm
Weights	
Weight, approx.	310 g
Other	
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

	Version	Article No.
	SIPLUS ET 200SP CPU 1510SP F-1 PN T1 RAIL (Extended temperature range and exposure to environmental substances) Work memory 150 KB for program, 750 KB for data, PROFINET IO IRT interface; SIMATIC Memory Card required; for areas with extreme exposure to environmental substances (conformal coating); Ambient temperature -25 ... +60 °C (+70 °C for 10 min.)	**6AG2510-1SJ01-1AB0**
	Accessories	
	SIPLUS extreme RAIL BusAdapter	
	SIPLUS ET 200SP BA 2XRJ45 TX RAIL For PROFINET interface modules in Standard function class or above; max. cable length 50 m; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6AR00-4AA0**
	SIPLUS ET 200SP BA 2XFC TX RAIL For PROFINET interface modules in Standard function class or above; for increased vibration and EMC load rating; max. cable length 50 m; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6AF00-4AA0**
	SIPLUS Mounting Kit ET 200SP Mounting accessories for use with increased mechanical vibration and shock loads. Not approved for SIPLUS BusAdapter BA 2xRJ45	**6AG1193-6AA00-0AA0**

*** You can order this quantity or a multiple thereof.**

Overview

- SIPLUS ET 200SP CPU 1512SP F-1 PN RAIL for SIPLUS extreme RAIL ET 200SP based on S7-1500 CPU 1513F-1 PN
- Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic
- For applications with average requirements regarding the program scope and processing speed, for distributed setup via PROFINET IO or PROFIBUS DP
- Increase in availability of systems and machines
- Supports PROFIsafe in centralized and distributed configurations
- PROFINET IO controller for up to 128 IO devices
- PROFINET I-Device for connecting the CPU as an intelligent PROFINET device with a SIMATIC or third-party PROFINET IO controller
- PROFINET shared I-device for 4 controllers
- PROFINET IO IRT interface with integrated 3-port switch
- Isochronous mode on PROFINET
- With multiple communication options:
  PG/OP communication, PROFINET IO, open IE communication (TCP, ISO-on-TCP and UDP), web server and S7 communication (with loadable FBs)
- Configuration control (option handling)
- Integrated motion control functions for controlling speed-controlled and positioning axes, support for external encoders

Application

SIPLUS ET 200SP CPU 1512SP F-1 PN RAIL for standard and fail-safe applications with average requirements in terms of processing performance and response speed in discrete production technology. SIPLUS ET 200SP CPU 1512SP F-1 PN RAIL can be used as a PROFINET IO controller or as distributed intelligence (PROFINET I-Device). The integrated PROFINET IO IRT interface is designed as a 3-port switch enabling configuration of a linear topology in the system via port 1 and 2, such that a PG/PC or HMI device can also be connected via port 3.

When used as an I-device, the SIPLUS ET 200SP CPU 1512SP F-1 PN RAIL enables distributed preprocessing of process data locally and only delivers the information actually required to the higher-level controller. This has the following advantages:

- Less load on central controller
- Short response times to critical local signals
- Less load on the bus system due to smaller data volumes
- Faster commissioning due to pre-tested units and parallel commissioning
- Increased availability and flexibility due to autonomous machine units
- Easy-to-understand configuration

SIPLUS ET 200SP CPU 1512SP F-1 PN RAIL operates fully independently of the central controller. If the controller fails, the CPU simply continues to operate.

The bit-modular design of the ET 200SP I/O system, together with SIPLUS ET 200SP CPU 1512SP F-1 PN RAIL, enables functionally oriented station design.

In addition, the CPU offers comprehensive control functionalities via easy-to-configure blocks as well as the ability to connect drives via standardized PLCopen blocks.

Design

SIPLUS ET 200SP CPU 1512SP F-1 PN RAIL is directly snapped onto the DIN rail and features:

- A high-performance processor;
  the CPU achieves command execution times as low as 48 ns per binary instruction
- Extensive work memory:
  300 KB for program, 1 MB for data
- SIMATIC Memory Cards as load memory;
  permitting additional functions such as firmware update, datalog and archiving
- Bit-modular expandability for maximum flexibility;
  up to 64 I/O modules (I/O, technology, and communications modules) in any combination. Station width up to 1 m.
- PROFINET IO IRT interface with 3 integrated switch ports:
  - Port 1 and 2 via BusAdapter (SIPLUS ET 200SP CPU 1512SP F-1 PN T1 RAIL is supplied without the BusAdapter and can also be operated without it). The appropriate BusAdapter (BA 2xRJ45 or BA 2xFC) is to be ordered separately if needed.
  - Port 3 via integrated RJ45 socket.
- Integrated communication functions:
  - PG/OP communication
  - PROFINET IO
  - Open IE communication (TCP, ISO-on-TCP and UDP)
  - Web server
  - S7 communication
  - S7 routing
  - Data set routing
- Maintenance-free data backup without battery
- Diagnostics displays for errors (Error), operation (RUN/Stop), maintenance (MT), power supply (PWR) and one link LED per port
- Optional labeling using light gray or yellow labeling strips. There is a choice of 2 materials:
  - Foil and roll with 500 strips, for thermal transfer roll printer
  - Paper (280 g/m^2), DIN A4 sheets with 100 strips each, for laser printer
- The ET 200SP CPU can be equipped with a reference ID label.

- Different PROFINET connection types by means of BusAdapter:
  - Under standard ambient conditions, BA 2xRJ45 for connection via RJ45 plug
  - In the case of mechanical loading during operation and/or an increased EMC requirements BA 2xFC for direct connection of the PROFINET cable
- Dark BaseUnit as first BaseUnit behind the ET 200SP CPU when using an AC I/O module or an AI Energy Meter ST as the first I/O module

Scope of delivery

SIPLUS ET 200SP CPU 1512SP F-1 PN RAIL including server module, 24 V DC connector and cover for BusAdapter port (BusAdapter must be ordered separately)

Function

- Performance
  - High-speed command processing
  - High-performance network connection:
    CPU comes equipped with a PROFINET IO IRT interface (3-port switch) as standard.
- Integrated technology
  - Connection of analog and PROFIdrive-capable drives via standardized blocks (PLCopen)
  - Support of speed-controlled and positioning axes as well as external encoders
  - Precise position gearing for synchronous operation between axes
  - Trace functions for all CPU tags, both for diagnostics in real time and for sporadic error detection
  - Comprehensive control functionalities, e.g. easily configurable blocks for automatic optimization of the control parameters for optimum control quality
- Isochronous mode
  - Synchronous coupling of distributed signal acquisition, signal transmission, and program execution to the PROFINET cycle with constant bus cycle time
- Security Integrated
  - Password-based know-how protection against unauthorized read-out and modification of program blocks
  - Copy protection for tying individual blocks to the serial number of the SIMATIC Memory Card:
    The block can only run if the configured Memory Card is inserted in the CPU.
  - 4-stage authorization concept:
    Communication to operator panels can also be restricted.
  - Manipulation protection:
    The controller recognizes changed or unauthorized transmissions of the engineering data.
- Integrated system diagnostics
  - System diagnostics information is displayed consistently and in plain text in the TIA Portal, operator panels and web server, even for messages from the drives, and updated even if the CPU is in STOP mode.
  - Integrated in the firmware of the CPU, no special configuration is required
- Configuration control (option handling) in central setup
  - Various hardware configurations can be stored in the PLC:
    Modification of the configuration in the user program (startup OB100),
    Retrofitting of options at end of configuration;
    Use of placeholder modules is possible.
- SIMATIC Memory Card (required for operation of the CPU)
  - Used as plug-in load memory or for updating the firmware
  - Also for storing additional documents or csv files (for recipes and archives)
  - Creation of data blocks and storage/reading of data via SFCs of the user program
- Datalog (archives) and recipes
  - Storage of csv files for recipes and archives on the SIMATIC Memory Card;
    easy access to plant-relevant operating data using Office tools and via web server.
  - Easy access to configuration data of the machine by means of a web browser or SD card reader (two-way data exchange from and to the PLC)
- Programming of the standard program section
  - Programming with STEP 7 Professional, V13 SP1 and higher
- Programming of the fail-safe program section
  - Programming of the safety-related program section with the "STEP 7 Safety Advanced" option package.

Technical specifications

Article number	**6AG2512-1SK01-1AB0** SIPLUS ET 200SP CPU 1512 F-1 PN RAIL	**6AG2512-1SK01-4AB0** SIPLUS ET 200SP CPU 1512 F-1 PN RAIL
General information		
Product type designation	CPU 1512SP F-1 PN	CPU 1512SP F-1 PN
Engineering with • STEP 7 TIA Portal configurable/integrated from version	see entry ID: 109746275	see entry ID: 109746275
Supply voltage		
Rated value (DC)	24 V	24 V
Memory		
Work memory • integrated (for program) • integrated (for data)	 300 kbyte 1 Mbyte	 300 kbyte 1 Mbyte
Load memory • Plug-in (SIMATIC Memory Card), max.	 32 Gbyte	 32 Gbyte
CPU processing times		
for bit operations, typ.	48 ns	48 ns
for word operations, typ.	58 ns	58 ns
for fixed point arithmetic, typ.	77 ns	77 ns
for floating point arithmetic, typ.	307 ns	307 ns

Article number	**6AG2512-1SK01-1AB0** SIPLUS ET 200SP CPU 1512 F-1 PN RAIL	**6AG2512-1SK01-4AB0** SIPLUS ET 200SP CPU 1512 F-1 PN RAIL
Counters, timers and their retentivity		
S7 counter		
• Number	2 048	2 048
IEC counter		
• Number	Any (only limited by the main memory)	Any (only limited by the main memory)
S7 times		
• Number	2 048	2 048
IEC timer		
• Number	Any (only limited by the main memory)	Any (only limited by the main memory)
Data areas and their retentivity		
Flag		
• Size, max.	16 kbyte	16 kbyte
Address area		
I/O address area		
• Inputs	32 kbyte; All inputs are in the process image	32 kbyte; All inputs are in the process image
• Outputs	32 kbyte; All outputs are in the process image	32 kbyte; All outputs are in the process image
Address space per module		
• Address space per module, max.	288 byte; For input and output data respectively	288 byte; For input and output data respectively
Address space per station		
• Address space per station, max.	2 560 byte; for central inputs and outputs; depending on configuration; 2 048 bytes for ET 200SP modules + 512 bytes for ET 200AL modules	2 560 byte; for central inputs and outputs; depending on configuration; 2 048 bytes for ET 200SP modules + 512 bytes for ET 200AL modules
Time of day		
Clock		
• Type	Hardware clock	Hardware clock
1. Interface		
Interface types		
• RJ 45 (Ethernet)	Yes; X1 P3; opt. X1 P1 and X1 P2 via BusAdapter BA 2x RJ45	Yes; X1 P3
• Number of ports	3; 1. integr. + 2. via BusAdapter	1
• integrated switch	Yes	
• BusAdapter (PROFINET)	Yes; compatible BusAdapters: BA 2x RJ45, BA 2x FC, BA 2x M12	No
Protocols		
• IP protocol	Yes; IPv4	Yes; IPv4
• PROFINET IO Controller	Yes	Yes
• PROFINET IO Device	Yes	Yes
• SIMATIC communication	Yes	Yes
• Open IE communication	Yes; Optionally also encrypted	Yes; Optionally also encrypted
• Web server	Yes	Yes
• Media redundancy	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0	No
PROFINET IO Controller		
- Services		
- PG/OP communication	Yes	Yes
- Isochronous mode	Yes	Yes
- Direct data exchange	Yes; Requirement: IRT and isochronous mode (MRPD optional)	Yes; Requirement: IRT and isochronous mode (MRPD optional)
- IRT	Yes	Yes
- PROFIenergy	Yes; per user program	Yes; per user program
- Prioritized startup	Yes; Max. 32 PROFINET devices	Yes; Max. 32 PROFINET devices
- Number of connectable IO Devices, max.	128; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or -PROFINET	128; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
- Of which IO devices with IRT, max.	64	64
- Number of connectable IO Devices for RT, max.	128	128
- of which in line, max.	128	128
- Number of IO Devices that can be simultaneously activated/deactivated, max.	8; in total across all interfaces	8; in total across all interfaces
- Number of IO Devices per tool, max.	8	8
- Updating times	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data
PROFINET IO Device		
• Services		
- PG/OP communication	Yes	Yes
- Isochronous mode	No	No
- IRT	Yes	Yes
- PROFIenergy	Yes; per user program	Yes; per user program
- Shared device	Yes	Yes
- Number of IO Controllers with shared device, max.	4	4
- activation/deactivation of I-devices	Yes; per user program	Yes; per user program
- Asset management record	Yes; per user program	Yes; per user program

Article number	**6AG2512-1SK01-1AB0** SIPLUS ET 200SP CPU 1512 F-1 PN RAIL	**6AG2512-1SK01-4AB0** SIPLUS ET 200SP CPU 1512 F-1 PN RAIL
2. Interface		
Interface types		
• RS 485	Yes; Via CM DP module	Yes; Via CM DP module
• Number of ports	1	1
Protocols		
• PROFIBUS DP master	Yes	Yes
• PROFIBUS DP slave	Yes	Yes
• SIMATIC communication	Yes	Yes
PROFIBUS DP master		
• Number of DP slaves, max.	125; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	125; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
Protocols		
Number of connections		
• Number of connections, max.	128; via integrated interfaces of the CPU and connected CPs / CMs	128; via integrated interfaces of the CPU and connected CPs / CMs
Redundancy mode		
• Media redundancy		
- Media redundancy	Yes; only via BusAdapter	No
- MRP	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client	No
- MRP interconnection, supported	Yes; as MRP ring node according to IEC 62439-2 Edition 3.0	No
- MRPD	Yes; Requirement: IRT	No
- Switchover time on line break, typ.	200 ms; For MRP, bumpless for MRPD	
- Number of stations in the ring, max.	50	
SIMATIC communication		
• S7 routing	Yes	Yes
OPC UA		
• OPC UA Client	Yes	Yes
• OPC UA Server	Yes; Data access (read, write, subscribe), method call, custom address space	Yes; Data access (read, write, subscribe), method call, custom address space
Supported technology objects		
Motion Control	Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool	Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool
• Number of available Motion Control resources for technology objects	800	800
• Required Motion Control resources		
- per speed-controlled axis	40	40
- per positioning axis	80	80
- per synchronous axis	160	160
- per external encoder	80	80
- per output cam	20	20
- per cam track	160	160
- per probe	40	40
Controller		
• PID_Compact	Yes; Universal PID controller with integrated optimization	Yes; Universal PID controller with integrated optimization
• PID_3Step	Yes; PID controller with integrated optimization for valves	Yes; PID controller with integrated optimization for valves
• PID-Temp	Yes; PID controller with integrated optimization for temperature	Yes; PID controller with integrated optimization for temperature
Counting and measuring		
• High-speed counter	Yes	Yes
Standards, approvals, certificates		
Highest safety class achievable in safety mode		
• SIL in accordance with EN 50126, 50128, 50129	SIL 2; a higher safety integrity level is possible if tested and approved for the specific application under consideration of all local regulations.	SIL 2; a higher safety integrity level is possible if tested and approved for the specific application under consideration of all local regulations.
• Probability of failure (for service life of 20 years and repair time of 100 hours)		
- Low demand mode: PFDavg in accordance with SIL3	< 2.00E-05	< 2.00E-05
- High demand/continuous mode: PFH in accordance with SIL3	< 1.00E-09	< 1.00E-09

Article number	**6AG2512-1SK01-1AB0** SIPLUS ET 200SP CPU 1512 F-1 PN RAIL	**6AG2512-1SK01-4AB0** SIPLUS ET 200SP CPU 1512 F-1 PN RAIL
Railway application		
• EN 50121-3-2	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support
Ambient conditions		
Ambient temperature during operation		
• horizontal installation, min.	-25 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155)	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)
• vertical installation, min.	-25 °C; = Tmin	-40 °C; = Tmin
• vertical installation, max.	50 °C; = Tmax	50 °C; = Tmax
Altitude during operation relating to sea level		
• Installation altitude above sea level, max.	2 000 m	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity		
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance		
• Coolants and lubricants		
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air	No
• Use in stationary industrial systems		
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *
- Against mechanical environmental conditions acc. to EN 60721-3-3	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	
• Use on land craft, rail vehicles and special-purpose vehicles		
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *
- Against mechanical environmental conditions acc. to EN 60721-3-5	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	
- against mechanical environmental conditions in agriculture acc. to ISO 15003	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	
• Usage in industrial process technology		
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark		
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating		
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A

Article number	**6AG2512-1SK01-1AB0** SIPLUS ET 200SP CPU 1512 F-1 PN RAIL	**6AG2512-1SK01-4AB0** SIPLUS ET 200SP CPU 1512 F-1 PN RAIL
Configuration / header		
Configuration / programming / header		
• Programming language		
- LAD	Yes; incl. failsafe	Yes; incl. failsafe
- FBD	Yes; incl. failsafe	Yes; incl. failsafe
- STL	Yes	Yes
- SCL	Yes	Yes
- GRAPH	Yes	Yes
Know-how protection		
• User program protection/password protection	Yes	Yes
• Copy protection	Yes	Yes
• Block protection	Yes	Yes
Access protection		
• Protection level: Write protection	Yes	Yes
• Protection level: Read/write protection	Yes	Yes
• Protection level: Complete protection	Yes	Yes
Dimensions		
Width	100 mm	100 mm
Height	117 mm	117 mm
Depth	75 mm	75 mm
Weights		
Weight, approx.	310 g	470 g
Other		
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

	Version	Article No.
	SIPLUS ET 200SP CPU 1512SP F-1 PN RAIL Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic Work memory 300 KB for program, 1 MB for data, PROFINET IO IRT interface; SIMATIC Memory Card required; for areas with extreme exposure to environmental substances (conformal coating); Ambient temperature -25 ... +60 °C, OT1 with ST1/2, (+70 °C for 10 min.)	**6AG2510-1SJ01-1AB0**
	SIPLUS ET 200SP CPU 1512SP F-1 PN RAIL No BusAdapter can be inserted, work memory 300 KB for program, 1 MB for data, PROFINET IO IRT interface with 3-port switch, 48 ns bit performance, SIMATIC Memory Card required; for areas with extreme exposure to environmental substances (conformal coating); Ambient temperature -40 ... +70 °C, OT4 with ST1/2, (+85 °C for 10 min.)	**6AG2512-1SK01-4AB0**
	Accessories	
	SIPLUS extreme RAIL BusAdapter	
	SIPLUS ET 200SP BA 2XRJ45 TX RAIL For PROFINET interface modules in Standard function class or above; max. cable length 50 m; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6AR00-4AA0**
	SIPLUS ET 200SP BA 2XFC TX RAIL For PROFINET interface modules in Standard function class or above; for increased vibration and EMC load rating; max. cable length 50 m; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6AF00-4AA0**
	SIPLUS Mounting Kit ET 200SP Mounting accessories for use with increased mechanical vibration and shock loads. Not approved for SIPLUS BusAdapter BA 2xRJ45	**6AG1193-6AA00-0AA0**

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*** You can order this quantity or a multiple thereof.**

SIPLUS extreme RAIL Open Controller

Overview

Compact and powerful

SIPLUS ET 200SP RAIL Open Controller, SIPLUS CPU 1515SP PC RAIL is a rugged, compact control system that combines the functionality of a SIPLUS ET 200SP RAIL controller with a PC-based platform. It can be used to control special-purpose and series machines, or plants in a distributed configuration.

The SIPLUS ET 200SP RAIL I/O modules can be inserted centrally and communicate via the integrated backplane bus. S7 communication can be established and distributed I/Os can be connected via the PROFINET adapter of the SIPLUS ET 200SP system. The PROFIBUS CM DP module provides simple expandability for PROFIBUS communication.

The SIPLUS CPU 1515SP PC2 RAIL is used wherever special automation functions are to be integrated with support from SIMATIC ODK 1500S via the programming language C or C++, or if a close connection of independent applications is required in Windows for the software controller.

Characteristics	SIPLUS CPU 1515SP PC2 RAIL
DDR3 DRAM	8 GB
CFast card	30 GB
Operating system	Windows 10 Enterprise LTSB 2016
Work memory for program, integrated	1 MB (1.5 MB for F)
Work memory for data, integrated	5 MB
Load memory	320 MB
Command execution times	
• Bit operations	10 ns
• Word operations	12 ns
• Fixed-point operations	16 ns
• Floating-point operations	64 ns
Bit memories, timers, counters	
• S7 counters/timers	2048
• IEC counter	Arbitrary (only limited by the work memory)
• IEC timer	Arbitrary (only limited by the work memory)
• Bit memories	16 KB
I/O address range	
• Inputs	32 KB (all inputs are stored in the process image)
• Outputs	32 KB (all inputs are stored in the process image)
Motion	
• Motion control resources	2400
Communication	
• PtP	Yes (via CM)
• PROFINET IO	1 x PN IO IRT (BusAdapter not included in scope of delivery)
• PROFIBUS DP	Yes (via CM DP)
• Web server	Yes
• GB Ethernet	Yes, 1 x via GB Ethernet RJ45 interface

Application

ET 200SP Open Controller

Compact dimensions

The open controller is a particularly compact and energy-efficient controller for the DIN rail. Thanks to its minimal size, it can be used in extremely confined spaces. Signals can be detected centrally via the backplane bus or distributed via PROFIBUS or PROFINET.

Rugged design

All designs aim to achieve maximum safety in the case of vibration and shock loads. With its fan-free design and the use of CFast cards (flash memory), the open controller is particularly suitable for maintenance-free 24/7 continuous operation in the industrial environment, at temperatures of up to 60 degrees Celsius.

Interfaces

The open controller is connected to the controllers/cell levels via the integrated onboard Ethernet interfaces. I/O data communication can be implemented via PROFINET using a BusAdapter or an optional PROFIBUS CM-DP module. External monitors or displays can be connected via a DVI-I or DisplayPort interface.

Flexibility

The open controller has CE certification for use in industrial and domestic/commercial environments and can therefore be used in building automation or public installations in addition to industrial applications.

Continuity

The open controller offers a new part availability of at least three years. Moreover, a spare part availability of at least another five years is guaranteed. This is a unique long-term availability for PC technology which is unprecedented in the industry.

System availability

The open controller is delivered ready-for-use in various bundle variants. The high system availability by design can be further extended by means of additional data backup options (e.g. SIMATIC IPC Image & Partition Creator) and efficient software for self-diagnostics (SIMATIC IPC DiagMonitor).

More information

Further information and downloads

Manuals

The manuals for the ET 200SP Open Controller can be downloaded online for free from SIMATIC Customer Support.

https://support.industry.siemens.com/cs/ww/en/ps/13891/man

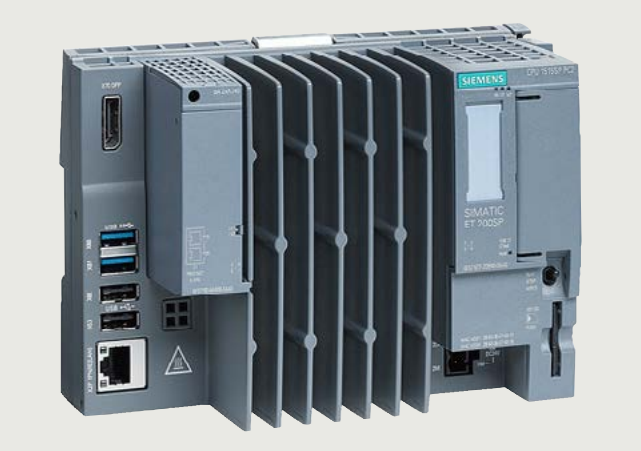
General information

http://www.siemens.com/open-controller

SIMATIC Selection Tool

http://www.siemens.com/tia-selection-tool

Overview



SIPLUS extreme RAIL Open Controller, SIPLUS ET 200SP CPU 1515SP PC2 RAIL, combines robustness and compact dimensions with the flexibility of centralized or decentralized communication in the highest industrial functionality. Furthermore, the CPU offers the entire value added of the SIPLUS ET 200SP system, the SIPLUS S7-1500 controller family and the TIA world together.

- Rugged, compact control system
- Combines the functions of a SIPLUS ET 200SP controller with those of a PC-based platform
- Turnkey all-in-one controller
- High performance automation tasks with the use of new generation Intel Quad Core processors
- Connects high-level language applications and processes high data volumes with support from SIMATIC ODK 1500S

Application

The SIPLUS ET 200SP CPU 1515SP PC2 RAIL can be used to control special and series machines as well as plants in a centralized or distributed configuration. The standard and fail-safe user program is generated in the TIA Portal. The controller is especially suitable for machines with high data volumes, e.g. for quality assurance with camera inspection and image transmission, or printer connection.

The SIPLUS ET 200SP CPU 1515SP PC2 RAIL shows its strength in particular:

- When special automation functions have to be integrated using the C or C++ programming languages
- When a close connection of Windows software to the software controller is required
- When large volumes of data have to be stored

Design

The SIPLUS ET 200SP CPU 1515SP PC2 RAIL is mounted on the standard DIN rail like all SIPLUS ET 200SP CPUs.

The SIPLUS ET 200SP I/O modules can be used directly and centrally, and they communicate via the integrated backplane bus.

PN IO and S7 communication can be established and distributed I/Os can be connected via the PROFINET BusAdapters of the SIPLUS ET 200SP system (not included in scope of supply). This way, the system can be integrated into existing automation environments with little effort.

The PROFIBUS CM DP module extends the SIPLUS ET 200SP CPU 1515SP PC2 RAIL to include PROFIBUS communication.

The following interfaces are available:

- 1 x Gb Ethernet
- 1 x PN IO interface via SIPLUS ET 200SP BusAdapter with 2 ports
- 2 x USB 2.0 / 2x USB 3.0 at the front, for connecting a keyboard, mouse and USB flash drive, for example
- 1 x display port, for connecting a SIMATIC Flat Panel or multi-touch device, for example

The CPU also features the following:

- Mode switch
- Replaceable mass storage CFast with security seal
- Additional memory slot for SD/MMC
- Status LEDs
- Connection for 24 V DC supply voltage

Function

- Configuring and programming with the STEP 7 engineering tool (and WinCC Advanced for the HMI option) in the TIA Portal:
  - Programmable according to IEC 61131-3
  - Supported programming languages: SCL (IL), LAD, FBD, STL, GRAPH7 (SFC)
- Innovative real-time system based on visualization technology:
  The real-time system of the integrated S7-1500 software controllers enables parallel operation independent of the operating system:
  - Maximum real-time and deterministic properties
  - Supports restart of Windows while the controller is in operation
- High-speed program execution with multiple priority-controlled execution levels (cyclic, time-controlled, isochronous with PROFINET or PROFIBUS, event-driven via process and diagnostics alarms)
- Saving of retentive data:
  The SIPLUS ET 200SP CPU 1515SP PC2 RAIL ensures the security of the plant data, even when the power fails:
  - Saving of retentive data on the NVRAM of the CPU possible during voltage dips (default)
  - Retentive data storage possible on CPU CFast card (UPS required)
- Communication:
  - PROFINET IO communication via the ET 200SP BusAdapter; PROFIBUS communication via ET 200SP CM DP: PROFINET IO RT/IRT, isochronous mode, IO controller, I-device, media redundancy, PROFIenergy, PROFIBUS DP master
  - SIMATIC and open user communication with Windows applications or external devices via the Windows interfaces (GB Ethernet) of the CPU
- Configuration control (option handling) for flexible variations of the central configuration
  - Configuration of a controller and operation of variants (options) that differ from this configuration
- Integrated web server:
  Scanning the CPU via the web server is supported by all CPUs of the S7-1500 automation system. The CPU web server offers the following diagnostics options:
  - Image of the CPU with LEDs and the current operating state
  - Readout of the diagnostics buffer entries
  - Query of module status
  - Query of current messages
  - Information on the status of the topology/PROFINET devices
  - Transfer and management of user data on the load memory of the CPU
  - User-programmable web pages for supporting servicing and commissioning of specific machine functions

- Trace functionality:
  The trace function is supported by all CPUs of the S7-1500 automation system. It enables recording of analog and digital variables for each cycle and their representation as a curve with STEP 7. This is especially useful for motion control or closed-loop control applications
- Integrated technology:
  - Control of PROFIdrive-capable drives and drives with analog setpoint interfaces via standardized motion control instructions (PLCopen).
  - Trace functions for all CPU tags, both for diagnostics in real time as well as for sporadic error detection; can also be called via the web server of the CPU.
  - Comprehensive control functionalities, e.g. easy to configure blocks for automatic optimization of the control parameters for maximum control performance.
- Integrated system diagnostics:
  System diagnostics can be displayed via a connected monitor, an HMI device, the web server, or the operator panel of the software controller. Drive messages are also displayed in this way. System diagnostics are also available when the CPU is in STOP mode. If new hardware components are configured, the diagnostic information is updated automatically.
- Integrated safety:
  - Know-how protection:
    Algorithms and program blocks can be reliably password-protected against unauthorized access and modification.
  - Access protection:
    Extended access protection provides comprehensive protection against unauthorized configuration changes. Various authorization levels are available for assigning separate rights to different user groups.
  - Integrity protection:
    The system protects the data transferred to the CPU against unauthorized tampering. Modified or third-party transmission of engineering data are safely detected by the CPU.

Note

Some functions of the SIPLUS ET 200SP CPU 1515SP PC2 RAIL, such as Windows Hello, Cortana with voice output, support for 5-point touch, etc., may require extended hardware. This hardware can be connected as a USB device.

Technical specifications

Article number	**6AG2677-2DB40-2AA0** SIPLUS ET 200SP CPU1515SP PC2 RAIL	**6AG2677-2DB42-2GB0** SIPLUS ET 200SP CPU 1515SP PC2 RAIL	**6AG2677-2DB40-2GB0** SIPLUS ET 200SP CPU 1515SP PC2 L RAIL
General information			
Product type designation	CPU 1515SP PC2	CPU 1515SP PC2	CPU 1515SP PC2 L
Engineering with • STEP 7 TIA Portal configurable/integrated from version	see entry ID: 109746275	see entry ID: 109746275	see entry ID: 109746275
Installed software • Visualization • Control	 No No	 No S7-1500 Software Controller CPU 1505SP	 No S7-1500 Software Controller CPU 1505SP
Supply voltage			
Rated value (DC)	24 V	24 V	24 V
Processor			
Processor type	Intel Atom E3940, 1.6 GHz, 4 cores	Intel Atom E3940, 1.6 GHz, 4 cores	Intel Atom E3940, 1.6 GHz, 4 cores
Memory			
Type of memory	DDR3L	DDR3L	DDR3L
Main memory	8 GB RAM	8 GB RAM	8 GB RAM
CFast memory card	No	Yes; 128 GB flash memory	Yes; 128 GB flash memory
Work memory • integrated (for program) • integrated (for data) • integrated (for CPU function library of CPU Runtime)	 1 Mbyte 5 Mbyte 20 Mbyte	 1 Mbyte 5 Mbyte 20 Mbyte	 1 Mbyte 5 Mbyte 20 Mbyte
Load memory • integrated (on PC mass storage)	 320 Mbyte	 320 Mbyte	 320 Mbyte
CPU processing times			
for bit operations, typ.	10 ns	10 ns	10 ns
for word operations, typ.	12 ns	12 ns	12 ns
for fixed point arithmetic, typ.	16 ns	16 ns	16 ns
for floating point arithmetic, typ.	64 ns	64 ns	64 ns
Counters, timers and their retentivity			
S7 counter • Number	 2 048	 2 048	 2 048
IEC counter • Number	 Any (only limited by the main memory)	 Any (only limited by the main memory)	 Any (only limited by the main memory)
S7 times • Number	 2 048	 2 048	 2 048

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Article number	**6AG2677-2DB40-2AA0** SIPLUS ET 200SP CPU1515SP PC2 RAIL	**6AG2677-2DB42-2GB0** SIPLUS ET 200SP CPU 1515SP PC2 RAIL	**6AG2677-2DB40-2GB0** SIPLUS ET 200SP CPU 1515SP PC2 L RAIL
IEC timer • Number	 Any (only limited by the main memory)	 Any (only limited by the main memory)	 Any (only limited by the main memory)
Data areas and their retentivity			
Flag • Size, max.	 16 kbyte	 16 kbyte	 16 kbyte
Address area			
I/O address area • Inputs • Outputs	 32 kbyte; All inputs are in the process image 32 kbyte; All outputs are in the process image	 32 kbyte; All inputs are in the process image 32 kbyte; All outputs are in the process image	 16 kbyte; All inputs are in the process image 16 kbyte; All outputs are in the process image
Hardware configuration			
Integrated power supply	Yes	Yes	Yes
Time of day			
Clock • Type • Hardware clock (real-time)	 Hardware clock	 Hardware clock Yes; Resolution: 1 s	 Hardware clock Yes; Resolution: 1 s
Interfaces			
Number of industrial Ethernet interfaces	2	2	2
Number of RS 485 interfaces	1; Via CM DP module	1; Via CM DP module	
Number of USB interfaces	4; 2x USB 2.0, 2x USB 3.0 on front side	4; 2x USB 2.0, 2x USB 3.0 on front side	4; 2x USB 2.0, 2x USB 3.0 on front side
Number of SD card slots	1	1	1
Video interfaces • Graphics interface	 1x DisplayPort	 1x DisplayPort	 1x DisplayPort
1. Interface			
Interface type	PROFINET	PROFINET	PROFINET
automatic detection of transmission rate	Yes	Yes	Yes
Autonegotiation	Yes	Yes	Yes
Autocrossing	Yes	Yes	Yes
Number of connections	88	88	88
Interface types • RJ 45 (Ethernet) - Transmission rate, max. - Industrial Ethernet status LED • Number of ports • integrated switch • BusAdapter (PROFINET)	 Yes; Via BusAdapter BA 2x RJ45 100 Mbit/s Yes 2 Yes Yes; Compatible BusAdapter: BA 2x RJ45, BA 2x FC, BA 2x SCRJ (from FS03, V2.2), BA SCRJ / RJ45 (from FS03, V3.1), BA SCRJ / FC (from FS03, V3.1), BA 2x LC (from FS03, V3.3), BA LC / RJ45 (from FS03, V3.3), BA LC / FC (from FS03, V3.3)	 Yes; Via BusAdapter BA 2x RJ45 100 Mbit/s Yes 2 Yes Yes; Compatible BusAdapter: BA 2x RJ45, BA 2x FC, BA 2x SCRJ (from FS03, V2.2), BA SCRJ / RJ45 (from FS03, V3.1), BA SCRJ / FC (from FS03, V3.1), BA 2x LC (from FS03, V3.3), BA LC / RJ45 (from FS03, V3.3), BA LC / FC (from FS03, V3.3)	 Yes; Via BusAdapter BA 2x RJ45 100 Mbit/s Yes 2 Yes Yes; Compatible BusAdapter: BA 2x RJ45, BA 2x FC, BA 2x SCRJ (from FS03, V2.2), BA SCRJ / RJ45 (from FS03, V3.1), BA SCRJ / FC (from FS03, V3.1), BA 2x LC (from FS03, V3.3), BA LC / RJ45 (from FS03, V3.3), BA LC / FC (from FS03, V3.3)
Protocols • PROFINET IO Controller • PROFINET IO Device • SIMATIC communication • Open IE communication • Web server	 Yes Yes Yes Yes Yes	 Yes Yes Yes Yes Yes	 Yes Yes Yes Yes Yes
PROFINET IO Controller • Services - Isochronous mode - shortest clock pulse - IRT - PROFIenergy - Prioritized startup - Number of connectable IO Devices, max. - Of which IO devices with IRT, max. - of which in line, max. - Number of connectable IO Devices for RT, max. - of which in line, max. - Number of IO Devices that can be simultaneously activated/deactivated, max. - IO Devices changing during operation (partner ports), supported - Number of IO Devices per tool, max.	 Yes 500 µs Yes Yes Yes; max. 32 PROFINET devices; if you want to use the "Prioritized startup" functionality in STEP 7 for the PROFINET interface of the CPU, the CPU and the device must be separated by means of a switch (e.g. SCALANCE X205) 128 64 64 128 128 8 Yes 8	 Yes 500 µs Yes Yes Yes; max. 32 PROFINET devices; if you want to use the "Prioritized startup" functionality in STEP 7 for the PROFINET interface of the CPU, the CPU and the device must be separated by means of a switch (e.g. SCALANCE X205) 128 64 64 128 128 8 Yes 8	 Yes 500 µs Yes Yes Yes; max. 32 PROFINET devices; if you want to use the "Prioritized startup" functionality in STEP 7 for the PROFINET interface of the CPU, the CPU and the device must be separated by means of a switch (e.g. SCALANCE X205) 128 64 64 128 128 8 Yes 8

Article number	**6AG2677-2DB40-2AA0** SIPLUS ET 200SP CPU1515SP PC2 RAIL	**6AG2677-2DB42-2GB0** SIPLUS ET 200SP CPU 1515SP PC2 RAIL	**6AG2677-2DB40-2GB0** SIPLUS ET 200SP CPU 1515SP PC2 L RAIL
- Updating times	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data
• Address area			
- Inputs, max.	8 kbyte	8 kbyte	8 kbyte
- Outputs, max.	8 kbyte	8 kbyte	8 kbyte
PROFINET IO Device			
• Services			
- Isochronous mode	No	No	No
- shortest clock pulse	500 µs	500 µs	500 µs
- IRT	Yes	Yes	Yes
- PROFIenergy	Yes	Yes	Yes
- Prioritized startup	Yes	Yes	Yes
- Shared device	Yes	Yes	Yes
- Number of IO Controllers with shared device, max.	4	4	4
- Asset management record	Yes	Yes	Yes
2. Interface			
Interface type	Integrated Ethernet interface	Integrated Ethernet interface	Integrated Ethernet interface
automatic detection of transmission rate	Yes	Yes	Yes
Autonegotiation	Yes	Yes	Yes
Autocrossing	Yes	Yes	Yes
Interface types			
• RJ 45 (Ethernet)	Yes; Integrated	Yes; Integrated	Yes; Integrated
- Transmission rate, max.	1 000 Mbit/s	1 000 Mbit/s	1 000 Mbit/s
- Industrial Ethernet status LED	No	No	No
• Number of ports	1	1	1
3. Interface			
Interface type	PROFIBUS with CM DP	PROFIBUS with CM DP	PROFIBUS with CM DP
Number of connections	44	44	44
Interface types			
• RS 485	Yes	Yes	Yes
Protocols			
• PROFIBUS DP master	Yes	Yes	Yes
• PROFIBUS DP slave	Yes	Yes	Yes
• SIMATIC communication	Yes	Yes	Yes
PROFIBUS DP master			
• Number of DP slaves, max.	125	125	125
• Services			
- Equidistance	No	No	No
- Isochronous mode	No	No	No
• Address area			
- Inputs, max.	8 kbyte	8 kbyte	8 kbyte
- Outputs, max.	8 kbyte	8 kbyte	8 kbyte
Protocols			
Number of connections			
• Number of connections, max.	88	88	88
Redundancy mode			
• Media redundancy			
- MRP	Yes	Yes	Yes
- MRPD	Yes	Yes	Yes
- Switchover time on line break, typ.	200 ms	200 ms	200 ms
- Number of stations in the ring, max.	50	50	50
SIMATIC communication			
• S7 routing	Yes	Yes	No
OPC UA			
• OPC UA Client	Yes; From SW CPU 1505SP V2.6	Yes; From SW CPU 1505SP V2.6	Yes; Data access (read, write), method call
• OPC UA Server	Yes; Data access (read, write, subscribe), runtime license required	Yes; Data access (read, write, subscribe), runtime license required	Yes; Data access (read, write, subscribe), runtime license required
Supported technology objects			
Motion Control	Yes	Yes	Yes
• Number of available Motion Control resources for technology objects	2 400	2 400	2 400
• Required Motion Control resources			
- per speed-controlled axis	40; per axis	40; per axis	40; per axis
- per positioning axis	80; per axis	80; per axis	80; per axis
- per synchronous axis	160; per axis	160; per axis	160; per axis
- per external encoder	80; per external encoder	80; per external encoder	80; per external encoder
- per output cam	20; per cam	20; per cam	20; per cam
- per cam track	160; per cam track	160; per cam track	160; per cam track
- per probe	40; per probe	40; per probe	40; per probe

SIPLUS extreme RAIL Open Controller > SIPLUS ET 200SP CPU 1515SP PC2 RAIL

Article number	**6AG2677-2DB40-2AA0** SIPLUS ET 200SP CPU1515SP PC2 RAIL	**6AG2677-2DB42-2GB0** SIPLUS ET 200SP CPU 1515SP PC2 RAIL	**6AG2677-2DB40-2GB0** SIPLUS ET 200SP CPU 1515SP PC2 L RAIL
Controller			
• PID_Compact	Yes; Universal PID controller with integrated optimizations	Yes; Universal PID controller with integrated optimization	Yes; Universal PID controller with integrated optimization
• PID_3Step	Yes; PID controller with integrated optimization for valves	Yes; PID controller with integrated optimization for valves	Yes; PID controller with integrated optimization for valves
• PID-Temp	Yes; PID controller with integrated optimization for temperature	Yes; PID controller with integrated optimization for temperature	Yes; PID controller with integrated optimization for temperature
Counting and measuring			
• High-speed counter	Yes	Yes	Yes
Standards, approvals, certificates			
Railway application			
• EN 50121-3-2	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT2, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT2, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support
Ambient conditions			
Ambient temperature during operation			
• min.	-40 °C; = Tmin	-40 °C; = Tmin	-40 °C; = Tmin
• max.	Up to 60 °C with max. 32 ET 200SP modules; up to 55 °C with max. 64 ET 200SP modules	up to 55 °C with max. 64 ET 200SP modules, max. 2x 900 mA USB load and max. 2x 500 mA USB load; up to 60 °C with max. 32 ET 200SP modules and 4x 500 mA USB load; FS06 or higher: up to 70 °C with max. 16 ET 200SP modules, 4x 100 mA USB load and no visualization	Up to 60 °C with max. 32 ET 200SP modules; up to 55 °C with max. 64 ET 200SP modules
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	60 °C; = Tmax; +70 °C for 10 min (OT2, ST1/ST2 acc. to EN 50155)	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)	60 °C; = Tmax; +70 °C for 10 min (OT2, ST1/ST2 acc. to EN 50155)
• vertical installation, min.	-40 °C; = Tmin	-40 °C; = Tmin	-40 °C; = Tmin
• vertical installation, max.	50 °C; = Tmax; with max. 32 ET 200SP modules	50 °C; = Tmax; with max. 32 ET 200SP modules and max. 4x 500 mA USB load	50 °C; = Tmax; with max. 32 ET 200SP modules
Altitude during operation relating to sea level			
• Installation altitude above sea level, max.	2 000 m	2 000 m	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity			
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance			
• Coolants and lubricants			
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems			
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *
- Against mechanical environmental conditions acc. to EN 60721-3-3	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0/ 6AG1193-6AB00-0AA0)	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0/ 6AG1193-6AB00-0AA0)	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0/ 6AG1193-6AB00-0AA0)

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• Use on land craft, rail vehicles and special-purpose vehicles			
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *
- Against mechanical environmental conditions acc. to EN 60721-3-5	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0/ 6AG1193-6AB00-0AA0)	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0/ 6AG1193-6AB00-0AA0)	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0/ 6AG1193-6AB00-0AA0)
- against mechanical environmental conditions in agriculture acc. to ISO 15003	Yes; Level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0/ 6AG1193-6AB00-0AA0)	Yes; Level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0/ 6AG1193-6AB00-0AA0)	Yes; Level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0/ 6AG1193-6AB00-0AA0)
• Usage in industrial process technology			
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark			
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating			
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection	Yes; Type 1 protection	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A
Operating systems			
pre-installed operating system	No	Windows 10 IoT Enterprise 2016 LTSB, 64bit, MUI	No
Configuration / header			
Configuration / programming / header			
• Programming language			
- LAD	Yes	Yes	Yes
- FBD	Yes	Yes	Yes
- STL	Yes	Yes	Yes
- SCL	Yes	Yes	Yes
- CFC	No	No	No
- GRAPH	Yes	Yes	Yes
Know-how protection			
• User program protection/password protection	Yes	Yes	Yes
• Copy protection	Yes	Yes	Yes
• Block protection	Yes	Yes	Yes
Access protection			
• Protection level: Write protection	Yes	Yes	Yes
• Protection level: Read/write protection	Yes	Yes	Yes
• Protection level: Complete protection	Yes	Yes	Yes
Open Development interfaces			
• Size of ODK SO file, max.	5.8 Mbyte	5.8 Mbyte	5.8 Mbyte

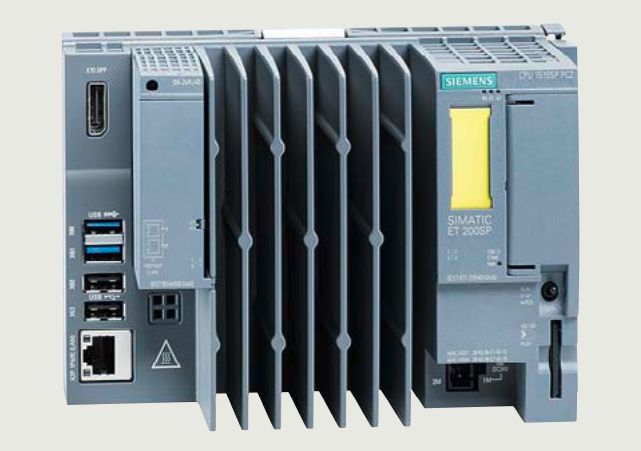
Article number	**6AG2677-2DB40-2AA0**	**6AG2677-2DB42-2GB0**	**6AG2677-2DB40-2GB0**
	SIPLUS ET 200SP CPU1515SP PC2 RAIL	SIPLUS ET 200SP CPU 1515SP PC2 RAIL	SIPLUS ET 200SP CPU 1515SP PC2 L RAIL
Peripherals/Options			
SD card	Optionally for additional mass storage	Optionally for additional mass storage	Optionally for additional mass storage
Dimensions			
Width	160 mm	160 mm	160 mm
Height	117 mm	117 mm	117 mm
Depth	75 mm	75 mm	75 mm
Weights			
Weight, approx.	0.83 kg	0.83 kg	0.83 kg
Other			
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

Version	Article No.
SIPLUS ET 200SP Open Controller CPU 1515SP PC2 RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic SIPLUS ET 200SP CPU with Windows 10 IoT Enterprise 64-bit and pre-installed SIMATIC S7-1500 Software Controller; 8 GB RAM, 30 GB CFast card **Type of delivery:** English, German, Chinese, Italian, French, Spanish	
• **SIPLUS ET 200SP CPU 1515SP PC2 RAIL OT2** For areas with extreme exposure to environmental substances (conformal coating); Ambient temperature -40 ... +55 °C (+70 °C for 10 min.)	**6AG2677-2DB42-2GB0**
• **SIPLUS ET 200SP CPU 1515SP PC2 RAIL Spare OT2** Spare part, without CFast card	**6AG2677-2DB40-2AA0**
• **SIPLUS ET 200SP CPU 1515SP PC2 L RAIL** 8 GB RAM, 128 GB CFast card, Ready4LinuxS For areas with extreme exposure to environmental substances (conformal coating); Ambient temperature -40 ... +55 °C (+70 °C for 10 min.)	**6AG2677-2DB40-2GB0**
Accessories	
SIPLUS ET 200SP BA 2XRJ45 TX RAIL For PROFINET interface modules in Standard function class or above; max. cable length 50 m; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6AR00-4AA0**
SIPLUS ET 200SP BA 2XFC TX RAIL For PROFINET interface modules in Standard function class or above; for increased vibration and EMC load rating; max. cable length 50 m; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6AF00-4AA0**
SIPLUS Mounting Kit ET 200SP Mounting accessories for use with increased mechanical vibration and shock loads. Not approved for SIPLUS BusAdapter BA 2xRJ45	**6AG1193-6AA00-0AA0**

* You can order this quantity or a multiple thereof.

Overview



SIPLUS ET 200SP CPU 1515SP PC2 F RAIL combines robustness and compact dimensions with the flexibility of centralized or distributed communication in the highest industrial functionality.
Furthermore, the CPU offers the entire value added of the ET 200SP system, the S7-1500 controller family and the TIA world together.

- Rugged, compact control system
- Combines the functions of an ET 200SP controller with those of a PC-based platform
- Turnkey all-in-one controller
- Can be used up to safety class SIL3 (Safety Integrity Level) according to IEC 61508 2nd Edition or PL e (Performance Level) according to ISO 13849
- High performance automation tasks with the use of new generation Intel Quad Core processors
- Connects high-level language applications and processes high data volumes with support from SIMATIC ODK 1500S

Note

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the corresponding standard products. SIPLUS extreme-specific information was added.

Application

The CPU 1515SP PC2 F can be used to control special and series machines as well as plants in a centralized or distributed configuration. The standard and fail-safe user program is generated in the TIA Portal. The controller is especially suitable for machines with high data volumes, e.g. for quality assurance with camera inspection and image transmission, or printer connection.

The CPU 1515SP PC2 shows its strengths in particular

- When special automation functions have to be integrated using the C or C++ programming languages
- When a close connection of Windows software to the Software Controller is required
- When large volumes of data have to be stored.

The CPU 1515SP PC2 F + HMI with preinstalled WinCC Runtime Advanced is offered for additional HMI functionality. This enables control and visualization to be integrated on a single device.

Design

The CPU 1515SP PC2 F is mounted on the standard DIN rail like all ET 200SP CPUs.

ET 200SP I/O modules can be used directly and centrally, and they communicate via the integrated backplane bus.

PN IO and S7 communication can be established and distributed I/Os can be connected via the PROFINET BusAdapters of the ET 200SP system (not included in scope of supply). This way, the system can be integrated into existing automation environments with little effort.

The PROFIBUS CM DP module extends the CPU 1515SP PC2 F to include PROFIBUS communication. The fail-safe versions support the PROFIsafe communication mechanisms.

The following interfaces are available:

- 1 x Gb Ethernet
- 1 x PN IO interface via ET 200SP BusAdapter with 2 ports
- 2 x USB 2.0 / 2x USB 3.0 at the front, for connecting a keyboard, mouse and USB flash drive, for example
- 1 x display port, for connecting a SIMATIC Flat Panel or multi-touch device, for example

The CPU also features the following:

- Mode switch
- Replaceable mass storage CFast with security seal
- Additional memory slot for SD/MMC
- Status LEDs
- Connection for 24 V DC supply voltage

Various turnkey and preconfigured variants are available with Windows 10 Enterprise on a 30 GB CFast card to suit different requirements:

- CPU 1515SP PC2 F
- CPU 1515SP PC2 F + HMI (incl. WinCC Runtime Advanced with 128/512/2 048 PowerTags)

Function

- Configuring and programming with the STEP 7 engineering tool (and WinCC Advanced for the HMI option) in the TIA Portal:
  - Programmable according to IEC 61131-3
  - Supported programming languages: SCL (IL), LAD, FBD, STL, GRAPH7 (SFC)
- Innovative real-time system based on visualization technology:
  The real-time system of the integrated S7-1500 software controllers enables parallel operation independent of the operating system:
  - Maximum real-time and deterministic properties
  - Supports restart of Windows while the controller is in operation
- High-speed program execution with several priority-controlled execution levels (cyclic, time-controlled, isochronous with PROFINET or PROFIBUS, event-driven via process and diagnostics alarms)
- Saving of retentive data:
  The CPU 1515SP PC2 F ensures the security of the plant data, even when the power fails:
  - Saving of retentive data on the NVRAM of the CPU possible during voltage dips (default)
  - Retentive data storage possible on CPU CFast card (UPS required)

- Communication:
  - PROFINET IO communication via the ET 200SP BusAdapter; PROFIBUS communication via ET 200SP CM DP: PROFINET IO RT/IRT, isochronous mode, IO controller, I-Device, media redundancy, PROFIenergy, PROFIBUS DP master
  - SIMATIC and Open User communication with Windows applications or external devices via the Windows interfaces (GB Ethernet) of the CPU
- Configuration control (option handling) for flexible variations of the central configuration
  - Configure a controller and operate variants (options) that differ from this configuration
- Integrated web server:
  Scanning the CPU via the web server is supported by all CPUs of the S7-1500 automation system. The CPU Web server offers the following diagnostics options:
  - Image of the CPU with LEDs and the current operating state
  - Readout of the diagnostics buffer entries
  - Query of module status
  - Query of current messages
  - Information on the status of the topology/PROFINET devices
  - Transfer and management of user data on the load memory of the CPU
  - User-programmable Web pages for supporting servicing and commissioning of specific machine functions
- Trace functionality:
  The trace function is supported by all CPUs of the S7-1500 automation system. It enables recording of analog and digital variables for each cycle and their representation as a curve with STEP 7. This is especially useful for motion control or closed-loop control applications
- Integrated technology:
  - S7-1500 Motion Control PLCopen blocks for programming the motion functionality via PROFINET IO IRT interface. The functionality supports speed-controlled axes, positioning axes and external encoders.
  - Trace functions for all CPU tags, both for diagnostics in real time as well as for sporadic error detection; can also be called via the web server of the CPU
  - Integral closed-loop control functionality:
    Universal PID or 3-step controller with integrated optimization. Integrated temperature controller.
- Integrated system diagnostics:
  System diagnostics can be displayed via a connected monitor, an HMI device, the web server, or the operator panel of the software controller. Drive messages are also displayed in this way. System diagnostics are also available when the CPU is in STOP mode. If new hardware components are configured, the diagnostic information is updated automatically.
- Integrated safety:
  - Know-how protection:
    Algorithms and program blocks can be reliably password-protected against unauthorized access and modification.
  - Access protection:
    Extended access protection provides comprehensive protection against unauthorized configuration changes. Various authorization levels are available for assigning separate rights to different user groups.
  - Integrity protection:
    The system protects the data transferred to the CPU against unauthorized tampering. Modified or third-party transmission of engineering data are safely detected by the CPU.
  - Fail-safe:
    The use of a fail-safe SIMATIC S7-1500 Software Controller allows processing of standard and safety programs on the same controller. Generation of the fail-safe and standard user program is carried out in the TIA Portal with the same editors. Due to this integration the system benefits and the comprehensive functionality of SIMATIC are also available for fail-safe applications.

Note

Some functions of the CPU 1515SP PC2 F, such as Windows Hello, Cortana with voice output, support for 5-point touch, etc., may require extended hardware. This hardware can be connected as a USB device.

6

Technical specifications

Article number	**6AG2677-2SB42-2GB0** SIPLUS ET 200SP CPU1515SP PC2 F RAIL
General information	
Product type designation	CPU 1515SP PC2 F
Engineering with • STEP 7 TIA Portal configurable/integrated from version	 see entry ID: 109746275
Installed software • Visualization • Control	 No S7-1500 Software Controller CPU 1505SP F
Supply voltage	
Rated value (DC)	24 V
Processor	
Processor type	Intel Atom E3940, 1.6 GHz, 4 cores
Memory	
Type of memory	DDR3L
Main memory	8 GB RAM
CFast memory card	Yes; 30 GB flash memory
Work memory • integrated (for program) • integrated (for data) • integrated (for CPU function library of CPU Runtime)	 1.5 Mbyte 5 Mbyte 20 Mbyte
Load memory • integrated (on PC mass storage)	 320 Mbyte

Article number	**6AG2677-2SB42-2GB0** SIPLUS ET 200SP CPU1515SP PC2 F RAIL
CPU processing times	
for bit operations, typ.	10 ns
for word operations, typ.	12 ns
for fixed point arithmetic, typ.	16 ns
for floating point arithmetic, typ.	64 ns
Counters, timers and their retentivity	
S7 counter	
• Number	2 048
IEC counter	
• Number	Any (only limited by the main memory)
S7 times	
• Number	2 048
IEC timer	
• Number	Any (only limited by the main memory)
Data areas and their retentivity	
Flag	
• Size, max.	16 kbyte
Address area	
I/O address area	
• Inputs	32 kbyte; All inputs are in the process image
• Outputs	32 kbyte; All outputs are in the process image
Hardware configuration	
Integrated power supply	Yes
Time of day	
Clock	
• Type	Hardware clock
• Hardware clock (real-time)	Yes; Resolution: 1 s
Interfaces	
Number of industrial Ethernet interfaces	2
Number of RS 485 interfaces	1; Via CM DP module
Number of USB interfaces	4; 2x USB 2.0, 2x USB 3.0 on front side
Number of SD card slots	1
Video interfaces	
• Graphics interface	1x DisplayPort
1. Interface	
Interface type	PROFINET
automatic detection of transmission rate	Yes
Autonegotiation	Yes
Autocrossing	Yes
Number of connections	88
Interface types	
• RJ 45 (Ethernet)	Yes; Via BusAdapter BA 2x RJ45
- Transmission rate, max.	100 Mbit/s
- Industrial Ethernet status LED	Yes
• Number of ports	2
• integrated switch	Yes
• BusAdapter (PROFINET)	Yes; Compatible BusAdapter: BA 2x RJ45, BA 2x FC, BA 2x SCRJ (from FS03, V2.2), BA SCRJ / RJ45 (from FS03, V3.1), BA SCRJ / FC (from FS03, V3.1), BA 2x LC (from FS03, V3.3), BA LC / RJ45 (from FS03, V3.3), BA LC / FC (from FS03, V3.3)
Protocols	
• PROFINET IO Controller	Yes
• PROFINET IO Device	Yes
• SIMATIC communication	Yes
• Open IE communication	Yes
• Web server	Yes

Article number	**6AG2677-2SB42-2GB0** SIPLUS ET 200SP CPU1515SP PC2 F RAIL
PROFINET IO Controller	
• Services	
- Isochronous mode	Yes
- shortest clock pulse	500 µs
- IRT	Yes
- PROFIenergy	Yes
- Prioritized startup	Yes; max. 32 PROFINET devices; if you want to use the "Prioritized startup" functionality in STEP 7 for the PROFINET interface of the CPU, the CPU and the device must be separated by means of a switch (e.g. SCALANCE X205)
- Number of connectable IO Devices, max.	128
- Of which IO devices with IRT, max.	64
- of which in line, max.	64
- Number of connectable IO Devices for RT, max.	128
- of which in line, max.	128
- Number of IO Devices that can be simultaneously activated/deactivated, max.	8
- IO Devices changing during operation (partner ports), supported	Yes
- Number of IO Devices per tool, max.	8
- Updating times	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data
• Address area	
- Inputs, max.	8 kbyte
- Outputs, max.	8 kbyte
PROFINET IO Device	
• Services	
- Isochronous mode	No
- shortest clock pulse	500 µs
- IRT	Yes
- PROFIenergy	Yes
- Prioritized startup	Yes
- Shared device	Yes
- Number of IO Controllers with shared device, max.	4
- Asset management record	Yes
2. Interface	
Interface type	Integrated Ethernet interface
automatic detection of transmission rate	Yes
Autonegotiation	Yes
Autocrossing	Yes
Interface types	
• RJ 45 (Ethernet)	Yes; Integrated
- Transmission rate, max.	1 000 Mbit/s
- Industrial Ethernet status LED	No
• Number of ports	1
3. Interface	
Interface type	PROFIBUS with CM DP
Number of connections	44
Interface types	
• RS 485	Yes
Protocols	
• PROFIBUS DP master	Yes
• PROFIBUS DP slave	Yes
• SIMATIC communication	Yes
PROFIBUS DP master	
• Number of DP slaves, max.	125
• Services	
- Equidistance	No
- Isochronous mode	No
• Address area	
- Inputs, max.	8 kbyte
- Outputs, max.	8 kbyte
Protocols	
Number of connections	
• Number of connections, max.	88
Redundancy mode	
• Media redundancy	
- MRP	Yes
- MRPD	Yes
- Switchover time on line break, typ.	200 ms
- Number of stations in the ring, max.	50
SIMATIC communication	
• S7 routing	Yes
OPC UA	
• OPC UA Client	Yes; From SW CPU 1505SP V2.6
• OPC UA Server	Yes; Data access (read, write, subscribe), runtime license required

Article number	**6AG2677-2SB42-2GB0** SIPLUS ET 200SP CPU1515SP PC2 F RAIL
Supported technology objects	
Motion Control	Yes
• Number of available Motion Control resources for technology objects	2 400
• Required Motion Control resources	
- per speed-controlled axis	40; per axis
- per positioning axis	80; per axis
- per synchronous axis	160; per axis
- per external encoder	80; per external encoder
- per output cam	20; per cam
- per cam track	160; per cam track
- per probe	40; per probe
Controller	
• PID_Compact	Yes; Universal PID controller with integrated optimization
• PID_3Step	Yes; PID controller with integrated optimization for valves
• PID-Temp	Yes; PID controller with integrated optimization for temperature
Counting and measuring	
• High-speed counter	Yes
Standards, approvals, certificates	
Highest safety class achievable in safety mode	
• Performance level according to ISO 13849-1	PLe
• SIL acc. to IEC 61508	SIL 3
• Probability of failure (for service life of 20 years and repair time of 100 hours)	
- Low demand mode: PFDavg in accordance with SIL3	< 2.00E-05
- High demand/continuous mode: PFH in accordance with SIL3	< 1.00E-09 1/h
Railway application	
• EN 50121-3-2	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT2, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support
Ambient conditions	
Ambient temperature during operation	
• min.	-40 °C; = Tmin
• max.	Up to 60 °C with max. 32 ET 200SP modules; up to 55 °C with max. 64 ET 200SP modules
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	60 °C; = Tmax; +70 °C for 10 min (OT2, ST1/ST2 acc. to EN 50155)
• vertical installation, min.	-40 °C; = Tmin
• vertical installation, max.	50 °C; = Tmax; with max. 32 ET 200SP modules
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity	
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance	
• Coolants and lubricants	
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems	
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *
• Use on land craft, rail vehicles and special-purpose vehicles	
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *
• Usage in industrial process technology	
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark	
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!

Article number	**6AG2677-2SB42-2GB0** SIPLUS ET 200SP CPU1515SP PC2 F RAIL
Conformal coating	
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A
Operating systems	
pre-installed operating system	Windows 10 IoT Enterprise 2016 LTSB, 64bit, MUI
Configuration / header	
Configuration / programming / header	
• Programming language	
- LAD	Yes; incl. failsafe
- FBD	Yes; incl. failsafe
- STL	Yes
- SCL	Yes
- CFC	No
- GRAPH	Yes
Know-how protection	
• User program protection/password protection	Yes
• Copy protection	Yes
• Block protection	Yes
Access protection	
• Protection level: Write protection	Yes
• Protection level: Read/write protection	Yes
• Protection level: Complete protection	Yes
Open Development interfaces	
• Size of ODK SO file, max.	5.8 Mbyte
Peripherals/Options	
SD card	Optionally for additional mass storage
Dimensions	
Width	160 mm
Height	117 mm
Depth	75 mm
Weights	
Weight, approx.	0.83 kg
Other	
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

	Version	Article No.
	SIPLUS ET 200SP CPU 1515SP PC2 F RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic Work memory 8 GB for program, 300 GB CFAST, with Windows IoT, Enterprise 64 bit and S7-1500 Software Controller, PROFINET IO IRT interface; for areas with extreme exposure to environmental substances (conformal coating); Ambient temperature -40 ... +55 °C (+70 °C for 10 min.)	**6AG2677-2SB42-2GB0**
	Accessories	
	SIPLUS extreme RAIL BusAdapter	
	SIPLUS ET 200SP BA 2XRJ45 TX RAIL For PROFINET interface modules in Standard function class or above; max. cable length 50 m; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6AR00-4AA0**
	SIPLUS ET 200SP BA 2XFC TX RAIL For PROFINET interface modules in Standard function class or above; for increased vibration and EMC load rating; max. cable length 50 m; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6AF00-4AA0**
	SIPLUS ET 200SP BA 2xM12 RAIL 2 x M12 push-pull sockets, D-coding, also for standard M12, suitable for PROFINET For areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6AM00-4AA0**
	SIPLUS Mounting Kit ET 200SP Mounting accessories for use with increased mechanical vibration and shock loads. Not approved for SIPLUS BusAdapter BA 2xRJ45	**6AG1193-6AA00-0AA0**

* You can order this quantity or a multiple thereof.

Overview

Thanks to their wide scope of functions, the interface modules of the scalable SIPLUS extreme RAIL ET 200SP I/O system, even in their basic versions, cover a wide range of applications. The basic functions of the interface modules include:

- Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic
- Short data update times of typically 1 ms
- Single Hot Swap (withdrawing and insertion of an I/O module during operation without impairing the communication with the remaining modules)
- Operation with gaps (empty BaseUnits)
- Complete diagnostic support, extending to channel-by-channel diagnostics
- Configuration control / option handling (adaptation of the actual configuration via user software)
- Device replacement without PG I&M data 0 to 3 (electronic rating plate with non-volatile storage of plant data)
- Firmware update
- Pluggable 24 V DC supply connection
- Network / power failure bridging time of 5 ms
- Labeling option via optional labeling strips and equipment labeling plates

When using PROFINET interface modules, the following basic functions are also included:

- Media redundancy (MRP) integrated 2-port switch
- Freely selectable connection method via SIMATIC Bus-Adapter
- Reset button for simple return to factory settings without the need for programming device
- Replacement without programming device even in case of non-topological configuration with subsequent automatic launching
- Automatic synchronization of the backplane bus to the PROFINET cycle to minimize the response time fluctuations (jitter)

SIPLUS ET 200SP IM 155-6PN ST BA TX RAIL with PROFINET interface

- Max. 32 I/O modules, also PROFIsafe modules, with complete diagnostic support
- Expansion option with max. 16 modules from the ET 200AL series using the BU-Send BaseUnit and the BA-Send Bus-Adapter
- Max. 256 bytes in each case for input and output data per module and max. 512 bytes per station (depending on configuration)
- Data update time: typ. 1 ms
- Selection of the type of connection of the PROFINET by means of SIMATIC BusAdapter (BusAdapter for copper cables only)

SIPLUS ET 200SP IM 155-6PN ST TX RAIL with PROFINET interface

- Max. 32 I/O modules, also PROFIsafe modules, with complete diagnostic support
- Expansion option with max. 16 modules from the ET 200AL series using the BU-Send BaseUnit and the BA-Send Bus-Adapter
- Max. 256 bytes in each case for input and output data per module and max. 512 bytes per station (depending on configuration)
- Data update time: typ.1 ms
- Selection of the type of connection of the PROFINET by means of SIMATIC BusAdapter (BusAdapter for copper cables only)

SIPLUS ET 200SP IM 155-6PN HF T1 RAIL and SIPLUS ET 200SP IM 155-6PN HF TX RAIL with PROFINET interface

- Max. 64 I/O modules, also PROFIsafe modules, with complete diagnostic support
- Expansion option with max. 16 modules from the ET 200AL series using the BU-Send BaseUnit and the BA-Send Bus-Adapter
- Max. 288 bytes in each case for input and output data per module and max. 1440 bytes per station (depending on configuration)
- Fast data refresh time: from 250 µs, also in isochronous mode
- S2 system redundancy
- Choice of connection type and physical connection of the PROFINET by means of SIMATIC BusAdapter. All BusAdapters with a connection for copper and/or fiber-optic cables can be used; BusAdapter must be ordered separately
- Package inclusive of server module

SIPLUS extreme RAIL interface modules

Application

SIPLUS ET 200SP IM 155-6PN ST (BA) TX RAIL

The SIPLUS ET 200SP IM 155-6PN ST (BA) TX RAIL is designed mainly for standard PROFINET applications with average station expansion of up to 32 modules (max. 512 IO signals). All I/O modules, including PROFIsafe, can be used. In addition, the station can be expanded with as many as 16 IP67 modules of the SIMATIC ET 200AL series using BA-Send/BU-Send.

SIPLUS ET 200SP IM 155-6PN HF T1/TX RAIL

The SIPLUS ET 200SP IM 155-6PN HF T1 RAIL/ET 200SP IM 155-6PN HF TX RAIL are designed mainly for PROFINET applications with a high, flexible demand for functions, as well as large station expansion of up to 64 modules (max. 1024 IO signals). All I/O modules, including PROFIsafe, can be used. In addition, the station can be expanded with as many as 16 IP67 modules of the SIMATIC ET 200AL series using BA-Send/BU-Send.

Unlike the other interface modules, the SIPLUS ET 200SP IM 155-6PN HF T1 RAIL/ET 200SP IM 155-6PN HF TX RAIL support the following additional functions:

- Use of BusAdapters with fiber-optic cable connection
- Increased data volume of up to 1440 bytes for both input and output data and up to 288 bytes per module
- Multi Hot Swap (withdrawing and insertion of any number of I/O modules during operation without impairing the communication with the remaining modules)
- S2 redundancy
- Isochronous mode from 250 µs
- Oversampling
- MSI/MSO
- Shared device with up to four controllers
- Up to four subslots per module

Design

The SIPLUS ET 200SP IM 155-6PN RAIL interface module is snapped directly onto the DIN rail (7.5 x 35 mm or 15 x 35 mm).

- Optional labeling using light gray or yellow labeling strips. There is a choice of 2 materials:
  - Film strips on a roll with 500 strips, for thermal transfer roll printer
  - Card (180 g/m^2), DIN A4 sheets with 100 strips each, for laser printer
- Optional equipment marking using slide-in equipment labeling plates
- Different connection types of the PROFINET by means of SIMATIC BusAdapter
  - Under ambient conditions in accordance with SIMATIC standard using BA 2xRJ45 for connection via RJ45 plug
  - In the case of mechanical loading during operation and/or an increased EMC requirements BA 2xFC for direct connection of the PROFINET cable

Technical specifications

Article number	**6AG2155-6AA01-4BN0** SIPLUS ET 200SP IM155-6PN ST BA TX RAIL	**6AG2155-6AU01-4BN0** SIPLUS ET 200SP IM155-6PN ST TX RAIL	**6AG2155-6AU01-1CN0** SIPLUS ET 200SP IM155-6PN HF T1 RAIL	**6AG2155-6AU01-4CN0** SIPLUS ET 200SP IM155-6PN HF TX RAIL
General information				
Product type designation	IM 155-6 PN ST	IM 155-6 PN ST	IM 155-6 PN/2 HF	IM 155-6 PN/2 HF
Product function				
• I&M data	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3
• Module swapping during operation (hot swapping)	Yes; Single hot swapping	Yes; Single hot swapping	Yes; Multi-hot swapping	Yes; Multi-hot swapping
• Isochronous mode	No	No	Yes	Yes
• Tool changer			Yes; Docking station and docking unit	Yes; Docking station and docking unit
• Local coupling, IO data			No	No
• Local coupling, data records			No	No
Engineering with				
• STEP 7 TIA Portal configurable/integrated from version	see entry ID: 109746275	see entry ID: 109746275	see entry ID: 109746275	see entry ID: 109746275
Supply voltage				
Rated value (DC)	24 V	24 V	24 V	24 V
Reverse polarity protection	Yes	Yes	Yes	Yes
Short-circuit protection	Yes	Yes		
Input current				
Current consumption (rated value)	450 mA	450 mA		
Address area				
Address space per station				
• Address space per station, max.	512 byte; Dependent on configuration	512 byte; Dependent on configuration	1 440 byte; Dependent on configuration	1 440 byte; Dependent on configuration

Article number	**6AG2155-6AA01-4BN0** SIPLUS ET 200SP IM155-6PN ST BA TX RAIL	**6AG2155-6AU01-4BN0** SIPLUS ET 200SP IM155-6PN ST TX RAIL	**6AG2155-6AU01-1CN0** SIPLUS ET 200SP IM155-6PN HF T1 RAIL	**6AG2155-6AU01-4CN0** SIPLUS ET 200SP IM155-6PN HF TX RAIL
Hardware configuration				
Rack				
• Modules per rack, max.	32; + 16 ET 200AL modules	32; + 16 ET 200AL modules	64; + 16 ET 200AL modules	64; + 16 ET 200AL modules
Submodules				
• Number of submodules per station, max.	256	256	256	256
Time stamping				
Accuracy			10 ms	10 ms
Interfaces				
Number of PROFINET interfaces	1; 2 ports (switch)	1; 2 ports (switch)	1; 2 ports (switch)	1; 2 ports (switch)
1. Interface				
Interface types				
• RJ 45 (Ethernet)	Yes; Pre-assembled BusAdapter BA 2x RJ45			
• Number of ports	2	2	2; via BusAdapter	2; via BusAdapter
• integrated switch	Yes	Yes	Yes	Yes
• BusAdapter (PROFINET)	Yes; Applicable Bus-Adapter: BA 2x RJ45, BA 2x FC	Yes; Applicable Bus-Adapter: BA 2x RJ45, BA 2x FC	Yes; Compatible Bus-Adapter: BA 2x RJ45, BA 2x FC, BA 2x SCRJ, BA SCRJ / RJ45, BA SCRJ / FC, BA 2x LC, BA LC / RJ45, BA LC / FC	Yes; Compatible Bus-Adapter: BA 2x RJ45, BA 2x FC, BA 2x SCRJ, BA SCRJ / RJ45, BA SCRJ / FC, BA 2x LC, BA LC / RJ45, BA LC / FC
Protocols				
• PROFINET IO Device	Yes	Yes	Yes	Yes
• Open IE communication	Yes	Yes	Yes	Yes
• Media redundancy	Yes; PROFINET MRP	Yes; PROFINET MRP	Yes; PROFINET MRP	Yes; PROFINET MRP
Interface types				
RJ 45 (Ethernet)				
• Transmission procedure	PROFINET with 100 Mbit/s full duplex (100BASE-TX)	PROFINET with 100 Mbit/s full duplex (100BASE-TX)	PROFINET with 100 Mbit/s full duplex (100BASE-TX)	PROFINET with 100 Mbit/s full duplex (100BASE-TX)
• 10 Mbps	Yes; for Ethernet services	Yes; for Ethernet services	No	No
• 100 Mbps	Yes; PROFINET with 100 Mbit/s full duplex (100BASE-TX)	Yes; PROFINET with 100 Mbit/s full duplex (100BASE-TX)	Yes; PROFINET with 100 Mbit/s full duplex (100BASE-TX)	Yes; PROFINET with 100 Mbit/s full duplex (100BASE-TX)
• Autonegotiation	Yes	Yes	Yes	Yes
• Autocrossing	Yes	Yes	Yes	Yes
Protocols				
Number of connections				
• Number of MtM communication relationships/connections, max.			16	16
PROFINET IO Device				
• Services				
- IRT	Yes; with send cycles of between 250 µs and 4 ms in increments of 125 µs	Yes; with send cycles of between 250 µs and 4 ms in increments of 125 µs	Yes; 250 µs, 500 µs, 1 ms, 2 ms, 4 ms additionally with IRT with high performance: 250 µs to 4 ms in 125 µs frame	Yes; 250 µs, 500 µs, 1 ms, 2 ms, 4 ms additionally with IRT with high performance: 250 µs to 4 ms in 125 µs frame
- PROFIenergy	Yes	Yes	Yes	Yes
- Prioritized startup	Yes	Yes	Yes	Yes
- Shared device	Yes	Yes	Yes	Yes
- Number of IO Controllers with shared device, max.	2	2	4	4
Redundancy mode				
• PROFINET system redundancy (S2)	No	No	Yes; NAP S2	Yes; NAP S2
• Redundant PROFINET configuration (R1)			No	No
• H-Sync forwarding			Yes	Yes
• Media redundancy				
- MRP	Yes	Yes	Yes	Yes
- MRPD	No	No	No	No
Open IE communication				
• TCP/IP	Yes	Yes	Yes	Yes
• SNMP	Yes	Yes	Yes	Yes
• LLDP	Yes	Yes	Yes	Yes
Isochronous mode				
Equidistance			Yes	Yes
shortest clock pulse			250 µs	250 µs
max. cycle			4 ms	4 ms
Bus cycle time (TDP), min.			250 µs	250 µs

SIPLUS extreme RAIL interface modules

Article number	6AG2155-6AA01-4BN0 SIPLUS ET 200SP IM155-6PN ST BA TX RAIL	6AG2155-6AU01-4BN0 SIPLUS ET 200SP IM155-6PN ST TX RAIL	6AG2155-6AU01-1CN0 SIPLUS ET 200SP IM155-6PN HF T1 RAIL	6AG2155-6AU01-4CN0 SIPLUS ET 200SP IM155-6PN HF TX RAIL
Interrupts/diagnostics/status information				
Status indicator	Yes	Yes	Yes	Yes
Alarms	Yes	Yes	Yes	Yes
Diagnostics function	Yes	Yes	Yes	Yes
Diagnostics indication LED				
• RUN LED	Yes; green LED	Yes; green LED	Yes; green LED	Yes; green LED
• ERROR LED	Yes; red LED	Yes; red LED	Yes; red LED	Yes; red LED
• MAINT LED	Yes; Yellow LED	Yes; Yellow LED	Yes; Yellow LED	Yes; Yellow LED
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED	Yes; green PWR LED	Yes; green PWR LED	Yes; green PWR LED
• Connection display LINK TX/RX	Yes; 2x green link LEDs on BusAdapter	Yes; 2x green link LEDs on BusAdapter	Yes; 2x green link LEDs on BusAdapter	Yes; 2x green link LEDs on BusAdapter
Standards, approvals, certificates				
Network loading class	2	2	3	3
Security level	According to Security Level 1 Test Cases V1.1.1	According to Security Level 1 Test Cases V1.1.1	According to Security Level 1 Test Cases V1.1.1	According to Security Level 1 Test Cases V1.1.1
Railway application				
• EN 50121-3-2	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support
Ambient conditions				
Ambient temperature during operation				
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)	-30 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155)	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)
• vertical installation, min.	-40 °C; = Tmin	-40 °C; = Tmin	-30 °C; = Tmin	-40 °C; = Tmin
• vertical installation, max.	50 °C; = Tmax	50 °C; = Tmax	50 °C; = Tmax	50 °C; = Tmax
Altitude during operation relating to sea level				
• Installation altitude above sea level, max.	2 000 m	2 000 m	2 000 m	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity				
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation

Article number	**6AG2155-6AA01-4BN0** SIPLUS ET 200SP IM155-6PN ST BA TX RAIL	**6AG2155-6AU01-4BN0** SIPLUS ET 200SP IM155-6PN ST TX RAIL	**6AG2155-6AU01-1CN0** SIPLUS ET 200SP IM155-6PN HF T1 RAIL	**6AG2155-6AU01-4CN0** SIPLUS ET 200SP IM155-6PN HF TX RAIL
Resistance				
• Coolants and lubricants				
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems				
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *
- Against mechanical environmental conditions acc. to EN 60721-3-3		Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Use on land craft, rail vehicles and special-purpose vehicles				
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *
- Against mechanical environmental conditions acc. to EN 60721-3-5		Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
- against mechanical environmental conditions in agriculture acc. to ISO 15003		Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Usage in industrial process technology				
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark				
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating				
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection	Yes; Type 1 protection	Yes; Type 1 protection	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A
Connection method / header				
ET-Connection				
• via BU/BA Send	Yes; + 16 ET 200AL modules	Yes; + 16 ET 200AL modules	Yes; + 16 ET 200AL modules	Yes; + 16 ET 200AL modules
Mechanics/material				
Strain relief			Yes; Optional	Yes; Optional
Dimensions				
Width	50 mm	50 mm	50 mm	50 mm
Height	117 mm	117 mm	117 mm	117 mm
Depth	74 mm	74 mm	74 mm	74 mm

SIPLUS extreme RAIL interface modules

Article number	6AG2155-6AA01-4BN0 SIPLUS ET 200SP IM155-6PN ST BA TX RAIL	6AG2155-6AU01-4BN0 SIPLUS ET 200SP IM155-6PN ST TX RAIL	6AG2155-6AU01-1CN0 SIPLUS ET 200SP IM155-6PN HF T1 RAIL	6AG2155-6AU01-4CN0 SIPLUS ET 200SP IM155-6PN HF TX RAIL
Weights				
Weight, approx.	190 g; IM 155-6 PN BA with 2x RJ45 ports and server module	147 g; without BusAdapter	120 g; without BusAdapter	120 g; without BusAdapter
Other				
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

Version	Article No.
SIPLUS extreme RAIL SIPLUS IM155-6PN Standard PROFINET interface module With server module	
• **SIPLUS ET 200SP IM155-6PN ST BA TX RAIL** With server module and installed SIMATIC BusAdapter BA 2xRJ45; for areas with extreme exposure to environmental substances (conformal coating); Ambient temperature -40 ... +70 °C (+85 °C for 10 min.); extended power failure backup time	**6AG2155-6AA01-4BN0**
• **SIPLUS ET 200SP IM155-6PN ST TX RAIL** With server module, without SIMATIC BusAdapter; for areas with extreme exposure to environmental substances (conformal coating); Aambient temperature -40 ... +70 °C (+85 °C for 10 min.); extended power failure backup time	**6AG2155-6AU01-4BN0**
• **SIPLUS ET 200SP IM155-6PN HF T1 RAIL** With server module, without SIMATIC BusAdapter; for areas with extreme exposure to environmental substances (conformal coating); Ambient temperature -25 ... +55 °C (+70 °C for 10 min.)	**6AG2155-6AU01-1CN0**
• **SIPLUS ET 200SP IM155-6PN HF TX RAIL** With server module, without SIMATIC BusAdapter; for areas with extreme exposure to environmental substances (conformal coating); Ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2155-6AU01-4CN0**
Accessories	
SIPLUS extreme RAIL BusAdapter	
SIPLUS ET 200SP BA 2XRJ45 TX RAIL For PROFINET interface modules in Standard function class or above; max. cable length 50 m; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6AR00-4AA0**
SIPLUS ET 200SP BA 2XFC TX RAIL For PROFINET interface modules in Standard function class or above; for increased vibration and EMC load rating; max. cable length 50 m; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6AF00-4AA0**
SIPLUS Mounting Kit ET 200SP Mounting accessories for use with increased mechanical vibration and shock loads. Not approved for SIPLUS BusAdapter BA 2xRJ45	**6AG1193-6AA00-0AA0**

* You can order this quantity or a multiple thereof.

Overview

- 4, 8 and 16-channel digital input (DI) modules
- Approved in accordance with the railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic

For different requirements, the digital input modules offer:

- Function classes Standard and High Feature
- BaseUnits for single or multiple-conductor connection with automatic slot coding
- Individual system-integrated load group formation with self-assembling voltage distribution bars (a separate power module is no longer required for ET 200SP)
- Connection option of sensors compliant with IEC 61131 Type 1, 2 or 3 (module-dependent) for rated voltages of up to 24 V DC or 230 V AC
- Clear labeling on front of module
- LEDs for diagnostics, status, supply voltage and faults
- Electronically readable and non-volatile writable rating plate (I&M data 0 to 3)
- Optional accessories
  - Labeling strips (film or card)
  - Reference identification label
  - Color-coded label with module-specific CC Code
  - Shielding terminal

A quick and clear comparison of the functions of the different DI modules is offered by the TIA Selection Tool.

Overview of digital input modules

Digital input	PU	Article No.	CC code	BU type
DI 16 x 24 V DC ST	1	6AG2131-6BH00-4BA0	CC00	A0
DI 8 x NAMUR HF	1	6AG2131-6TF00-4CA0	CC01	A0
DI 4 x 120 ... 230 V AC ST	1	6AG2131-6FD00-4BB1	CC41	B1

Overview of BaseUnits

BaseUnit	PU	Article No.	CC codes for process terminals	CC codes for AUX terminals
BU type A0 • New load group (light) • 16 process terminals • With 10 AUX terminals	1	6AG2193-6BP20-4DA0	CC01 to CC05	CC71 to CC73
BU type A0 • New load group (light) • 16 process terminals • Without AUX terminals	1	6AG2193-6BP00-4DA0	CC01 to CC05	--
BU type A0 • Forwarding of load group (dark) • 16 process terminals • With 10 AUX terminals	1	6AG2193-6BP20-4BA0	CC01 to CC05	CC71 to CC73
BU type A0 • Forwarding of load group (dark) • 16 process terminals • Without AUX terminals	1	6AG2193-6BP00-4BA0	CC01 to CC05	--

Application

The signals from digital sensors (switches, inductive and optical sensors etc.) can be recorded and transferred to the higher-level controller via the digital input modules.

Design

Usable BaseUnits (BU)

BaseUnits with an appropriate number of terminals are available for single or multi-conductor connection.

All variants that correspond to the BU type of the I/O module used can be used as BaseUnits (see Selection and ordering data).

Load group formation

A light-colored BU separates the self-assembling, internal voltage buses (P1, P2, AUX) and thus opens a new load group. The power supply of a load group must be fed in at the light BU of this load group.

A dark BU forwards the power supply of the adjacent light BU on the left via the self-assembling voltage buses P1, P2 and AUX. A new infeed is therefore only required on the next light BU to the right. The setting of a further light BU is required whenever

- a new load group is to be formed (for example, for isolating the supply voltage from module groups) or
- the maximum current simultaneously required by the load group exceeds the permissible limit of 10 A.

SIPLUS extreme RAIL digital inputs

Color identification of the terminals

The potentials at the terminals of the BaseUnit are defined by the inserted I/O module in each case. To prevent wiring faults, the potentials of the terminals can optionally be identified by means of module-specific color-coded labels. The color-coded label that matches the respective I/O module is defined by the color code CCxx of the I/O module. This color code is also printed on the front of the module.

In BaseUnits with the additional ten internally jumpered AUX terminals, these can also be identified with color-coded labels. For the ten AUX terminals, color-coded labels are available in red, blue, and yellow/green.

Labeling

Labeling strips

Labeling strips can be inserted on the front of the interface modules or I/O modules and individually labeled via STEP 7, macros, etc. No special additional holder is required. If required, they can be easily replaced with the component.

Equipment labeling plates

Equipment labeling plates enable the equipment to be easily identified (e.g. compliant with EN 81346). They are easily plugged onto the required component (interface modules, I/O modules and BaseUnits) and when required, they can be easily replaced with the component.

The following labeling components are available:

- Film labeling strips, light-gray, roll with 500 strips, perforated, for thermal transfer printers
- Film labeling strips, yellow, roll with 500 strips, perforated, for thermal transfer printers
- Card labeling strips (180 g/m^2), light gray, DIN A4 sheets with 100 strips each, perforated, for laser printer
- Card labeling strips (180 g/m^2), yellow, DIN A4 sheets with 100 strips each, for laser printer
- Equipment labeling plates, white, ten sheets each with 16 labels, for thermal transfer card printers or labels

System-integrated shield connection

For the space-saving and EMC-optimized connection of cable shields, a shield connection is available that is quick and easy to mount. This consists of one shield connection element that can be plugged onto the BaseUnit and one shield terminal for each module. The low-impedance connection to the functional ground (DIN rail) is achieved without any additional wiring by the user.

Technical specifications

6

Article number	**6AG2131-6BH01-4BA0** SIPLUS ET 200SP DI 16X24-VDC ST TX RAIL	**6AG2131-6TF00-4CA0** SIPLUS ET 200SP DI 8xNAMUR HF TX RAIL	**6AG2131-6FD01-4BB1** SIPLUS ET 200SP DI 4X120/230VAC TX RAIL	**6AG2131-6CF00-4AU0** SIPLUS ET 200SP DI 8x48VUC TX RAIL
General information				
Product type designation	DI 16x24VDC ST	DI 8xNAMUR HF	DI 4x120 ... 230 V AC ST	DI 8x24VAC/48VUC BA
Product function • Isochronous mode	 No	 No	 No	 No
Operating mode • DI • Counter • Oversampling • MSI	 Yes No No No	 Yes No No No	 Yes No No No	 Yes No No No
Supply voltage				
Rated value (DC)	24 V	24 V		48 V
Rated value (AC)			230 V	48 V; 24 V/48 V; 50 Hz/60 Hz
Reverse polarity protection	Yes	Yes	No	Yes
Encoder supply				
Number of outputs		8	4	8
Short-circuit protection		Yes	No; when using BU type B1, a fuse with 10 A tripping current must be provided	Yes; Per module, 5x 20 mm fuse, 2 A/250 V, quick-response, replaceable
Output current • up to 60 °C, max. • up to 70 °C, max.	 	 	 10 A 	 1 A
24 V encoder supply • 24 V • Short-circuit protection	 No	 No No	 	 No
Digital inputs				
Number of digital inputs	16	8; > +60 °C number of simultaneously controllable inputs max. 4 (no adjacent points)	4	8
Digital inputs, parameterizable	Yes	Yes		
Source/sink input	P-reading			P-reading
Input characteristic curve in accordance with IEC 61131, type 1				Yes
Input characteristic curve in accordance with IEC 61131, type 2				No
Input characteristic curve in accordance with IEC 61131, type 3	Yes		Yes	No
Pulse extension		Yes; 0.5 s, 1 s, 2 s		No
Edge evaluation		Yes; rising edge, falling edge, edge change		

Article number	**6AG2131-6BH01-4BA0** SIPLUS ET 200SP DI 16X24-VDC ST TX RAIL	**6AG2131-6TF00-4CA0** SIPLUS ET 200SP DI 8xNAMUR HF TX RAIL	**6AG2131-6FD01-4BB1** SIPLUS ET 200SP DI 4X120/230VAC TX RAIL	**6AG2131-6CF00-4AU0** SIPLUS ET 200SP DI 8x48VUC TX RAIL
Signal change flutter		Yes; 2 to 32 signal changes		
Flutter observation window		Yes; 0.5 s, 1 s to 100 s in 1-s steps		
Input voltage				
• Rated value (DC)	24 V	8.2 V		
• Rated value (AC)			230 V	
• for signal "0"	-30 to +5 V		0V AC to 40V AC	AC/DC < 10 V
• for signal "1"	+11 to +30V		74 V AC to 264 V AC	AC > 14 V, DC > 34 V
Input current				
• for signal "1", typ.	2.5 mA		10.8 mA	3.5 mA
• for 10 k switched contact				
- for signal "0"		0.35 to 1.2 mA		
- for signal "1"		2.1 to 7 mA		
• for unswitched contact				
- for signal "0", max. (permissible quiescent current)		0.5 mA		
- for signal "1"		typ. 8 mA		
• for NAMUR encoders				
- for signal "0", min.		0.35 mA		
- for signal "0", max.		1.2 mA		
- for signal "1", min.		2.1 mA		
- for signal "1", max.		7 mA		
Input delay (for rated value of input voltage)				
• tolerated changeover time for changeover contacts		300 ms		
• for standard inputs				
- parameterizable	Yes; 0.05 / 0.1 / 0.4 / 0.8 / 1.6 / 3.2 / 12.8 / 20 ms (in each case + delay of 30 to 500 µs, depending on line length)	No	No	No
• for NAMUR inputs				
- at "0" to "1", max.		12 ms		
- at "1" to "0", max.		12 ms		
Encoder				
Connectable encoders				
• NAMUR encoder/changeover contact according to EN 60947		Yes		
• Single contact / changeover contact unconnected		Yes		
• Single contact / changeover contact connected with 10 kΩ		Yes		
• 2-wire sensor	Yes		Yes	Yes
- permissible quiescent current (2-wire sensor), max.	1.5 mA			
Interrupts/diagnostics/status information				
Diagnostics function	Yes	Yes		Yes
Alarms				
• Diagnostic alarm	Yes	Yes; channel by channel	No	Yes
• Hardware interrupt		Yes; Parameterizable, channels 0 to 7	No	
Diagnoses				
• Diagnostic information readable	Yes	Yes		Yes
• Monitoring the supply voltage	Yes	Yes	No	Yes
• parameterizable	Yes	Yes		
• Monitoring of encoder power supply	No	Yes; channel by channel		Yes
• Wire-break	Yes; Module-by-module, optional protective circuit for preventing wire-break diagnostics in the case of simple encoder contacts: 25 kOhm to 45 kOhm	Yes; channel by channel	No	
• Short-circuit	No	Yes; channel by channel	No	
• Group error	Yes	Yes		Yes
Diagnostics indication LED				
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED	Yes; green PWR LED	Yes; green PWR LED	Yes; green PWR LED
• Channel status display	Yes; green LED	Yes; green LED	Yes; green LED	Yes; green LED
• for channel diagnostics	No	Yes; red LED	No	No
• for module diagnostics	Yes; green/red DIAG LED	Yes; green/red DIAG LED	Yes; green/red DIAG LED	Yes; green/red DIAG LED
Potential separation				
Potential separation channels				
• between the channels and backplane bus	Yes	Yes	Yes	Yes

SIPLUS extreme RAIL digital inputs

Article number	6AG2131-6BH01-4BA0 SIPLUS ET 200SP DI 16X24-VDC ST TX RAIL	6AG2131-6TF00-4CA0 SIPLUS ET 200SP DI 8xNAMUR HF TX RAIL	6AG2131-6FD01-4BB1 SIPLUS ET 200SP DI 4X120/230VAC TX RAIL	6AG2131-6CF00-4AU0 SIPLUS ET 200SP DI 8x48VUC TX RAIL
Standards, approvals, certificates				
Suitable for safety functions	No	No	No	No
Railway application				
• EN 50121-3-2	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV3; pollution degree PD2; UNm = 230 V AC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 48 V AC/DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support
Ambient conditions				
Ambient temperature during operation				
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)	70 °C; = Tmax; +85 °C for min (OT4, ST1/ST2 acc. to EN 50155)	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)
• vertical installation, min.	-40 °C; = Tmin	-40 °C; = Tmin	-40 °C; = Tmin	-40 °C; = Tmin
• vertical installation, max.	50 °C; = Tmax	50 °C; = Tmax	50 °C; = Tmax	50 °C; = Tmax
Altitude during operation relating to sea level				
• Installation altitude above sea level, max.	2 000 m	2 000 m	2 000 m	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity				
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance				
• Coolants and lubricants				
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems				
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *
- Against mechanical environmental conditions acc. to EN 60721-3-3	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)

Article number	6AG2131-6BH01-4BA0	6AG2131-6TF00-4CA0	6AG2131-6FD01-4BB1	6AG2131-6CF00-4AU0
	SIPLUS ET 200SP DI 16X24-VDC ST TX RAIL	SIPLUS ET 200SP DI 8xNAMUR HF TX RAIL	SIPLUS ET 200SP DI 4X120/230VAC TX RAIL	SIPLUS ET 200SP DI 8x48VUC TX RAIL
• Use on land craft, rail vehicles and special-purpose vehicles				
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *
- Against mechanical environmental conditions acc. to EN 60721-3-5	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
- against mechanical environmental conditions in agriculture acc. to ISO 15003	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Usage in industrial process technology				
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark				
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating				
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection	Yes; Type 1 protection	Yes; Type 1 protection	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A
Dimensions				
Width	15 mm	15 mm	20 mm	20 mm
Height	73 mm	73 mm	73 mm	73 mm
Depth	58 mm	58 mm	58 mm	58 mm
Weights				
Weight, approx.	28 g	32 g	36 g	40 g
Other				
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

SIPLUS extreme RAIL digital inputs

Selection and ordering data

Version	Article No.
SIPLUS extreme RAIL digital inputs	
Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic	
SIPLUS ET 200SP DI 16X24VDC ST TX RAIL, BU type A0, color code CC00; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2131-6BH01-4BA0**
SIPLUS ET 200SP DI 8xNAMUR HF TX RAIL, BU type A0, color code CC01; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2131-6TF00-4CA0**
SIPLUS ET 200SP DI 4X120/230VAC TX RAIL, BU type B1, color code CC41; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2131-6FD01-4BB1**
SIPLUS ET 200SP DI 8x48VUC TX RAIL, BU type U0, color code CC20, module diagnostics; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2131-6CF00-4AU0**
Suitable SIPLUS extreme RAIL BaseUnits	
SIPLUS ET 200SP BU15-P16+A0+2D TX RAIL	**6AG2193-6BP00-4DA0**
Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic	
BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A); for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	
SIPLUS ET 200SP BU15-P16+A0+2B TX RAIL	**6AG2193-6BP00-4BA0**
Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic	
BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	
SIPLUS ET 200SP BU15-P16+A10+2D TX RAIL	**6AG2193-6BP20-4DA0**
Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic	
BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A); for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	
SIPLUS ET 200SP BU15-P16+A10+2B TX RAIL	**6AG2193-6BP20-4BA0**
Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic	
BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	
SIPLUS ET 200SP BU20-P12+A0+4B TX RAIL	**6AG2193-6BP20-4BB1**
Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic	
BU type B1; BaseUnit (dark) with 12 process terminals to the module; for continuing the load group; 1 unit	
SIPLUS ET 200SP BU20-P16+A0+2B TX RAIL	**6AG2193-6BP00-4BU0**
Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic	
BU type U0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group	
SIPLUS ET 200SP BU20-P16+A0+2D TX RAIL	**6AG2193-6BP00-4DU0**
Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic	
BU type U0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A)	
Accessories	
SIPLUS Mounting Kit ET 200SP	**6AG1193-6AA00-0AA0**
Mounting accessories for use with increased mechanical vibration and shock loads.	

*** You can order this quantity or a multiple thereof.**

Overview

- 4, 8 and 16-channel digital output (DQ) modules
- Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic

For different requirements, the digital output modules offer:

- Function classes Basic and High Feature
- BaseUnits for single or multiple-conductor connection with automatic slot coding
- Individual system-integrated load group formation with self-assembling voltage distribution bars (a separate power module is no longer required for ET 200SP)
- Option of connecting actuators with rated load voltages of up to 120 V DC or 230 V AC and load currents of up to 5 A (depending on module)
- Clear labeling on front of module
- LEDs for diagnostics, status, supply voltage and faults
- Electronically readable and non-volatile writable rating plate (I&M data 0 to 3)
- Optional accessories
  - Labeling strips (film or card)
  - Equipment labeling plate
  - Color-coded label with module-specific CC code
  - Shielding terminal

A quick and clear comparison of the functions of the different DQ modules is offered by the TIA Selection Tool.

Overview of digital output modules

Digital output	PU	Article No.	CC code	BU type
DQ 16 x 24 V DC/0.5 A ST	1	6AG2132-6BH01-4BA0	CC00	A0
DQ 8 x 24 V DC/0.5 A HF	1	6AG2132-6BF00-4CA0	CC02	A0
DQ 4 x 24 V DC/2 A ST	1	6AG2132-6BD20-4BA0	CC02	A0
DQ 4 x 24 ... 230 V AC/2 A HF With two operating modes: • DQ • PC: Power control via phase angle, half-wave or full-wave control	1	6AG2132-6FD00-4CU0	CC20	U0
RQ 4 x UC 24 V/2A ST	1	6AG2132-6GD51-4BA0	CC00	A0
RQ 4 x DC 120 V-AC 230 V/ 5 A NO ST	1	6AG2132-6HD01-4BB1	--	B0, B1
RQ MA 4 x 120 V DC ... 230 V AC/5 A NO ST	1	6AG2132-6MD00-4BB1	--	B0, B1

Overview of BaseUnits

BaseUnit	PU	Article No.	CC codes for process terminals	CC codes for AUX terminals
BU type A0 • New load group (light) • 16 process terminals • With 10 AUX terminals	1	6AG2193-6BP20-4DA0	CC01 to CC05	CC71 to CC73
BU type A0 • New load group (light) • 16 process terminals • Without AUX terminals	1	6AG2193-6BP00-4DA0	CC01 to CC05	--
BU type A0 • Forwarding of load group (dark) • 16 process terminals • With 10 AUX terminals	1	6AG2193-6BP20-4BA0	CC01 to CC05	CC71 to CC73
BU type A0 • Forwarding of load group (dark) • 16 process terminals • Without AUX terminals	1	6AG2193-6BP00-4BA0	CC01 to CC05	--
BU type B1 • Forwarding of load group (dark) • 12 process terminals • 2 x 2 (1L, 2L, 1N, 2N) direct infeed module • Without AUX terminals	1	6AG2193-6BP20-0BB1	CC41	--
BU type U0 • Forwarding of load group (dark) • 16 process terminals • Without AUX terminals	1	6AG2193-6BP00-4BU0	CC20	--
BU type U0 • New load group (light) • 16 process terminals • Without AUX terminals	1	6AG2193-6BP00-4DU0	CC20	--

SIPLUS extreme RAIL digital outputs

Application

Digital actuators (magnetic valves, contactors and signal lamps, etc.) can be controlled by means of the digital output modules.

Design

Usable BaseUnits (BU)

BaseUnits with an appropriate number of terminals are available for single or multi-conductor connection.

All variants that correspond to the BU type of the I/O module used can be used as BaseUnits (see Selection and ordering data).

Load group formation

A light-colored BU separates the self-assembling, internal voltage buses (P1, P2, AUX) and thus opens a new load group. The supply voltage of a load group must be fed in at the light BU of this load group.

A dark BU forwards the supply voltage of the adjacent light BU on the left via the self-assembling voltage buses P1, P2 and AUX. A new infeed is therefore only required on the next light BU to the right. The setting of a further light BU is required whenever

- a new load group is to be formed (for example, for isolating the supply voltage from module groups) or
- the maximum current simultaneously required by the load group exceeds the permissible limit of 10 A.

Color identification of the terminals

The potentials at the terminals of the BaseUnit are defined by the inserted I/O module in each case. To prevent wiring faults, the potentials of the terminals can optionally be identified by means of module-specific color-coded labels. The color-coded label that matches the respective I/O module is defined by the color code CCxx of the I/O module. This color code is also printed on the front of the module.

In BaseUnits with the additional ten internally jumpered AUX terminals, these can also be identified with color-coded labels. For the ten AUX terminals, color-coded labels are available in red, blue, and yellow/green.

Labeling

Labeling strips

Labeling strips can be inserted on the front of the interface modules or I/O modules and individually labeled via STEP 7, macros, etc. No special additional holder is required. If required, they can be easily replaced with the component.

Equipment labeling plates

Equipment labeling plates enable the equipment to be easily identified (e.g. compliant with EN 81346). They are easily plugged onto the required component (interface modules, I/O modules and BaseUnits) and when required, they can be easily replaced with the component.

The following labeling components are available:

- Film labeling strips, light-gray, roll with 500 strips, perforated, for thermal transfer printers
- Film labeling strips, yellow, roll with 500 strips, perforated, for thermal transfer printers
- Card labeling strips (180 g/m^2), light gray, DIN A4 sheets with 100 strips each, perforated, for laser printer
- Card labeling strips (180 g/m^2), yellow, DIN A4 sheets with 100 strips each, perforated, for laser printer

Equipment labeling plates, white, ten sheets each with 16 labels, for thermal transfer card printers or labels

System-integrated shielded connection

For the space-saving and EMC-optimized connection of cable shields, a shield connection is available that is quick and easy to mount. This consists of one shield connection element that can be plugged onto the BaseUnit and one shield terminal for each module. The low-impedance connection to the functional ground (DIN rail) is achieved without any additional wiring by the user.

6

Technical specifications

Article number	**6AG2132-6BD20-4BA0** SIPLUS ET 200SP DQ 4X24-VDC/2A ST TX RAIL	**6AG2132-6BF00-4CA0** SIPLUS ET 200SP DQ 8X24-VDC/0.5A TX RAIL	**6AG2132-6BH01-4BA0** SIPLUS ET 200SP DQ 16X24VDC/0.5A TX RAIL	**6AG2132-6FD00-4CU0** SIPLUS ET 200SP DQ 4X24..230VAC TX RAIL
General information				
Product type designation	DQ 4x24 V DC/2 A ST	DQ 8x24 VDC/0.5 A ST	DQ 16x24VDC/0.5A ST	DQ 4x24 ... 230 V AC/2 A HF
Product function • Isochronous mode	 No	 Yes	 No	 No
Engineering with • STEP 7 TIA Portal configurable/ integrated from version				see entry ID: 109746275
Operating mode • DQ • DQ with energy-saving function • PWM • Oversampling • MSO • Phase control • Trailing-edge phase • Half-wave • Full-wave	 Yes No No No No	 Yes No No No Yes	 Yes No No No No	 Yes Yes No No No Yes; Control area: 8.5 ... 100% of the phase angle No Yes Yes
Supply voltage				
Rated value (DC)	24 V	24 V	24 V	
Rated value (AC)				230 V; 47 ... 63 Hz, max. rate of change of frequency 1 mHz/s
Reverse polarity protection	Yes	Yes	Yes	

Article number	**6AG2132-6BD20-4BA0** SIPLUS ET 200SP DQ 4X24-VDC/2A ST TX RAIL	**6AG2132-6BF00-4CA0** SIPLUS ET 200SP DQ 8X24-VDC/0.5A TX RAIL	**6AG2132-6BH01-4BA0** SIPLUS ET 200SP DQ 16X24VDC/0.5A TX RAIL	**6AG2132-6FD00-4CU0** SIPLUS ET 200SP DQ 4X24..230VAC TX RAIL
Digital outputs				
Type of digital output	Source output (PNP, current-sourcing)	Source output (PNP, current-sourcing)	Source output (PNP, current-sourcing)	Triac
Number of digital outputs	4; > +60 °C number of simultaneously controllable outputs max. 2x 0.25 A or max. 4x 0.125 A, max. total current 0.5 A	8; > +60 °C max. total current 1.0 A	16; > +60 °C max. total current 1.0 A	4
Current-sinking	No	No	No	No
Current-sourcing	Yes	Yes	Yes	Yes
Digital outputs, parameterizable	Yes	Yes	Yes	Yes
Short-circuit protection	Yes	Yes	Yes	No; external fusing necessary
Open-circuit detection			Yes	Yes; channel by channel
Overload protection				No; A miniature fuse with 10 tripping current and tripping characteristic "quick response" must be provided in the module supply
Limitation of inductive shutdown voltage to	Typ. L+ (-50 V)	Typ. L+ (-50 V)	Typ. L+ (-50 V)	
Controlling a digital input	Yes	Yes	Yes	Yes
Switching capacity of the outputs				
• with resistive load, max.	2 A	0.5 A	0.5 A	2 A; Max. 4 A, see additional description in manual
• with inductive load, max.				2 A
• on lamp load, max.	10 W	5 W	5 W	100 W; Tungsten rating in accordance with UL; for thermistors with higher power ratings, see the notes in the manual
Load resistance range				
• lower limit	12 Ω	48 Ω	48 Ω	
• upper limit	3 400 Ω	12 kΩ	12 kΩ	
Output voltage				
• for signal "1", min.				20.4 V
Output current				
• for signal "1" rated value	2 A	0.5 A	0.5 A	2 A
• for signal "0" residual current, max.	0.1 mA	0.1 mA	0.1 mA	3 mA
Output delay with resistive load				
• "0" to "1", typ.	50 µs	50 µs	50 µs	
• "0" to "1", max.	50 µs			40 ms; 2 AC cycles
• "1" to "0", typ.	100 µs	100 µs	100 µs	
• "1" to "0", max.	100 µs			20 ms; 1 AC cycle
Parallel switching of two outputs				
• for logic links				No
• for uprating	No	No	No	No
• for redundant control of a load	Yes	Yes	Yes	Yes
Switching frequency				
• with resistive load, max.	100 Hz	100 Hz	100 Hz	10 Hz; Applies to DQ mode; limited by line frequency in PC mode
• with inductive load, max.	2 Hz	2 Hz	2 Hz	
• with inductive load (acc. to IEC 60947-5-1, AC15), max.				10 Hz; Applies to DQ mode; limited by line frequency in PC mode
• on lamp load, max.	10 Hz	10 Hz	10 Hz	1 Hz; Applies to DQ mode; limited by line frequency in PC mode
Total current of the outputs				
• Current per channel, max.	2 A	0.5 A	0.5 A	2 A; Max. 4 A, see additional description in manual
• Current per module, max.	8 A	4 A	8 A	8 A

SIPLUS extreme RAIL digital outputs

Article number	6AG2132-6BD20-4BA0 SIPLUS ET 200SP DQ 4X24-VDC/2A ST TX RAIL	6AG2132-6BF00-4CA0 SIPLUS ET 200SP DQ 8X24-VDC/0.5A TX RAIL	6AG2132-6BH01-4BA0 SIPLUS ET 200SP DQ 16X24VDC/0.5A TX RAIL	6AG2132-6FD00-4CU0 SIPLUS ET 200SP DQ 4X24..230VAC TX RAIL
Total current of the outputs (per module)				
• horizontal installation				
- up to 30 °C, max.	8 A		8 A	
- up to 40 °C, max.	8 A		8 A	8 A; Applicable for current channels up to 2 A. For current channels between 2 A and 4 A, note derating data in the manual
- up to 50 °C, max.	6 A		6 A	6 A; Applicable for current channels up to 2 A. For current channels between 2 A and 4 A, note derating data in the manual
- up to 60 °C, max.	4 A	4 A	4 A	4 A; Applicable for current channels up to 2 A. For current channels between 2 A and 4 A, note derating data in the manual
- up to 70 °C, max.	0.5 A	1 A	1 A	2 A; Applicable for current channels up to 2 A
• vertical installation				
- up to 30 °C, max.	8 A		8 A; in all other mounting positions	
- up to 40 °C, max.	6 A		6 A; in all other mounting positions	
- up to 50 °C, max.	4 A	4 A; in all other mounting positions	4 A; in all other mounting positions	
- up to 60 °C, max.	4 A			
Isochronous mode				
Execution and activation time (TCO), min.		48 µs		
Bus cycle time (TDP), min.		500 µs		
Interrupts/diagnostics/status information				
Diagnostics function	Yes	Yes	Yes	Yes
Substitute values connectable	Yes	Yes	Yes	Yes
Alarms				
• Diagnostic alarm	Yes	Yes	Yes	Yes
Diagnoses				
• Diagnostic information readable				Yes
• Monitoring the supply voltage	Yes	Yes	Yes	Yes
• Wire-break	Yes; Module-wise	Yes; channel by channel	Yes; Module-wise	Yes; channel by channel
• Short-circuit	Yes; Module-wise	Yes; channel by channel		No
• Short-circuit to M			Yes; Module-wise	
• Short-circuit to L+			Yes; Module-wise	
• Group error	Yes	Yes		Yes
Diagnostics indication LED				
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED	Yes; green PWR LED	Yes; green PWR LED	Yes; green PWR LED
• Channel status display	Yes; green LED	Yes; green LED	Yes; green LED	Yes; green LED
• for channel diagnostics	No	Yes; red LED	No	Yes; red Fn LED
• for module diagnostics	Yes; green/red DIAG LED	Yes; green/red DIAG LED	Yes; green/red DIAG LED	Yes; green/red DIAG LED
Potential separation				
Potential separation channels				
• between the channels and backplane bus	Yes	Yes	Yes	Yes
Standards, approvals, certificates				
Suitable for safety functions	No	No	No	No
Suitable for safety-related tripping of standard modules			Yes	
Railway application				
• EN 50121-3-2	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV3; pollution degree PD2; UNm = 230 V AC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions

Article number	**6AG2132-6BD20-4BA0** SIPLUS ET 200SP DQ 4X24-VDC/2A ST TX RAIL	**6AG2132-6BF00-4CA0** SIPLUS ET 200SP DQ 8X24-VDC/0.5A TX RAIL	**6AG2132-6BH01-4BA0** SIPLUS ET 200SP DQ 16X24VDC/0.5A TX RAIL	**6AG2132-6FD00-4CU0** SIPLUS ET 200SP DQ 4X24..230VAC TX RAIL
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support
Ambient conditions				
Ambient temperature during operation				
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)
• vertical installation, min.	-40 °C; = Tmin	-40 °C; = Tmin	-40 °C; = Tmin	-40 °C; = Tmin
• vertical installation, max.	50 °C; = Tmax	50 °C; = Tmax	50 °C; = Tmax	50 °C; = Tmax
Altitude during operation relating to sea level				
• Installation altitude above sea level, max.	2 000 m	2 000 m	2 000 m	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity				
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance				
• Coolants and lubricants				
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems				
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *
- Against mechanical environmental conditions acc. to EN 60721-3-3	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Use on land craft, rail vehicles and special-purpose vehicles				
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *
- Against mechanical environmental conditions acc. to EN 60721-3-5	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
- against mechanical environmental conditions in agriculture acc. to ISO 15003	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)

SIPLUS extreme RAIL digital outputs

Article number	6AG2132-6BD20-4BA0 SIPLUS ET 200SP DQ 4X24-VDC/2A ST TX RAIL	6AG2132-6BF00-4CA0 SIPLUS ET 200SP DQ 8X24-VDC/0.5A TX RAIL	6AG2132-6BH01-4BA0 SIPLUS ET 200SP DQ 16X24VDC/0.5A TX RAIL	6AG2132-6FD00-4CU0 SIPLUS ET 200SP DQ 4X24..230VAC TX RAIL
• Usage in industrial process technology				
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark				
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating				
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection	Yes; Type 1 protection	Yes; Type 1 protection	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A
Dimensions				
Width	15 mm	15 mm	15 mm	20 mm
Height	73 mm	73 mm	73 mm	73 mm
Depth	58 mm	58 mm	58 mm	58 mm
Weights				
Weight, approx.	30 g	30 g	30 g	50 g
Other				
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Article number	6AG2132-6HD01-4BB1 SIPLUS ET 200SP RQ 4x120VDC/230 TX RAIL	6AG2132-6GD51-4BA0 SIPLUS ET 200SP RQ 4x24VUC/2A ST TX RAIL	6AG2132-6MD00-4BB1 SIPLUS ET 200SP RQ 4x120/230 MA TX RAIL
General information			
Product type designation	RQ 4x120 VDC ... 230 VAC/5 A NO ST	RQ CO 4x24VDC/2A ST	RQ 4x120 V DC ... 230 V AC/5 A NO MA ST
Product function			
• Isochronous mode	No	No	No
Operating mode			
• DQ	Yes	Yes	Yes
• DQ with energy-saving function	No	No	No
• PWM	No	No	No
• Oversampling	No	No	No
• MSO	No	No	No
Supply voltage			
Rated value (DC)	24 V	24 V	24 V
Reverse polarity protection	Yes	Yes	Yes
Digital outputs			
Type of digital output	Relays	Relays	Relays
Number of digital outputs	4	4	4
Current-sinking	Yes	Yes	
Current-sourcing	Yes	Yes	
Digital outputs, parameterizable	Yes	Yes	
Short-circuit protection	No	No	No
Parallel switching of two outputs			
• for logic links	Yes	Yes	
• for uprating	No	No	
• for redundant control of a load	Yes	Yes	

Article number	**6AG2132-6HD01-4BB1** SIPLUS ET 200SP RQ 4x120VDC/230 TX RAIL	**6AG2132-6GD51-4BA0** SIPLUS ET 200SP RQ 4x24VUC/2A ST TX RAIL	**6AG2132-6MD00-4BB1** SIPLUS ET 200SP RQ 4x120/230 MA TX RAIL
Switching frequency			
• with resistive load, max.	2 Hz	2 Hz	2 Hz
• with inductive load, max.	0.5 Hz		0.5 Hz
• on lamp load, max.	2 Hz		2 Hz
Total current of the outputs			
• Current per channel, max.	5 A; > +60 °C max. continuous current per relay 3 A	2 A	5 A
• Current per module, max.	20 A	8 A	20 A
Total current of the outputs (per module)			
• horizontal installation			
- up to 40 °C, max.		8 A	
- up to 50 °C, max.	20 A	6 A	20 A
- up to 60 °C, max.	16 A	4 A	16 A
- up to 70 °C, max.	12 A	2 A	12 A
• vertical installation			
- up to 30 °C, max.		8 A	
- up to 40 °C, max.	20 A	6 A	20 A
- up to 50 °C, max.	16 A; in all other mounting positions	4 A; in all other mounting positions	16 A
Relay outputs			
• Number of relay outputs	4	4	4
• Rated supply voltage of relay coil L+ (DC)	24 V	24 V	24 V
• Current consumption of relays (coil current of all relays), max.	40 mA	40 mA	40 mA
• external protection for relay outputs	Yes, with 6A		Yes, with 6A
• Number of operating cycles, max.	7 000 000; see additional description in the manual		7 000 000; see additional description in the manual
Switching capacity of contacts			
• with inductive load, max.	2 A; see additional description in the manual		2 A; see additional description in the manual
• with resistive load, max.	5 A; see additional description in the manual	2 A	5 A; see additional description in the manual
• Thermal continuous current, max.	5 A; Max. 1 385 VA, 150 W	2 A	5 A
• Switching current, min.	100 mA; 5 V DC	1 mA; 5 V DC	100 mA; 5 V DC
• Rated switching voltage (DC)	24 V DC to 120 V DC	24 V	24 V DC to 120 V DC
• Rated switching voltage (AC)	24V AC to 230V AC	24 V	24V AC to 230V AC
Interrupts/diagnostics/status information			
Diagnostics function	Yes	Yes	Yes
Substitute values connectable	Yes	Yes	Yes
Alarms			
• Diagnostic alarm	Yes	Yes	Yes
Diagnoses			
• Monitoring the supply voltage	Yes	Yes	Yes
• Wire-break	No	No	No
• Short-circuit	No	No	No
• Group error			Yes
Diagnostics indication LED			
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED	Yes; green PWR LED	Yes; green PWR LED
• Channel status display	Yes; green LED	Yes; green LED	Yes; green LED
• for channel diagnostics	No	No	No
• for module diagnostics	Yes; green/red DIAG LED	Yes; green/red DIAG LED	Yes; green/red DIAG LED
Potential separation			
Potential separation channels			
• between the channels and back-plane bus	Yes	Yes	Yes
Standards, approvals, certificates			
Suitable for safety functions	No	No	No
Railway application			
• EN 50121-3-2	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV3; pollution degree PD2; UNm = 230 V AC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV3; pollution degree PD2; UNm = 230 V AC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions

SIPLUS extreme RAIL digital outputs

Article number	**6AG2132-6HD01-4BB1** SIPLUS ET 200SP RQ 4x120VDC/230 TX RAIL	**6AG2132-6GD51-4BA0** SIPLUS ET 200SP RQ 4x24VUC/2A ST TX RAIL	**6AG2132-6MD00-4BB1** SIPLUS ET 200SP RQ 4x120/230 MA TX RAIL
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support
Ambient conditions			
Ambient temperature during operation			
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)
• vertical installation, min.	-40 °C; = Tmin	-40 °C; = Tmin	-40 °C; = Tmin
• vertical installation, max.	50 °C; = Tmax	50 °C; = Tmax	50 °C; = Tmax
Altitude during operation relating to sea level			
• Installation altitude above sea level, max.	2 000 m	2 000 m	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity			
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance			
• Coolants and lubricants			
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems			
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *
- Against mechanical environmental conditions acc. to EN 60721-3-3	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	
• Use on land craft, rail vehicles and special-purpose vehicles			
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *
- Against mechanical environmental conditions acc. to EN 60721-3-5	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	
- against mechanical environmental conditions in agriculture acc. to ISO 15003	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	
• Usage in industrial process technology			
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark			
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!

Article number	**6AG2132-6HD01-4BB1** SIPLUS ET 200SP RQ 4x120VDC/230 TX RAIL	**6AG2132-6GD51-4BA0** SIPLUS ET 200SP RQ 4x24VUC/2A ST TX RAIL	**6AG2132-6MD00-4BB1** SIPLUS ET 200SP RQ 4x120/230 MA TX RAIL
Conformal coating			
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection	Yes; Type 1 protection	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A
Dimensions			
Width	20 mm	15 mm	20 mm
Height	73 mm	73 mm	73 mm
Depth	58 mm	58 mm	58 mm
Weights			
Weight, approx.	40 g	30 g	45 g
Other			
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

Version	Article No.
SIPLUS extreme RAIL digital outputs Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic	
SIPLUS ET 200SP DQ 16X24VDC/0.5A TX RAIL, BU type A0, color code CC00; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2132-6BH01-4BA0**
SIPLUS ET 200SP DQ 8X24VDC/0.5A TX RAIL, BU type A0, color code CC02; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2132-6BF00-4CA0**
SIPLUS ET 200SP DQ 4X24VDC/2A ST TX RAIL, BU type A0, color code CC02; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2132-6BD20-4BA0**
SIPLUS ET 200SP DQ 4x24VAC...230VAC/2A High Feature for BU type U0, color code CC20, 2 operating modes: DQ and PC (power control with phase angle, half- and full-wave control); For areas with extreme exposure to environmental substances (conformal coating); Ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2132-6FD00-4CU0**
SIPLUS ET 200SP RQ CO 4x24VUC/2A Standard, change-over contact, BU type A0, color code CC00; For areas with extreme exposure to environmental substances (conformal coating); Ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2132-6GD51-4BA0**
SIPLUS ET 200SP RQ 4x120VDC/230 TX RAIL, normally open, BU type B0, B1, color code CC40; For areas with extreme exposure to environmental substances (conformal coating); Ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2132-6HD01-4BB1**
SIPLUS ET 200SP RQ NO 4x120VDC-230VAC/5A Standard, normally open, with manual operation, BU type B0, B1; For areas with extreme exposure to environmental substances (conformal coating); Ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2132-6MD00-4BB1**

*** You can order this quantity or a multiple thereof.**

SIPLUS extreme RAIL digital outputs

Version	Article No.
Suitable SIPLUS extreme RAIL BaseUnits	
SIPLUS ET 200SP BU15-P16+A0+2D TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A); for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP00-4DA0**
SIPLUS ET 200SP BU15-P16+A0+2B TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP00-4BA0**
SIPLUS ET 200SP BU15-P16+A10+2D TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A); for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP20-4DA0**
SIPLUS ET 200SP BU15-P16+A10+2B TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP20-4BA0**
SIPLUS ET 200SP BU20-P12+A0+4B TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type B1; BaseUnit (dark) with 12 process terminals to the module; for continuing the load group; 1 unit	**6AG2193-6BP20-4BB1**
SIPLUS ET 200SP BU20-P16+A0+2B TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type U0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group	**6AG2193-6BP00-4BU0**
SIPLUS ET 200SP BU20-P16+A0+2D TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type U0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A)	**6AG2193-6BP00-4DU0**
Accessories	
SIPLUS Mounting Kit ET 200SP Mounting accessories for use with increased mechanical vibration and shock loads.	**6AG1193-6AA00-0AA0**

* You can order this quantity or a multiple thereof.

Overview

- 2, 4 and 8-channel analog input (AI) modules
- Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic

For different requirements, the analog input modules offer:

- Function classes Basic and High Feature
- BaseUnits for single or multiple-conductor connection with automatic slot coding
- Individual system-integrated load group formation with self-assembling voltage distribution bars (a separate power module is no longer required for ET 200SP)
- Option of connecting current, voltage and resistance sensors, as well as thermocouples
- Energy Meter for recording up to 200 electrical variables
- Clear labeling on front of module
- LEDs for diagnostics, status, supply voltage and faults
- Electronically readable and non-volatile writable rating plate (I&M data 0 to 3)
- Extended functions and additional operating modes in some cases
  - Scalable measuring range (adaptation of measuring range, increase of the 16-bit resolution by adapting the measuring range to a limited section)
- Optional accessories
  - Labeling strips (film or card)
  - Equipment labeling plate
  - Color-coded label with module-specific CC code
  - Shielding terminal

A quick and clear comparison of the functions of the AI modules is offered by the TIA Selection Tool.

Overview of analog input modules

Analog input	PU	Article No.	CC code	BU type
AI 8 x I 2/4-wire BA	1	6AG2134-6GF00-4AA1	CC01	A0, A1
AI 4 x I 2/4-wire ST	1	6AG2134-6GD01-1BA1	CC03	A0, A1
AI 4 x I 2/4-wire ST	1	6AG2134-6GD01-4BA1	CC03	A0, A1
AI 4 x U/I 2-wire ST	1	6AG2134-6HD01-1BA1	CC03	A0, A1
AI 4 x U/I 2-wire ST	1	6AG2134-6HD01-4BA1	CC03	A0, A1
AI 2 x U/I 2/4-wire HF	1	6AG2134-6HB00-1CA1	CC05	A0, A1
AI 8 x RTD/TC 2-wire HF	1	6AG2134-6JF00-1CA1	CC00	A0, A1
AI 4 x RTD/TC 2/3/4-wire HF	1	6AG2134-6JD00-1CA1	CC00	A0, A1
AI Energy Meter 480 V AC/CT High Feature	1	6AG2134-6PA00-4CU0	--	U0
AI Energy Meter 480 V AC ST	1	6AG2134-6PA20-4BD0	CC00	D0

SIPLUS extreme RAIL analog inputs

Overview of BaseUnits

BaseUnit	PU	Article No.	CC codes for process terminals	CC codes for AUX terminals
BU type A0 • New load group (light) • 16 process terminals • With 10 AUX terminals	1	6AG2193-6BP20-4DA0	CC01 to CC05	CC71 to CC73
BU type A0 • New load group (light) • 16 process terminals • Without AUX terminals	1	6AG2193-6BP00-4DA0	CC01 to CC05	--
BU type A0 • Forwarding of load group (dark) • 16 process terminals • With 10 AUX terminals	1	6AG2193-6BP20-4BA0	CC01 to CC05	CC71 to CC73
BU type A0 • Forwarding of load group (dark) • 16 process terminals • Without AUX terminals	1	6AG2193-6BP00-4BA0	CC01 to CC05	--
BU type D0 • Forwarding of load group (dark) • 12 process terminals • Without AUX terminals	1	6AG2193-6BP00-4BD0	--	--
BU type U0 • New load group (light) • 16 process terminals • Without AUX terminals	1	6AG2193-6BP00-4DU0	CC00	--
BU type U0 • Forwarding of load group (dark) • 16 process terminals • Without AUX terminals	1	6AG2193-6BP00-4BU0	CC00	--

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Application

The measured values of analog sensors (current, voltage, resistance, temperature etc.) can be recorded and transferred to the higher-level controller via the analog input modules.

Design

Usable BaseUnits (BU)

BaseUnits with an appropriate number of terminals are available for single or multi-conductor connection.

All variants that correspond to the BU type of the I/O module used can be used as BaseUnits (see Selection and ordering data).

Load group formation

A light-colored BU separates the self-assembling, internal voltage buses (P1, P2, AUX) and thus opens a new load group. The supply voltage of a load group must be fed in at the light BU of this load group.

A dark BU forwards the supply voltage of the adjacent light BU on the left via the self-assembling voltage buses P1, P2 and AUX. A new infeed is therefore only required on the next light BU to the right. The setting of a further light BU is required whenever

- a new load group is to be formed (for example, for isolating the supply voltage from module groups) or
- the maximum current simultaneously required by the load group exceeds the permissible limit of 10 A.

Color identification of the terminals

The potentials at the terminals of the BaseUnit are defined by the inserted I/O module in each case. To prevent wiring faults, the potentials of the terminals can optionally be identified by means of module-specific color-coded labels. The color-coded label that matches the respective I/O module is defined by the color code CCxx of the I/O module. This color code is also printed on the front of the module.

In BaseUnits with the additional ten internally jumpered AUX terminals or 2x5 additional terminals, these can also be identified with color-coded labels. For the ten AUX terminals, color-coded labels are available in red, blue, and yellow/green.

Labeling

Labeling strips

Labeling strips can be inserted on the front of the interface modules or I/O modules and individually labeled by means of STEP7, macros, etc. No special additional holder is required. If required, they can be easily replaced with the component.

Equipment labeling plates

Equipment labeling plates enable the equipment to be easily identified (e.g. compliant with EN 81346). They are easily plugged onto the required component (interface modules, I/O modules and BaseUnits) and when required, they can be easily replaced with the component.

The following labeling components are available:

Film labeling strips, light-gray, roll with 500 strips, perforated, for thermal transfer printers

- Film labeling strips, yellow, roll with 500 strips, perforated, for thermal transfer printers
- Card labeling strips (180 g/m^2), light gray, DIN A4 sheets with 100 strips each, perforated, for laser printer
- Card labeling strips (180 g/m^2), yellow, DIN A4 sheets with 100 strips each, perforated, for laser printer
- Equipment labeling plates, white, ten sheets each with 16 labels, for thermal transfer card printers or labels

System-integrated shielded connection

For the space-saving and EMC-optimized connection of cable shields, a shield connection is available that is quick and easy to mount. This consists of one shield connection element that can be plugged onto the BaseUnit and one shield terminal for each module. The low-impedance connection to the functional ground (DIN rail) is achieved without any additional wiring by the user.

Technical specifications

Article number	**6AG2134-6GD01-1BA1** SIPLUS ET 200SP AI 4XI 2-/4-WIRE T1 RAIL	**6AG2134-6GD01-4BA1** SIPLUS ET 200SP AI 4XI 2-/4-WIRE TX RAIL	**6AG2134-6HD01-1BA1** SIPLUS ET 200SP AI 4XU/I 2-WIRE T1 RAIL	**6AG2134-6HD01-4BA1** SIPLUS ET 200SP AI 4XU/I 2-WIRE TX RAIL
General information				
Product type designation	AI 4xI 2-/4-wire ST	AI 4xI 2-/4-wire ST	AI 4x U/I 2-wire	AI 4x U/I 2-wire
Product function				
• Isochronous mode	No	No	No	No
• Measuring range scalable	No	No	No	No
Operating mode				
• Oversampling	No	No	No	No
• MSI	No	No	No	No
Supply voltage				
Rated value (DC)	24 V	24 V	24 V	24 V
Reverse polarity protection	Yes	Yes	Yes	Yes
Analog inputs				
Number of analog inputs	4; Differential inputs	4; > 60 °C max. 1x ±20 mA permissible	4; Differential inputs	4; > 60 °C max. 1x ±20 mA or 4x ±10 V permissible
permissible input voltage for voltage input (destruction limit), max.			30 V	30 V
permissible input current for current input (destruction limit), max.	50 mA	50 mA	50 mA	50 mA
Cycle time (all channels), min.	Sum of the basic conversion times and additional processing times (depending on the parameterization of the active channels)	Sum of the basic conversion times and additional processing times (depending on the parameterization of the active channels)	Sum of the basic conversion times and additional processing times (depending on the parameterization of the active channels)	Sum of the basic conversion times and additional processing times (depending on the parameterization of the active channels)
Input ranges (rated values), voltages				
• 0 to +10 V			Yes; 15 bit	Yes; 15 bit
• 1 V to 5 V			Yes; 15 bit	Yes; 15 bit
• -10 V to +10 V			Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• -5 V to +5 V			Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
Input ranges (rated values), currents				
• 0 to 20 mA	Yes; 16 bit incl. sign	Yes; 16 bit incl. sign	Yes; 15 bit	Yes; 15 bit
• -20 mA to +20 mA	Yes	Yes		
• 4 mA to 20 mA	Yes; 15 bit	Yes; 15 bit	Yes; 15 bit	Yes; 15 bit
Cable length				
• shielded, max.	1 000 m	1 000 m	1 000 m; 200 m for voltage measurement	1 000 m; 200 m for voltage measurement
Analog value generation for the inputs				
Integration and conversion time/resolution per channel				
• Resolution with overrange (bit including sign), max.	16 bit	16 bit	16 bit	16 bit
• Integration time, parameterizable	Yes	Yes	Yes	Yes
• Interference voltage suppression for interference frequency f1 in Hz	16.6 / 50 / 60 Hz	16.6 / 50 / 60 Hz	16.6 / 50 / 60 Hz	16.6 / 50 / 60 Hz
• Conversion time (per channel)	180 / 60 / 50 ms	180 / 60 / 50 ms	180 / 60 / 50 ms	180 / 60 / 50 ms
Smoothing of measured values				
• Number of smoothing levels	4; None; 4/8/16 times	4; None; 4/8/16 times	4; None; 4/8/16 times	4; None; 4/8/16 times
• parameterizable	Yes	Yes	Yes	Yes
Encoder				
Connection of signal encoders				
• for voltage measurement	No	No	Yes	Yes
• for current measurement as 2-wire transducer	Yes	Yes	Yes	Yes
- Burden of 2-wire transmitter, max.	650 Ω	650 Ω	650 Ω	650 Ω
• for current measurement as 4-wire transducer	Yes	Yes	No	No
Errors/accuracies				
Basic error limit (operational limit at 25 °C)				
• Voltage, relative to input range, (+/-)			0.3 %	0.3 %
• Current, relative to input range, (+/-)	0.3 %	0.3 %	0.3 %	0.3 %
Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency				
• Series mode interference (peak value of interference < rated value of input range), min.	70 dB	70 dB	70 dB	70 dB
• Common mode voltage, max.	10 V	10 V	10 V	10 V
• Common mode interference, min.	90 dB	90 dB	90 dB	90 dB

SIPLUS extreme RAIL analog inputs

Article number	6AG2134-6GD01-1BA1 SIPLUS ET 200SP AI 4XI 2-/4-WIRE T1 RAIL	6AG2134-6GD01-4BA1 SIPLUS ET 200SP AI 4XI 2-/4-WIRE TX RAIL	6AG2134-6HD01-1BA1 SIPLUS ET 200SP AI 4XU/I 2-WIRE T1 RAIL	6AG2134-6HD01-4BA1 SIPLUS ET 200SP AI 4XU/I 2-WIRE TX RAIL
Interrupts/diagnostics/status information				
Diagnostics function	Yes	Yes	Yes	Yes
Alarms				
• Diagnostic alarm	Yes	Yes	Yes	Yes
• Limit value alarm	No	No	No	No
Diagnoses				
• Monitoring the supply voltage	Yes	Yes	Yes	Yes
• Wire-break	Yes; at 4 to 20 mA	Yes; at 4 to 20 mA	Yes; at 4 to 20 mA	Yes; at 4 to 20 mA
• Short-circuit	Yes; 2-wire mode: Short-circuit of the encoder supply to ground or of an input to the encoder supply	Yes; 2-wire mode: Short-circuit of the encoder supply to ground or of an input to the encoder supply	Yes; with 1 to 5 V or 2-wire mode: Short-circuit of the encoder supply to ground or of an input to the encoder supply	Yes; with 1 to 5 V or 2-wire mode: Short-circuit of the encoder supply to ground or of an input to the encoder supply
• Group error	Yes	Yes	Yes	Yes
• Overflow/underflow	Yes	Yes	Yes	Yes
Diagnostics indication LED				
• Monitoring of the supply voltage (PWR-LED)	Yes; green LED	Yes; green LED	Yes; green LED	Yes; green LED
• Channel status display	Yes; green LED	Yes; green LED	Yes; green LED	Yes; green LED
• for channel diagnostics	No	No	No	No
• for module diagnostics	Yes; green/red LED	Yes; green/red LED	Yes; green/red LED	Yes; green/red LED
Potential separation				
Potential separation channels				
• between the channels and backplane bus	Yes	Yes	Yes	Yes
Standards, approvals, certificates				
Railway application				
• EN 50121-3-2	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support
Ambient conditions				
Ambient temperature during operation				
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost); start-up @ -30 °C	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost); start-up @ -30 °C	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155)	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155)	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)
• vertical installation, min.	-40 °C; = Tmin; startup @ -30 °C	-40 °C; = Tmin	-40 °C; = Tmin; startup @ -30 °C	-40 °C; = Tmin
• vertical installation, max.	50 °C; = Tmax	50 °C; = Tmax	50 °C; = Tmax	50 °C; = Tmax
Altitude during operation relating to sea level				
• Installation altitude above sea level, max.	2 000 m	2 000 m	2 000 m	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000m)

Article number	**6AG2134-6GD01-1BA1** SIPLUS ET 200SP AI 4XI 2-/4-WIRE T1 RAIL	**6AG2134-6GD01-4BA1** SIPLUS ET 200SP AI 4XI 2-/4-WIRE TX RAIL	**6AG2134-6HD01-1BA1** SIPLUS ET 200SP AI 4XU/I 2-WIRE T1 RAIL	**6AG2134-6HD01-4BA1** SIPLUS ET 200SP AI 4XU/I 2-WIRE TX RAIL
Relative humidity				
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance				
• Coolants and lubricants				
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems				
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN -2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *
- Against mechanical environmental conditions acc. to EN 60721-3-3	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Use on land craft, rail vehicles and special-purpose vehicles				
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN -2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *
- Against mechanical environmental conditions acc. to EN 60721-3-5	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
- against mechanical environmental conditions in agriculture acc. to ISO 15003	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Usage in industrial process technology				
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark				
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating				
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection	Yes; Type 1 protection	Yes; Type 1 protection	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A

SIPLUS extreme RAIL analog inputs

Article number	**6AG2134-6GD01-1BA1** SIPLUS ET 200SP AI 4XI 2-/4-WIRE T1 RAIL	**6AG2134-6GD01-4BA1** SIPLUS ET 200SP AI 4XI 2-/4-WIRE TX RAIL	**6AG2134-6HD01-1BA1** SIPLUS ET 200SP AI 4XU/I 2-WIRE T1 RAIL	**6AG2134-6HD01-4BA1** SIPLUS ET 200SP AI 4XU/I 2-WIRE TX RAIL
Dimensions				
Width	15 mm	15 mm	15 mm	15 mm
Height	73 mm	73 mm	73 mm	73 mm
Depth	58 mm	58 mm	58 mm	58 mm
Weights				
Weight, approx.	31 g	31 g	31 g	31 g
Other				
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Article number	**6AG2134-6GF00-4AA1** SIPLUS ET 200SP AI 8xI 2-/4-W BA TX RAIL	**6AG2134-6HB00-1CA1** SIPLUS ET 200SP AI 2XU/I 2/4W HF T1 RAIL	**6AG2134-6JF00-1CA1** SIPLUS ET 200SP AI 8XRTD/TC T1 RAIL	**6AG2134-6JD00-1CA1** SIPLUS ET 200SP AI 4xRTD/TC HF RAIL
General information				
Product type designation	AI 8xI 2-/4-wire BA	AI 2xU/I 2-4-wire HF	AI 8xRTD/TC 2-wire HF	AI 4xRTD/TC 2-/3-/4-wire HF
Product function • Isochronous mode • Measuring range scalable • Adjustment of measuring range	 No No	 Yes No	No	 No Yes
Operating mode • Oversampling • MSI	 No No	 No Yes	 No No	 No No
Supply voltage				
Rated value (DC)	24 V	24 V	24 V	24 V
Reverse polarity protection	Yes	Yes	Yes	Yes
Analog inputs				
Number of analog inputs • For current measurement	8; Single-ended 8	2; Differential inputs	8	4
permissible input voltage for voltage input (destruction limit), max.		30 V	30 V	30 V
permissible input current for current input (destruction limit), max.	50 mA	50 mA		
Constant measurement current for resistance-type transmitter, typ.			2 mA	0.7 mA; 1.7 mA for Cu10 sensors
Cycle time (all channels), min.	1 ms; per channel		Sum of the basic conversion times and additional processing times (depending on the parameterization of the active channels)	Sum of the basic conversion times and additional processing times (depending on the parameterization of the active channels); for line compensation in case of a three-wire connection, an additional cycle is necessary
Technical unit for temperature measurement adjustable			Yes; °C/°F/K	Yes; °C/°F/K
Analog input with oversampling		No		
Standardization of measured values		Yes		
Input ranges (rated values), voltages • 0 to +10 V • 1 V to 5 V • -1 V to +1 V • -10 V to +10 V • -250 mV to +250 mV • -5 V to +5 V • -50 mV to +50 mV • -80 mV to +80 mV		 Yes; 15 bit Yes; 15 bit Yes; 16 bit incl. sign Yes; 16 bit incl. sign	 Yes; 16 bit incl. sign Yes; 16 bit incl. sign Yes; 16 bit incl. sign Yes; 16 bit incl. sign	 Yes; 16 bit incl. sign Yes; 16 bit incl. sign Yes; 16 bit incl. sign Yes; 16 bit incl. sign
Input ranges (rated values), currents • 0 to 20 mA • -20 mA to +20 mA • 4 mA to 20 mA	 Yes Yes Yes	 Yes; 15 bit Yes; 16 bit incl. sign Yes; 15 bit		

Article number	**6AG2134-6GF00-4AA1** SIPLUS ET 200SP AI 8xI 2-/4-W BA TX RAIL	**6AG2134-6HB00-1CA1** SIPLUS ET 200SP AI 2XU/I 2/4W HF T1 RAIL	**6AG2134-6JF00-1CA1** SIPLUS ET 200SP AI 8XRTD/TC T1 RAIL	**6AG2134-6JD00-1CA1** SIPLUS ET 200SP AI 4xRTD/TC HF RAIL
Input ranges (rated values), thermocouples				
• Type B			Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• Type C			Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• Type E			Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• Type J			Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• Type K			Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• Type L			Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• Type N			Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• Type R			Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• Type S			Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• Type T			Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• Type U			Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• Type TXK/TXK(L) to GOST			Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
Input ranges (rated values), resistance thermometer				
• Cu 10				Yes; 16 bit incl. sign
• Ni 100			Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• Ni 1000			Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• LG-Ni 1000			Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• Ni 120			Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• Ni 200			Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• Ni 500			Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• Pt 100			Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• Pt 1000			Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• Pt 200			Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• Pt 500			Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
Input ranges (rated values), resistors				
• 0 to 150 ohms			Yes; 15 bit	Yes; 15 bit
• 0 to 300 ohms			Yes; 15 bit	Yes; 15 bit
• 0 to 600 ohms			Yes; 15 bit	Yes; 15 bit
• 0 to 3000 ohms			Yes; 15 bit	Yes; 15 bit
• 0 to 6000 ohms			Yes; 15 bit	Yes; 15 bit
• PTC			Yes; 15 bit	Yes; 15 bit
Thermocouple (TC)				
• Temperature compensation - parameterizable			Yes	Yes
Cable length				
• shielded, max.	200 m	1 000 m; 200 m for voltage measurement	200 m; 50 m with thermocouples	200 m; 50 m with thermocouples
Analog value generation for the inputs				
Integration and conversion time/resolution per channel				
• Resolution with overrange (bit including sign), max.	16 bit	16 bit	16 bit	16 bit
• Integration time, parameterizable	Yes	Yes	Yes	Yes
• Interference voltage suppression for interference frequency f1 in Hz	16.67 / 50 / 60 / 4 800 (16.67 / 50 / 60)	16.6 / 50 / 60 / 300 / 600 / 1 200 / 2 400 / 4 800	16.6 / 50 / 60 Hz	16.6 / 50 / 60 Hz
• Conversion time (per channel)	180 / 60 / 50 / 0.625 (67.5 / 22.5 / 18.75) ms		180 / 60 / 50 ms	180 / 60 / 50 ms
• Basic execution time of the module (all channels released)		1 ms		
Smoothing of measured values				
• Number of smoothing levels	4; None; 4/8/16 times	6; none; 2-/4-/8-/16-/32-fold	4; None; 4/8/16 times	4; None; 4/8/16 times
• parameterizable	Yes	Yes	Yes	Yes
Encoder				
Connection of signal encoders				
• for voltage measurement	No	Yes	Yes	Yes
• for current measurement as 2-wire transducer	Yes	Yes		
• Burden of 2-wire transmitter, max.	650 Ω	650 Ω		
• for current measurement as 4-wire transducer	Yes	Yes		
• for resistance measurement with two-wire connection			Yes	Yes
• for resistance measurement with three-wire connection			No	Yes
• for resistance measurement with four-wire connection			No	Yes
Errors/accuracies				
Basic error limit (operational limit at 25 °C)				
• Voltage, relative to input range, (+/-)		0.05 %; 0.1 % at SFU 4.8 kHz	0.05 %	0.05 %
• Current, relative to input range, (+/-)	0.3 %	0.05 %; 0.1 % at SFU 4.8 kHz		
• Resistance, relative to input range, (+/-)			0.05 %	0.05 %

SIPLUS extreme RAIL analog inputs

Article number	**6AG2134-6GF00-4AA1** SIPLUS ET 200SP AI 8xI 2-/4-W BA TX RAIL	**6AG2134-6HB00-1CA1** SIPLUS ET 200SP AI 2XU/I 2/4W HF T1 RAIL	**6AG2134-6JF00-1CA1** SIPLUS ET 200SP AI 8XRTD/TC T1 RAIL	**6AG2134-6JD00-1CA1** SIPLUS ET 200SP AI 4xRTD/TC HF RAIL
Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency				
• Series mode interference (peak value of interference < rated value of input range), min.	70 dB; With conversion time 67.5 / 22.5 / 18.75 ms: 40 dB		70 dB	70 dB
• Common mode voltage, max.		35 V	10 V	10 V
• Common mode interference, min.		90 dB	90 dB	90 dB
Isochronous mode				
Filtering and processing time (TCI), min.		800 µs		
Bus cycle time (TDP), min.		1 ms		
Interrupts/diagnostics/status information				
Diagnostics function	Yes	Yes	Yes	Yes
Alarms				
• Diagnostic alarm	Yes	Yes	Yes	Yes
• Limit value alarm	No	Yes; two upper and two lower limit values in each case	Yes; two upper and two lower limit values in each case	Yes; two upper and two lower limit values in each case
Diagnoses				
• Monitoring the supply voltage	Yes	Yes	Yes	Yes
• Wire-break	Yes; at 4 to 20 mA	Yes; Measuring range 4 to 20 mA only	Yes; channel by channel	Yes; channel by channel
• Short-circuit	Yes; Sensor supply to M; module by module	Yes; channel-by-channel, at 1 to 5 V or for short-circuit in encoder supply		
• Group error	Yes	Yes	Yes	Yes
• Overflow/underflow	Yes	Yes	Yes; channel by channel	Yes; channel by channel
Diagnostics indication LED				
• Monitoring of the supply voltage (PWR-LED)	Yes; green LED	Yes; green PWR LED	Yes; green PWR LED	Yes; green PWR LED
• Channel status display	Yes; green LED	Yes; green LED	Yes; green LED	Yes; green LED
• for channel diagnostics	No	Yes; red LED	Yes; red LED	Yes; red LED
• for module diagnostics	Yes; green/red DIAG LED	Yes; green/red DIAG LED	Yes; green/red DIAG LED	Yes; green/red DIAG LED
Potential separation				
Potential separation channels				
• between the channels and backplane bus	Yes	Yes	Yes	Yes
Standards, approvals, certificates				
Railway application				
• EN 50121-3-2	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT2, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT2, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support	Yes; Rail vehicles - verification on request

Article number	**6AG2134-6GF00-4AA1** SIPLUS ET 200SP AI 8xI 2-/4-W BA TX RAIL	**6AG2134-6HB00-1CA1** SIPLUS ET 200SP AI 2XU/I 2/4W HF T1 RAIL	**6AG2134-6JF00-1CA1** SIPLUS ET 200SP AI 8XRTD/TC T1 RAIL	**6AG2134-6JD00-1CA1** SIPLUS ET 200SP AI 4xRTD/TC HF RAIL
Ambient conditions				
Ambient temperature during operation				
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost); start-up @ -30 °C	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155); +70 °C continuously with configured slots to the left and right of the module (OT3, ST0 acc. to EN 50155)	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155); +70 °C continuously with configured slots to the left and right of the module (OT3, ST0 acc. to EN 50155)	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155); +70 °C continuously with configured slots to the left and right of the module (OT3, ST0 acc. to EN 50155)
• vertical installation, min.	-40 °C; = Tmin	-40 °C; = Tmin (incl. condensation/frost); start-up @ -30 °C	-40 °C; = Tmin	-40 °C; = Tmin
• vertical installation, max.	50 °C; = Tmax	50 °C; = Tmax	50 °C; = Tmax	50 °C; = Tmax
Altitude during operation relating to sea level				
• Installation altitude above sea level, max.	2 000 m	2 000 m	2 000 m	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity				
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance				
• Coolants and lubricants				
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems				
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *
- Against mechanical environmental conditions acc. to EN 60721-3-3	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Use on land craft, rail vehicles and special-purpose vehicles				
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *
- Against mechanical environmental conditions acc. to EN 60721-3-5	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
- against mechanical environmental conditions in agriculture acc. to ISO 15003	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	

SIPLUS extreme RAIL analog inputs

Article number	**6AG2134-6GF00-4AA1** SIPLUS ET 200SP AI 8xI 2-/4-W BA TX RAIL	**6AG2134-6HB00-1CA1** SIPLUS ET 200SP AI 2XU/I 2/4W HF T1 RAIL	**6AG2134-6JF00-1CA1** SIPLUS ET 200SP AI 8XRTD/TC T1 RAIL	**6AG2134-6JD00-1CA1** SIPLUS ET 200SP AI 4xRTD/TC HF RAIL
• Usage in industrial process technology				
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark				
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating				
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection	Yes; Type 1 protection	Yes; Type 1 protection	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A
Dimensions				
Width	15 mm	15 mm	15 mm	15 mm
Height	73 mm	73 mm	73 mm	73 mm
Depth	58 mm	58 mm	58 mm	58 mm
Weights				
Weight, approx.	31 g	32 g	32 g	
Other				
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Article number	**6AG2134-6PA20-4BD0** SIPLUS ET 200SP AI EMETER 480VAC TX RAIL
General information	
Product type designation	AI Energy Meter 480VAC ST
Product function	
• Voltage measurement	Yes
- with voltage transformer	Yes
• Current measurement	Yes
- without current transformer	No
- with current transformer	Yes
• Energy measurement	Yes
• Frequency measurement	Yes
• Power measurement	Yes
• Active power measurement	Yes
• Reactive power measurement	Yes
• I&M data	Yes; I&M0 to I&M3
• Isochronous mode	No
Engineering with	
• STEP 7 TIA Portal configurable/integrated from version	see entry ID: 109746275
Operating mode	
• cyclic measurement	Yes
• acyclic measurement	Yes
• Acyclic measured value access	Yes
• Fixed measured value sets	Yes
• Freely definable measured value sets	Yes
Installation type/mounting	
Mounting position	any

Article number	**6AG2134-6PA20-4BD0** SIPLUS ET 200SP AI EMETER 480VAC TX RAIL
Supply voltage	
Design of the power supply	Supply via voltage measurement channel L1
Rated value (AC)	AC 100 - 277 V
Line frequency	
• permissible range, lower limit	47 Hz
• permissible range, upper limit	63 Hz
Analog inputs	
Cycle time (all channels), typ.	50 ms; Time for consistent update of all measured and calculated values (cyclic und acyclic data)
Interrupts/diagnostics/status information	
Alarms	
• Diagnostic alarm	Yes
• Limit value alarm	Yes
• Hardware interrupt	Yes; Monitoring of up to 16 freely selectable process values (exceeding or undershooting of value)
Diagnostics indication LED	
• Monitoring of the supply voltage (PWR-LED)	Yes
• Channel status display	Yes; green LED
• for channel diagnostics	Yes; red Fn LED
• for module diagnostics	Yes; green/red DIAG LED
Integrated Functions	
Measuring functions	
• Measuring procedure for voltage measurement	TRMS
• Measuring procedure for current measurement	TRMS
• Type of measured value acquisition	seamless
• Curve shape of voltage	Sinusoidal or distorted
• Buffering of measured variables	Yes
• Parameter length	74 byte
• Bandwidth of measured value acquisition	2 kHz; Harmonics: 39 / 50 Hz, 32 / 60 Hz
Measuring range	
• Frequency measurement, min.	45 Hz
• Frequency measurement, max.	65 Hz
Measuring inputs for voltage	
• Measurable line voltage between phase and neutral conductor	277 V
• Measurable line voltage between the line conductors	480 V
• Measurable line voltage between phase and neutral conductor, min.	90 V
• Measurable line voltage between phase and neutral conductor, max.	293 V
• Measurable line voltage between the line conductors, min.	155 V
• Measurable line voltage between the line conductors, max.	508 V
• Internal resistance line conductor and neutral conductor	3.4 MΩ
• Power consumption per phase	20 mW
• Impulse voltage resistance 1,2/50µs	1 kV
• Measurement category for voltage measurement in accordance with IEC 61010-2-030	CAT II; CAT III in case of guaranteed protection level of 1.5 kV
Measuring inputs for current	
• measurable relative current (AC), min.	1 %; Relative to the secondary rated current 5 A
• measurable relative current (AC), max.	100 %; Relative to the secondary rated current 5 A
• Continuous current with AC, maximum permissible	5 A; at > +60 °C max. permissible current 1 A per phase
• Apparent power consumption per phase for measuring range 5 A	0.6 VA
• Rated value short-time withstand current restricted to 1 s	100 A
• Input resistance measuring range 0 to 5 A	25 mΩ; At the terminal
• Surge strength	10 A; for 1 minute
• Zero point suppression	Parameterizable: 2 ... 250 mA, default 50 mA
Accuracy class according to IEC 61557-12	
• Measured variable voltage	0,2
• Measured variable current	0,2
• Measured variable apparent power	0.5
• Measured variable active power	0.5
• Measured variable reactive power	1
• Measured variable power factor	0.5
• Measured variable active energy	0.5
• Measured variable reactive energy	1
• Measured variable neutral current	0.5; calculated
• Measured variable phase angle	±1 °; not covered by IEC 61557-12
• Measured variable frequency	0.05
Potential separation	
Potential separation channels	
• between the channels and backplane bus	Yes; 3 700V AC (type test) CAT III

SIPLUS extreme RAIL analog inputs

Article number	**6AG2134-6PA20-4BD0** SIPLUS ET 200SP AI EMETER 480VAC TX RAIL
Standards, approvals, certificates	
Railway application	
• EN 50121-3-2	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV3; pollution degree PD2; UNm = 277/480 V AC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)
• vertical installation, min.	-40 °C; = Tmin
• vertical installation, max.	50 °C; = Tmax
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity	
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance	
• Coolants and lubricants	
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems	
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *
- Against mechanical environmental conditions acc. to EN 60721-3-3	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Use on land craft, rail vehicles and special-purpose vehicles	
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *
- Against mechanical environmental conditions acc. to EN 60721-3-5	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
- against mechanical environmental conditions in agriculture acc. to ISO 15003	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Usage in industrial process technology	
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark	
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating	
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A
Dimensions	
Width	20 mm
Height	73 mm
Depth	58 mm
Weights	
Weight, approx.	45 g
Other	
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776
Data for selecting a current transformer	
• Burden power current transformer x/1A, min.	As a function of cable length and cross section, see device manual
• Burden power current transformer x/5A, min.	As a function of cable length and cross section, see device manual

Selection and ordering data

Version	Article No.
SIPLUS extreme RAIL analog inputs Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic	
SIPLUS ET 200SP AI 8xI 2-/4-W BA TX RAIL, BU type A0 or A1, color code CC01, 16-bit, ± 0.3 %; for areas with extreme exposure to environmental substances (conformal coating); Ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2134-6GF00-4AA1**
SIPLUS ET 200SP AI 4xI 2-/4-WIRE T1 RAIL, BU type A0 or A1, color code CC03; 16-bit, ±0.3%, for areas with extreme exposure to environmental substances (conformal coating); Ambient temperature -25 ... +55 °C (+70 °C for 10 min.)	**6AG2134-6GD01-1BA1**
SIPLUS ET 200SP AI 4xI 2-/4-WIRE TX RAIL, BU type A0 or A1, color code CC03, 16-bit, ±0.3%, for areas with extreme exposure to environmental substances (conformal coating); Ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2134-6GD01-4BA1**
SIPLUS ET 200SP AI 4xU/I 2-W ST T1 RAIL, BU type A0 or A1, color code CC03, 16-bit, ±0.3%, for areas with extreme exposure to environmental substances (conformal coating); Ambient temperature -25 ... +55 °C (+70 °C for 10 min.)	**6AG2134-6HD01-1BA1**
SIPLUS ET 200SP AI 4xU/I 2-W ST TX RAIL, BU type A0 or A1, color code CC03, 16-bit, ±0.3%, for areas with extreme exposure to environmental substances (conformal coating); Ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2134-6HD01-4BA1**
SIPLUS ET 200SP AI 2XU/I 2/4W HF T1 RAIL, BU type A0 or A1, color code CC05, for areas with extreme exposure to environmental substances (conformal coating); Ambient temperature -25 ... +60 °C (+70 °C for 10 min.)	**6AG2134-6HB00-1CA1**
SIPLUS ET 200SP AI 4xRTD/TC HF RAIL OT2, BU type A0 or A1, color code CC00; 16-bit, ±0.1%, scalable measuring range, for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +60 °C (+70 °C for 10 min.)	**6AG2134-6JD00-1CA1**
SIPLUS ET 200SP AI 8xRTD/TC HF T1 RAIL, BU type A0 or A1, color code CC00; 16-bit, ±0.1%, scalable measuring range, for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -25 ... +60 °C (+70 °C for 10 min.)	**6AG2134-6JF00-1CA1**
SIPLUS ET 200SP AI Energy Meter 480VAC TX RAIL, BU type D0; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2134-6PA20-4BD0**
Suitable SIPLUS extreme RAIL BaseUnits, type A0	
SIPLUS ET 200SP BU15-P16+A0+2D TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A); for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP00-4DA0**
SIPLUS ET 200SP BU15-P16+A0+2B TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP00-4BA0**
SIPLUS ET 200SP BU15-P16+A10+2D TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A); for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP20-4DA0**
SIPLUS ET 200SP BU15-P16+A10+2B TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP20-4BA0**

*** You can order this quantity or a multiple thereof.**

SIPLUS extreme RAIL analog inputs

Version	Article No.
Suitable SIPLUS extreme RAIL BaseUnits, type D0	
SIPLUS ET 200SP BU20-P12+A0+0B TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type D0; BaseUnit with 12 push-in terminals, without AUX terminals, bridged to the left; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP00-4BD0**
Suitable SIPLUS extreme RAIL BaseUnits, type U0	
SIPLUS ET 200SP BU20-P16+A0+2B TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type U0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group	**6AG2193-6BP00-4BU0**
SIPLUS ET 200SP BU20-P16+A0+2D TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type U0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A)	**6AG2193-6BP00-4DU0**
Accessories	
SIPLUS Mounting Kit ET 200SP Mounting accessories for use with increased mechanical vibration and shock loads.	**6AG1193-6AA00-0AA0**

*** You can order this quantity or a multiple thereof.**

Overview

- 2 and 4-channel analog output (AQ) modules
- Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic

For different requirements, the analog output modules offer:

- Function classes Standard and High Speed
- BaseUnits for single or multiple-conductor connection with automatic slot coding
- Potential distributor modules for system-integrated expansion with potential terminals
- Individual system-integrated load group formation with self-assembling voltage distribution bars (a separate power module is no longer required for ET 200SP)
- Option for connecting current and voltage actuators
- Clear labeling on front of module
- LEDs for diagnostics, status, supply voltage and faults
- Electronically readable and non-volatile writable rating plate (I&M data 0 to 3)
- Extended functions and additional operating modes in some cases
  - Oversampling operating mode (n-fold equidistant output of an analog value within one PN cycle and thus the precisely timed output of an analog value or a sequence of analog values)
  - Isochronous mode (simultaneous equidistant output of analog values)
  - Output of substitute value in the event of interruptions to communication (shutdown, output adjustable substitute value, or keep last value)
  - Calibration during runtime
  - Re-parameterization during operation
  - Firmware update
  - Diagnostics of wire break, short circuit, overflow, underflow
  - Value status (optional binary validity information of the analog value status in the process image)
  - Supports the PROFIenergy profile
- Optional accessories
  - Labeling strips (film or card)
  - Equipment labeling plate
  - Color-coded label with module-specific CC code
  - Shielding terminal

A quick and clear comparison of the functions of the AQ modules is offered by the TIA Selection Tool.

Overview of analog output modules

Analog output	PU	Article No.	CC code	BU type
AQ 4 x U/I ST	1	6AG2135-6HD00-4BA1	CC00	A0, A1
AQ 2xU/I HS With two operating modes: • High-speed isochronous AQ • Oversampling	1	6AG2135-6HB00-1DA1	CC00	A0, A1

Overview of BaseUnits

BaseUnit	PU	Article No.	CC codes for process terminals	CC codes for AUX terminals
BU type A0 • New load group (light) • 16 process terminals • With 10 AUX terminals	1	6AG2193-6BP20-4DA0	CC01 to CC05	CC71 to CC73
BU type A0 • New load group (light) • 16 process terminals • Without AUX terminals	1	6AG2193-6BP00-4DA0	CC01 to CC05	--
BU type A0 • Forwarding of load group (dark) • 16 process terminals • With 10 AUX terminals	1	6AG2193-6BP20-4BA0	CC01 to CC05	CC71 to CC73
BU type A0 • Forwarding of load group (dark) • 16 process terminals • Without AUX terminals	1	6AG2193-6BP00-4BA0	CC01 to CC05	--

Application

The analog output modules enable analog actuators (proportional valves, drives, etc.) to be controlled.

SIPLUS extreme RAIL analog outputs

Design

Usable BaseUnits (BU)

BaseUnits with an appropriate number of terminals are available for single or multi-conductor connection.

All variants that correspond to the BU type of the I/O module used can be used as BaseUnits (see Selection and ordering data).

Load group formation

A light-colored BU separates the self-assembling, internal voltage buses (P1, P2, AUX) and thus opens a new load group. The supply voltage of a load group must be fed in at the light BU of this load group.

A dark BU forwards the supply voltage of the adjacent light BU on the left via the self-assembling voltage buses P1, P2 and AUX. A new infeed is therefore only required on the next light BU to the right. The setting of a further light BU is required whenever

- a new load group is to be formed (for example, for isolating the supply voltage from module groups) or
- the maximum current simultaneously required by the load group exceeds the permissible limit of 10 A.

Color identification of the terminals

The potentials at the terminals of the BaseUnit are defined by the inserted I/O module in each case. To prevent wiring faults, the potentials of the terminals can optionally be identified by means of module-specific color-coded labels. The color-coded label that matches the respective I/O module is defined by the color code CCxx of the I/O module. This color code is also printed on the front of the module.

In BaseUnits with the additional ten internally jumpered AUX terminals, these can also be identified with color-coded labels. For the ten AUX terminals, color-coded labels are available in red, blue, and yellow/green.

Labeling

Labeling strips

Labeling strips can be inserted on the front of the interface modules or I/O modules and individually labeled via STEP 7, macros, etc. No special additional holder is required. If required, they can be easily replaced with the component.

Equipment labeling plates

Equipment labeling plates enable the equipment to be easily identified (e.g. compliant with EN 81346). They are easily plugged onto the required component (interface modules, I/O modules and BaseUnits) and when required, they can be easily replaced with the component.

The following labeling components are available:

- Film labeling strips, light-gray, roll with 500 strips, perforated, for thermal transfer printers
- Film labeling strips, yellow, roll with 500 strips, perforated, for thermal transfer printers
- Card labeling strips (180 g/m^2), light gray, DIN A4 sheets with 100 strips each, perforated, for laser printer
- Card labeling strips (180 g/m^2), yellow, DIN A4 sheets with 100 strips each, perforated, for laser printer
- Equipment labeling plates, white, ten sheets each with 16 labels, for thermal transfer card printers or labels

Technical specifications

Article number	**6AG2135-6HD00-4BA1** SIPLUS ET 200SP AQ 4XU/I ST TX RAIL	**6AG2135-6HB00-1DA1** SIPLUS ET 200SP AQ 2x U/I HS RAIL
General information		
Product type designation	AQ 4xU/I ST	AQ 2xU/I HS
Product function • Isochronous mode • Output range scalable	 No No	 Yes
Operating mode • Oversampling • MSO	 No No	 Yes; 2 channels per module No
Supply voltage		
Rated value (DC)	24 V	24 V
Reverse polarity protection	Yes	Yes
Analog outputs		
Number of analog outputs	4; > +60 °C max. 2x ±10 V permissible	2
Cycle time (all channels), min.	5 ms	125 µs
Analog output with oversampling • Values per cycle, max. • Resolution, min.	No	Yes 16 45 µs; (2 channels), 35 µs (1 channel)
Output ranges, voltage • 0 to 10 V • 1 V to 5 V • -5 V to +5 V • -10 V to +10 V	 Yes; 15 bit Yes; 13 bit Yes; 15 bit incl. sign Yes; 16 bit incl. sign	 Yes; 15 bit Yes; 13 bit Yes; 15 bit incl. sign Yes; 16 bit incl. sign
Output ranges, current • 0 to 20 mA • -20 mA to +20 mA • 4 mA to 20 mA	 Yes; 15 bit Yes; 16 bit incl. sign Yes; 14 bit	 Yes; 15 bit Yes; 16 bit incl. sign Yes; 14 bit
Connection of actuators • for voltage output two-wire connection • for voltage output four-wire connection • for current output two-wire connection	 Yes Yes Yes	 Yes Yes Yes

Article number	**6AG2135-6HD00-4BA1** SIPLUS ET 200SP AQ 4XU/I ST TX RAIL	**6AG2135-6HB00-1DA1** SIPLUS ET 200SP AQ 2x U/I HS RAIL
Load impedance (in rated range of output)		
• with voltage outputs, min.	2 kΩ	2 kΩ
• with voltage outputs, capacitive load, max.	1 µF	1 µF
• with current outputs, max.	500 Ω	500 Ω
• with current outputs, inductive load, max.	1 mH	1 mH
Cable length		
• shielded, max.	1 000 m; 200 m for voltage output	1 000 m; 200 m for voltage output
Analog value generation for the outputs		
Integration and conversion time/resolution per channel		
• Resolution with overrange (bit including sign), max.	16 bit	16 bit
Settling time		
• for resistive load	0.1 ms	0.05 ms
• for capacitive load	1 ms	0.05 ms; Max. 47 nF and 20 m cable length
• for inductive load	0.5 ms	0.05 ms
Errors/accuracies		
Basic error limit (operational limit at 25 °C)		
• Voltage, relative to output range, (+/-)	0.3 %	0.1 %
• Current, relative to output range, (+/-)	0.3 %	0.1 %
Isochronous mode		
Execution and activation time (TCO), min.		70 µs
Bus cycle time (TDP), min.		125 µs
Interrupts/diagnostics/status information		
Diagnostics function	Yes	Yes
Substitute values connectable	Yes	Yes
Alarmvs		
• Diagnostic alarm	Yes	Yes
Diagnoses		
• Monitoring the supply voltage	Yes	Yes
• Wire-break	Yes	Yes; channel-by-channel, only for output type "current"
• Short-circuit	Yes	Yes; channel-by-channel, only for output type "voltage"
• Group error	Yes	Yes
• Overflow/underflow	Yes	Yes
Diagnostics indication LED		
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED	Yes; green PWR LED
• Channel status display	Yes; green LED	Yes; green LED
• for channel diagnostics	No	Yes; red LED
• for module diagnostics	Yes; green/red DIAG LED	Yes; green/red DIAG LED
Potential separation		
Potential separation channels		
• between the channels and backplane bus	Yes	Yes
Standards, approvals, certificates		
Railway application		
• EN 50121-3-2	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT2, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support	Yes; Rail vehicles - verification on request
Ambient conditions		
Ambient temperature during operation		
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155); +70 °C continuously with configured slots to the left and right of the module (OT3, ST0 acc. to EN 50155)
• vertical installation, min.	-40 °C; = Tmin	-40 °C; = Tmin (incl. condensation/frost)
• vertical installation, max.	50 °C; = Tmax	50 °C; = Tmax

SIPLUS extreme RAIL analog outputs

Article number	**6AG2135-6HD00-4BA1** SIPLUS ET 200SP AQ 4XU/I ST TX RAIL	**6AG2135-6HB00-1DA1** SIPLUS ET 200SP AQ 2x U/I HS RAIL
Altitude during operation relating to sea level		
• Installation altitude above sea level, max.	2 000 m	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity		
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance		
• Coolants and lubricants		
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems		
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *
- Against mechanical environmental conditions acc. to EN 60721-3-3	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Use on land craft, rail vehicles and special-purpose vehicles		
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *
- Against mechanical environmental conditions acc. to EN 60721-3-5	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
- against mechanical environmental conditions in agriculture acc. to ISO 15003	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	
• Usage in industrial process technology		
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark		
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating		
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A
Dimensions		
Width	15 mm	15 mm
Height	73 mm	73 mm
Depth	58 mm	58 mm
Weights		
Weight, approx.	31 g	31 g
Other		
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

Version	Article No.
SIPLUS extreme RAIL analog outputs	
Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic	
SIPLUS ET 200SP AQ 4XU/I ST TX RAIL, BU type A0 or A1, color code CC00; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2135-6HD00-4BA1**
SIPLUS ET 200SP AQ 2XU/I HS RAIL OT2, BU type A0 or A1, color code CC00; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2135-6HB00-1DA1**
Suitable SIPLUS extreme RAIL BaseUnits, type A0	
SIPLUS ET 200SP BU15-P16+A0+2D TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A); for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP00-4DA0**
SIPLUS ET 200SP BU15-P16+A0+2B TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP00-4BA0**
SIPLUS ET 200SP BU15-P16+A10+2D TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A); for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP20-4DA0**
SIPLUS ET 200SP BU15-P16+A10+2B TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP20-4BA0**
Accessories	
SIPLUS Mounting Kit ET 200SP Mounting accessories for use with increased mechanical vibration and shock loads.	**6AG1193-6AA00-0AA0**

*** You can order this quantity or a multiple thereof.**

Overview

Technical properties

- Counter module for ET 200SP
- Interfaces:
  - 24 V encoder signals A, B and N from P, M or push-pull-switching encoders and sensors
  - 24 V encoder supply output, short-circuit proof
  - 3 digital inputs for controlling the count operation, for saving or for setting the count value
  - 2 digital outputs for fast reactions regardless of the counter status or measured value
- Counting frequency 200 kHz (800 kHz with quadruple evaluation)
- Counting range: +/- 31 bits
- Measurement function
- Parameterizable hardware interrupts
- Parameterizable input filters for suppressing interferences at sensor and digital inputs

Supported types of encoders/signals

- 24 V incremental encoder with and without signal N
- 24 V pulse encoder with direction signal
- 24 V pulse encoder without direction signal
- 24 V pulse encoder for pulse up and down respectively

Supported system functions

- Isochronous mode
- Firmware update
- Identification data I&M

Application

In particular, the TM Count 1x24V counter module detects high-speed signals with high frequencies and returns the counter reading and the current speed to the control. The counter control ensures a precise counter result and rapid response in the system via integrated digital input and output signals. Comprehensive parameterization options provide optimum adaptation to the task at hand and reduce control load.

In particular, the TM Count 1x24V counter module is suitable for position detection for HTL incremental encoders for use with Motion Control technology objects of the SIMATIC S7-1500 Advanced Controller.

Design

Suitable BaseUnits

The standard BaseUnits Type A0 of ET 200SP are available for connection. The individual signals of the counter module are connected to the appropriate terminals.

A light BaseUnit opens a new load group. The supply voltage must be fed in via this BaseUnit. The first BaseUnit next to the interface module must always be a light BaseUnit.

A dark BaseUnit forwards the supply voltage of the adjacent light BaseUnit on the left via self-assembling voltage buses. A new infeed is therefore only required on the next light BaseUnit to the right.

All variants that correspond to BaseUnit type A0 can be used as BaseUnits.

System-integrated shield connection

For the space-saving and EMC-optimized connection of cable shields, a shield connection is available that is quick and easy to mount. This consists of one shield connection element that can be plugged onto the BaseUnit and one shield terminal for each module. The low-impedance connection to functional ground (DIN rail) is carried out by the user and requires no additional wiring.

Technical specifications

Article number	**6AG2138-6AA01-1BA0** SIPLUS ET 200SP TM COUNT 1X24V T1 RAIL
General information	
Product type designation	TM Count 1x24V
Product function • I&M data • Isochronous mode	 Yes; I&M0 to I&M3 Yes
Supply voltage	
Load voltage L+ • Rated value (DC) • Reverse polarity protection	 24 V Yes
Encoder supply	
Number of outputs	1
24 V encoder supply • 24 V • Short-circuit protection • Output current, max.	 Yes; L+ (-0.8 V) Yes; electronic/thermal 300 mA

Article number	**6AG2138-6AA01-1BA0** SIPLUS ET 200SP TM COUNT 1X24V T1 RAIL
Digital inputs	
Number of digital inputs	3
Digital inputs, parameterizable	Yes
Input characteristic curve in accordance with IEC 61131, type 3	Yes
Digital input functions, parameterizable	
• Gate start/stop	Yes
• Capture	Yes
• Synchronization	Yes
• Freely usable digital input	Yes
Input voltage	
• Rated value (DC)	24 V
• for signal "0"	-5 ... +5 V
• for signal "1"	+11 to +30V
• permissible voltage at input, min.	-30 V; -5 V continuous, -30 V brief reverse polarity protection
• permissible voltage at input, max.	30 V
Input current	
• for signal "1", typ.	2.5 mA
Input delay (for rated value of input voltage)	
• for standard inputs	
- parameterizable	Yes; none / 0.05 / 0.1 / 0.4 / 0.8 / 1.6 / 3.2 / 12.8 / 20 ms
- at "0" to "1", min.	6 µs; for parameterization "none"
- at "1" to "0", min.	6 µs; for parameterization "none"
• for technological functions	
- parameterizable	Yes
Digital outputs	
Type of digital output	Transistor
Number of digital outputs	2
Digital outputs, parameterizable	Yes
Short-circuit protection	Yes; electronic/thermal
Limitation of inductive shutdown voltage to	L+ (-53 V)
Controlling a digital input	Yes
Digital output functions, parameterizable	
• Switching tripped by comparison values	Yes
• Freely usable digital output	Yes
Switching capacity of the outputs	
• with resistive load, max.	0.5 A; Per digital output
• on lamp load, max.	5 W
Load resistance range	
• lower limit	48 Ω
• upper limit	12 kΩ
Output voltage	
• for signal "1", min.	23.2 V; L+ (-0.8 V)
Output current	
• for signal "1" rated value	0.5 A; Per digital output
• for signal "0" residual current, max.	0.5 mA
Output delay with resistive load	
• "0" to "1", max.	50 µs
• "1" to "0", max.	50 µs
Switching frequency	
• with resistive load, max.	10 kHz
• with inductive load, max.	0.5 Hz; Acc. to IEC 60947-5-1, DC-13; observe derating curve
• on lamp load, max.	10 Hz
Total current of the outputs	
• Current per module, max.	1 A
Encoder	
Connectable encoders	
• 2-wire sensor	Yes
- permissible quiescent current (2-wire sensor), max.	1.5 mA
Encoder signals, incremental encoder (asymmetrical)	
• Input voltage	24 V
• Input frequency, max.	200 kHz
• Counting frequency, max.	800 kHz; with quadruple evaluation
• Cable length, shielded, max.	600 m; depending on input frequency, encoder and cable quality; max. 50 m at 200 kHz
• Signal filter, parameterizable	Yes
• Incremental encoder with A/B tracks, 90° phase offset	Yes
• Incremental encoder with A/B tracks, 90° phase offset and zero track	Yes
• pulse encoder	Yes
• pulse encoder with direction	Yes
• pulse encoder with one impulse signal per count direction	Yes
Interface types	
• Source/sink input	Yes
• Input characteristic curve in accordance with IEC 61131, type 3	Yes

Article number	**6AG2138-6AA01-1BA0** SIPLUS ET 200SP TM COUNT 1X24V T1 RAIL
Interrupts/diagnostics/status information	
Substitute values connectable	Yes; Parameterizable
Alarms	
• Diagnostic alarm	Yes
• Hardware interrupt	Yes
Diagnoses	
• Monitoring the supply voltage	Yes
• Wire-break	Yes
• Short-circuit	Yes
• A/B transition error at incremental encoder	Yes
• Group error	Yes
Diagnostics indication LED	
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED
• Channel status display	Yes; green LED
• for module diagnostics	Yes; green/red DIAG LED
• Status indicator forward counting (green)	Yes
• Status indicator backward counting (green)	Yes
Integrated Functions	
Counter	Yes
• Number of counters	1
• Counting frequency, max.	800 kHz; with quadruple evaluation
Fast mode	Yes
Counting functions	
• Can be used with TO High_Speed_Counter	Yes
• Continuous counting	Yes
• Counter response parameterizable	Yes
• Hardware gate via digital input	Yes
• Software gate	Yes
• Event-controlled stop	Yes
• Synchronization via digital input	Yes
• Counting range, parameterizable	Yes
Comparator	
• Number of comparators	2
• Direction dependency	Yes
• Can be changed from user program	Yes
Position detection	
• Incremental acquisition	Yes
• Suitable for S7-1500 Motion Control	Yes
Measuring functions	
• Measuring time, parameterizable	Yes
• Dynamic measurement period adjustment	Yes
• Number of thresholds, parameterizable	2
Measuring range	
• Frequency measurement, min.	0.04 Hz
• Frequency measurement, max.	800 kHz
• Cycle duration measurement, min.	1.25 µs
• Cycle duration measurement, max.	25 s
Accuracy	
• Frequency measurement	100 ppm; depending on measuring interval and signal evaluation
• Cycle duration measurement	100 ppm; depending on measuring interval and signal evaluation
• Velocity measurement	100 ppm; depending on measuring interval and signal evaluation
Potential separation	
Potential separation channels	
• between the channels and backplane bus	Yes
Standards, approvals, certificates	
Suitable for safety functions	No
Railway application	
• EN 50121-3-2	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support

Article number	**6AG2138-6AA01-1BA0** SIPLUS ET 200SP TM COUNT 1X24V T1 RAIL
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155); +70 °C continuously with configured slots to the left and right of the module (OT3, ST0 acc. to EN 50155)
• vertical installation, min.	-40 °C; = Tmin
• vertical installation, max.	50 °C; = Tmax
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity	
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance	
• Coolants and lubricants	
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems	
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *
- Against mechanical environmental conditions acc. to EN 60721-3-3	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Use on land craft, rail vehicles and special-purpose vehicles	
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *
- Against mechanical environmental conditions acc. to EN 60721-3-5	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
- against mechanical environmental conditions in agriculture acc. to ISO 15003	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Usage in industrial process technology	
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark	
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating	
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A
Decentralized operation	
to SIMATIC S7-300	Yes
to SIMATIC S7-400	Yes
to SIMATIC S7-1200	Yes
to SIMATIC S7-1500	Yes
to standard PROFIBUS master	Yes
to standard PROFINET controller	Yes
Dimensions	
Width	15 mm
Height	73 mm
Depth	58 mm
Weights	
Weight, approx.	45 g
Other	
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

Version	Article No.
SIPLUS ET 200SP TM COUNT 1X24V T1 RAIL counter module Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic With one channel, max. 200 kHz; for 24 V encoder, BU type A0, color code CC00; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -25 ... +55 °C (+70 °C for 10 min.)	**6AG2138-6AA01-1BA0**
Suitable SIPLUS extreme RAIL BaseUnits, type A0	
SIPLUS ET 200SP BU15-P16+A0+2D TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A); for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP00-4DA0**
SIPLUS ET 200SP BU15-P16+A0+2B TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP00-4BA0**
SIPLUS ET 200SP BU15-P16+A10+2D TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A); for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP20-4DA0**
SIPLUS ET 200SP BU15-P16+A10+2B TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP20-4BA0**
Accessories	
SIPLUS Mounting Kit ET 200SP Mounting accessories for use with increased mechanical vibration and shock loads.	**6AG1193-6AA00-0AA0**

*** You can order this quantity or a multiple thereof.**

Overview

- 2-channel pulse output module for SIPLUS ET 200SP
- Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic
- Operating modes:
  - Single pulse with defined length
  - Pulse chain with defined number of pulses
  - Pulse width modulation (with flexible ON period, optional current control and dither function)
  - PWM signal for controlling a DC motor
  - On and OFF delay; rising and falling edge can be delayed separately to the microsecond
  - Frequency output with defined output frequency
- Hardware:
  - 2 24V channels, 2A output current can be switched in parallel to boost performance to 4A of output current
  - Switching frequencies to 10 kHz; at reduced output current to 0.1 A up to 100 kHz
  - Push/pull output driver for especially steep edges at the outputs
  - Polarity change in DC motor operation for direction reversal
  - 1 high-speed 24 V digital input per channel with parameterizable input delay from 4 µs
- Channel functions:
  - HW enable;
    Start of signal output with the onboard digital input
  - Parameterizable ON delay;
    for precise deceleration between the HW enable and the start of output
  - Current measurement in the operating modes pulse-width modulation and pulse chain;
    enables control of the output current mean value over a period. Temperature influences can thus be balanced to the resistance of the actuator.
  - Cyclic control of the respective main setpoint from the PLC in every operating mode;
    other values can be modified flexibly from the user program.
- Supported system functions:
  - Isochronous mode;
    enables precision-timed connection of the setpoint output to a higher-level controller
  - Firmware update
  - Identification data I&M

Application

A host of tasks can be solved with the pulse output module TM Pulse 2x24V.

- In the operating mode input/output delay, precisely adjustable, reproducible and extremely short response times can be implemented between an input and an output. Enabling of the response can be controlled flexibly from the CPU using the software enable bit.
- The operating mode pulse output allows precise proportioning by means of a pulse that can be specified to the microsecond.
- The operating mode pulse width modulation is suitable for controlling proportional valves without further amplification electronics. The integrated dither function overlays the setpoint, if required, with an oscillation that keeps the valve in motion and thus allows precise control of the valve position. The optional current control compensates for temperatures that would change the current in the valve.
- When operating with simple DC motors, setpoints of -100% to +100% can be specified, allowing the motor to be controlled with variable voltage in both directions.
- The pulse chain allows precise filling of number-dependent packaging
- If a higher current is required, both of the module's channels can be combined to allow a current of up to 4A.

Design

- 2 24 V channels each with up to 2 A of output current; Parallel switching of both channels to boost power up to 4 A of output current
- 1 high-speed 24 V digital input per channel with parameterizable input delay from 4 µs

Suitable BaseUnits

The ET 200SP type B1 BaseUnit is available for connection. The individual signals of the pulse output module are connected to the appropriate terminals.

The type B1 BaseUnit is a dark BaseUnit and forwards the supply voltage of the BaseUnit on the left to its neighbor on the right via self-assembling voltage busbars. The TM Pulse is supplied direct via the infeed terminals of the BaseUnit and is not connected to the neighboring modules.

Shield connection

Due to the high-speed input and output signals, a shielded cable and a low-impedance connection to function ground (DIN rail) are recommended. The type B1 BaseUnit does NOT offer an integrated connection to the DIN rail. Users must ensure correct shielding themselves. Please observe the information in the manual.

Accessories (not included in the scope of supply of the module)

- Labeling strips
- Equipment labeling plates

Function

Operating modes

- Single pulse with defined length
- Pulse chain with defined number of pulses
- Pulse width modulation with flexible ON period, optional current control and dither function (the dither function overlays the setpoint, if required, with an oscillation that keeps the valve in motion and thus allows precise control of the valve position).
- Control of a DC motor with a PWM signal and direction reversal
- ON and OFF delay; forwards the input signal to the output. The rising and falling edge can be delayed separately to the microsecond.
- Frequency output with defined output frequency

Hardware functions

- Switching frequencies to 10 kHz;
  at reduced output current to 0.1 A up to 100 kHz
- Push/pull output driver for especially steep edges at the outputs
- Polarity change in DC motor operation for direction reversal

Channel functions for flexible adaptation to the requirements of a machine and the respective sequence

- HW enable;
  Start of signal output with the onboard digital input
- Parameterizable ON delay;
  allows precise delay between the HW enable and the start of output
  Current measurement in the operating modes pulse-width modulation and pulse chain;
  enables control of the output current to the mean value over a period. Temperature influences can thus be balanced to the resistance of the actuator.
- The respective main setpoint in each operating mode is controlled cyclically by the PLC, and other values can be modified flexibly from the user program.

Supported system functions

- Isochronous mode enables precision-timed connection of the setpoint output to a higher-level controller
- Firmware update
- Identification data I&M

Technical specifications

Article number	**6AG2138-6DB00-1BB1** SIPLUS ET 200SP TM PULSE 2x24V T1 RAIL
General information	
Product type designation	TM Pulse 2x24 V
Product function • I&M data • Isochronous mode	 Yes; I&M 0 Yes
Supply voltage	
Load voltage L+ • Rated value (DC) • Short-circuit protection • Reverse polarity protection	 24 V Yes Yes; against destruction
Encoder supply	
Number of outputs	2; A common 24V encoder supply for both channels
24 V encoder supply • 24 V • Short-circuit protection • Output current, max.	 Yes; L+ (-0.8 V) Yes; per module, electronic 300 mA
Digital inputs	
Number of digital inputs	2; 1 per channel
Digital inputs, parameterizable	Yes
Input characteristic curve in accordance with IEC 61131, type 3	Yes
Digital input functions, parameterizable • Freely usable digital input • HW enable for digital output	 Yes Yes
Input voltage • Type of input voltage • Rated value (DC) • for signal "0" • for signal "1" • permissible voltage at input, min. • permissible voltage at input, max.	 DC 24 V -30 to +5 V +11 to +30V -30 V 30 V
Input current • for signal "1", typ.	 2.5 mA
Input delay (for rated value of input voltage) • for standard inputs - parameterizable - at "0" to "1", min. - at "1" to "0", min.	 Yes; none / 0.05 / 0.1 / 0.4 / 0.8 / 1.6 / 3.2 / 12.8 / 20 ms 4 µs; for parameterization "none" 4 µs; for parameterization "none"
Digital outputs	
Type of digital output	P- and M-switching
Number of digital outputs	2; 1 per channel
Digital outputs, parameterizable	Yes
Short-circuit protection	Yes; electronic/thermal
Limitation of inductive shutdown voltage to	-0.8 V
Controlling a digital input	Yes

Article number	**6AG2138-6DB00-1BB1** SIPLUS ET 200SP TM PULSE 2x24V T1 RAIL
Digital output functions, parameterizable	
• Freely usable digital output	Yes
• PWM output	Yes
- Number, max.	2; 1 per channel
- Cycle duration, parameterizable	Yes; Max. 85 s
• Connection of a proportional valve	Yes
• Dithering	Yes
• Current measurement	Yes
• Current control	Yes
• Connection of a DC motor	Yes
• ON-delay	Yes
• OFF-delay	Yes
• Frequency output	Yes
• Pulse train	Yes
• Pulse output	Yes
Switching capacity of the outputs	
• with resistive load, max.	2 A
• on lamp load, max.	10 W; 1 W with High Speed output
Load resistance range	
• lower limit	12 Ω; 240 ohm with High Speed output
• upper limit	12 kΩ
Output voltage	
• Type of output voltage	DC
• for signal "0", max.	1 V
• for signal "1", min.	23.2 V; L+ (-0.8 V)
Output current	
• for signal "1" rated value	2 A; 0.1 A with High Speed output, observe derating
Output delay with resistive load	
• "0" to "1", typ.	0 µs; With High Speed output, 4.5 µs with Standard output
• "0" to "1", max.	0.8 µs; With High Speed output, 9 µs with Standard output
• "1" to "0", typ.	0 µs; With High Speed output, 4.5 µs with Standard output
• "1" to "0", max.	0.8 µs; With High Speed output, 9 µs with Standard output
Parallel switching of two outputs	
• for uprating	Yes
Switching frequency	
• with resistive load, max.	100 kHz; With High Speed output, 10 kHz with standard output
• with inductive load, max.	100 kHz; With High Speed output, 10 kHz with standard output
• on lamp load, max.	10 Hz
Total current of the outputs	
• Current per channel, max.	2 A
• Current per group, max.	4 A
• Current per module, max.	4 A
Isochronous mode	
Bus cycle time (TDP), min.	250 µs; with 1 channel configuration, 375 µs with 2 channel configuration
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Substitute values connectable	Yes; Parameterizable
Alarms	
• Diagnostic alarm	Yes
Diagnoses	
• Monitoring the supply voltage	Yes
• Short-circuit	Yes
Diagnostics indication LED	
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED
• Channel status display	Yes
• for module diagnostics	Yes; green/red DIAG LED
Integrated Functions	
Counter	No
Potential separation	
Potential separation channels	
• between the channels and backplane bus	Yes
Standards, approvals, certificates	
Suitable for safety functions	No
Railway application	
• EN 50121-3-2	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT2, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support

Article number	**6AG2138-6DB00-1BB1** SIPLUS ET 200SP TM PULSE 2x24V T1 RAIL
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155); +70 °C continuously with configured slots to the left and right of the module (OT3, ST0 acc. to EN 50155)
• vertical installation, min.	-40 °C; = Tmin
• vertical installation, max.	50 °C; = Tmax
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity	
• With condensation, tested in accordance with IEC -2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance	
• Coolants and lubricants	
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems	
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *
- Against mechanical environmental conditions acc. to EN 60721-3-3	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Use on land craft, rail vehicles and special-purpose vehicles	
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *
- Against mechanical environmental conditions acc. to EN 60721-3-5	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
- against mechanical environmental conditions in agriculture acc. to ISO 15003	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Usage in industrial process technology	
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark	
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating	
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A
Decentralized operation	
to SIMATIC S7-300	Yes
to SIMATIC S7-400	Yes
to SIMATIC S7-1200	Yes
to SIMATIC S7-1500	Yes
to standard PROFIBUS master	Yes
to standard PROFINET controller	Yes
Dimensions	
Width	20 mm
Height	73 mm
Depth	58 mm
Weights	
Weight, approx.	50 g
Other	
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

Version	Article No.
SIPLUS ET 200SP TM Pulse 2x24V T1 RAIL pulse output module Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic PWM and pulse output, 2 channels 2 A for proportional valves and DC motors; For areas with extreme exposure to environmental substances (conformal coating); ambient temperature -25 ... +55 °C (+70 °C for 10 min.)	**6AG2138-6DB00-1BB1**
Accessories	
Suitable SIPLUS extreme RAIL BaseUnits, type B1	
SIPLUS ET 200SP BU20-P12+A0+4B TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type B1; BaseUnit (dark) with 12 process terminals to the module; for continuing the load group; 1 unit	**6AG2193-6BP20-4BB1**
SIPLUS Mounting Kit ET 200SP Mounting accessories for use with increased mechanical vibration and shock loads.	**6AG1193-6AA00-0AA0**

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*** You can order this quantity or a multiple thereof.**

Overview

- CM PtP communications module;
  module for serial communication connections with RS232 and RS422 interfaces. RS485 for the Freeport, 3964(R), Modbus RTU, and USS protocols, max. 115.2 kbit/s, 2 KB frame length, 4 KB receive buffer.
- Protocols supported
  - Freeport: User-parameterizable frame format for universal communication
  - 3964(R) for improved transmission reliability
  - Modbus RTU master (requires instructions in SIMATIC S7)
  - Modbus RTU slave (requires instructions in SIMATIC S7)
  - USS, implemented through instructions
- Interface properties
  - RS232 with auxiliary signals
  - RS422 for full-duplex connections
  - RS485 for half-duplex and multi-point connections
  - Transfer rates from 300 to 115 200 bps for RS232 and RS422
  - Transfer rates from 300 to 25 000 bps for RS485
  - Frame lengths
    - In universal mode: 2 KB each in send and receive direction
    - In performance-optimized operation: 30 bytes in send direction, 24 bytes in receive direction
- Can be plugged into type A0 BaseUnits (BU) with automatic coding
- LED display for errors, operation, and supply voltage
- Communication display for sending and receiving
- Clear labeling on front of module
  - Plain text identification of the module type and function class
  - 2D matrix code (order and serial number)
  - Connection diagram
  - Color coding of the module type
  - Hardware and firmware version
  - Complete Article No.
- Optional labeling accessories
  - Labeling strips
  - Equipment labeling plate
- Optional system-integrated shield connection

Application

- Communications modules connect the PLC with an external communication partner to exchange data.
- Comprehensive parameterization options make it possible to adapt the PLC flexibly to the communication partner.
- Modbus RTU master creates a Modbus RTU network for up to 30 Modbus slaves.
- Lights and devices are controlled from the stage area with DMX512.
- Performance-optimized operation is particularly suitable for sending and receiving large numbers of short frames with multiple CM PtP in a station. Frames of max. 24 bytes in send direction and 30 bytes in receive direction are possible.

Design

Suitable BaseUnits

The standard BaseUnits of ET 200SP are available for connection. The individual signals of the serial connection are connected with appropriate terminals.

A light BaseUnit opens a new load group. The supply voltage must be fed in via this BaseUnit.

A dark BaseUnit forwards the supply voltage of the adjacent light BaseUnit on the left via self-assembling voltage buses. A new infeed is therefore only required on the next light BaseUnit to the right.

All variants that correspond to BaseUnit type A0 can be used as BaseUnits.

System-integrated shield connection

For the space-saving and EMC-optimized connection of cable shields, a shield connection is available that is quick and easy to mount. This consists of one shield connection element that can be plugged onto the BaseUnit and one shield terminal for each module. The low-impedance connection to functional ground (DIN rail) is carried out by the user and requires no additional wiring.

Technical specifications

Article number	**6AG2137-6AA01-4BA0** SIPLUS ET 200SP CM PTP RAIL
General information	
Product type designation	CM PtP
Product function	
• I&M data	Yes; I&M0 to I&M3
Supply voltage	
Rated value (DC)	24 V
Reverse polarity protection	Yes
1. Interface	
Interface types	
• RS 485	Yes
• RS 422	Yes
• RS 232	Yes
• Design of the connection	Push-in terminal
Interface types	
RS 232	
• Transmission rate, max.	115.2 kbit/s
• Cable length, max.	15 m
• RS 232 auxiliary signals	RTS, CTS, DTR, DSR, RI, DCD
RS 485	
• Transmission rate, max.	250 kbit/s
• Cable length, max.	1 200 m; 100 to 1200 m, depending on transmission speed
RS 422	
• Transmission rate, max.	115.2 kbit/s
• Cable length, max.	1 200 m
• 4-wire full duplex connection	Yes
• 4-wire multipoint connection	Yes
Protocols	
Integrated protocols	
• Freeport	
- Telegram length, max.	2 kbyte; performance mode: receive data max. 24 byte and send data max. 30 byte
- Bits per character	7 or 8
- Number of stop bits	1 or 2 bit
- Parity	None, even, odd, always 1, always 0, any
• 3964 (R)	
- Telegram length, max.	2 kbyte; performance mode: receive data max. 24 byte and send data max. 30 byte
- Bits per character	7 or 8
- Number of stop bits	1 or 2 bit
- Parity	None, even, odd, always 1, always 0, any
• Modbus RTU master	
- Address area	1 to 247, extended 1 to 65535
- Number of slaves, max.	32
• MODBUS RTU slave	
- Address area	1 to 247, extended 1 to 65535
Telegram buffer	
• Buffer memory for telegrams	4 kbyte
• Number of telegrams which can be buffered	255
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Alarms	
• Diagnostic alarm	Yes
• Hardware interrupt	No
Diagnoses	
• Wire-break	Yes
Diagnostics indication LED	
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED
• for module diagnostics	Yes; green/red DIAG LED
• Receive RxD	Yes; green LED
• Transmit TxD	Yes; green LED
Potential separation	
between backplane bus and interface	Yes
Standards, approvals, certificates	
Railway application	
• EN 50121-3-2	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support

Article number	**6AG2137-6AA01-4BA0** SIPLUS ET 200SP CM PTP RAIL
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)
• vertical installation, min.	-40 °C; = Tmin
• vertical installation, max.	50 °C; = Tmax
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity	
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance	
• Coolants and lubricants	
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems	
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *
- Against mechanical environmental conditions acc. to EN 60721-3-3	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Use on land craft, rail vehicles and special-purpose vehicles	
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *
- Against mechanical environmental conditions acc. to EN 60721-3-5	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
- against mechanical environmental conditions in agriculture acc. to ISO 15003	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Usage in industrial process technology	
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark	
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating	
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A
Decentralized operation	
to SIMATIC S7-300	Yes
to SIMATIC S7-400	Yes
to SIMATIC S7-1200	Yes
to SIMATIC S7-1500	Yes
to standard PROFINET controller	Yes
Dimensions	
Width	15 mm
Height	73 mm
Depth	58 mm
Weights	
Weight, approx.	30 g
Other	
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

Version	Article No.
Serial interface SIPLUS ET 200SP CM PtP RAIL OT4 Approved in accordance with railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic With conformal coating, ambient temperature (-40 ... +70 °C) (+85 °C for 10 min.) For serial connection RS-422, RS-485 and RS-232, Freeport, 3964 (R), USS, MODBUS RTU master, slave, max. 250 Kbps, suitable for BU type A0, pack quantity: 1 unit	**6AG2137-6AA01-4BA0**
Suitable SIPLUS extreme RAIL BaseUnits, type A0	
SIPLUS ET 200SP BU15-P16+A0+2D TX RAIL Approved in accordance with railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic BU type A0; BaseUnit (light) with 16 push-in terminals to the module; for starting a new load group (max. 10 A); for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP00-4DA0**
SIPLUS ET 200SP BU15-P16+A0+2B TX RAIL Approved in accordance with railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic BU type A0; BaseUnit (dark) with 16 push-in terminals to the module; for continuing the load group; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP00-4BA0**
SIPLUS ET 200SP BU15-P16+A10+2D TX RAIL Approved in accordance with railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic BU type A0; BaseUnit (light) with 16 push-in terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A); for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP20-4DA0**
SIPLUS ET 200SP BU15-P16+A10+2B TX RAIL Approved in accordance with railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic BU type A0; BaseUnit (dark) with 16 push-in terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP20-4BA0**
Accessories	
SIPLUS Mounting Kit ET 200SP Mounting accessories for use with increased mechanical vibration and shock loads.	**6AG1193-6AA00-0AA0**

*** You can order this quantity or a multiple thereof.**

Overview

- SIPLUS ET 200SP CM 4XIO-LINK ST T1 RAIL communication module:
  Serial communication module for connecting up to 4 IO-Link devices in accordance with IO-Link specification V1.0 and V1.1. The IO-Link parameters are configured using the Port Configuration Tool (PCT), version V3.0 and higher.
- Approved in accordance with the railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic
- Time-based IO
  Time-based IO ensures that signals are output with a precisely defined response time. By combining inputs and outputs, for example, passing products can be accurately measured or fluids dosed in precise quantities.
- Supported data transfer rates
  - COM1 (4.8 kbps)
  - COM2 (38.4 kbps)
  - COM3 (230.4 kbps)
- Expansion limits
  - Length of cable: Max. 20 m
  - Max. 32 bytes of input and output data per port
  - Max. 144 bytes of input data and 128 bytes of output data per module
- Supported ET 200SP system functions
  - Replacement without PG with automatic backup without the engineering tool of the IO Link Device Parameter (V1.1 devices only) and the IO-Link master parameters by means of redundant saving of parameters on the e-coding element
  - Re-parameterization during operation
  - Identification data I&M
  - Firmware update
  - PROFIenergy
- Can be plugged into Type A0 BaseUnits (BU) with automatic e-coding
- LED indicators
  - DIAG: Operating state indicator (green/red) of the module
  - C1..C4: Port status indicator (green) for Port 1, 2, 3 and 4
  - Q1..Q4: Channel status indicator (green) for Port 1, 2, 3 and 4
  - F1..F4: Port fault indicator (red) for Port 1, 2, 3 and 4
  - PWR: Supply voltage indicator (green)
- Clear labeling on front of module
  - Plain text identification of the module type and function class
  - 2D matrix code (order and serial number)
  - Connection diagram
  - Color-coding of the module class CM: Silver
  - Hardware and firmware version
  - Complete Article No.
- Optional accessories
  - Labeling strips
  - Reference identification label
  - Color-coding plate with color code CC04
- Optional system-integrated shield connection

Overview of CM 4xIO-Link

Communication module	Article No.	CC code	BU type	PU
CM 4xIO-Link	6AG2137-6BD00-1BA0	CC04	A0	1

Overview of BaseUnits

BaseUnit	Article No.	CC codes for process terminals	CC codes for AUX terminals	PU
BU type A0 • New load group (light) • 16 process terminals • With 10 AUX terminals	6AG2193-6BP20-4DA0	CC01 to CC05	CC71 to CC73	1
BU type A0 • New load group (light) • 16 process terminals • Without AUX terminals	6AG2193-6BP00-4DA0	CC01 to CC05	--	1
BU type A0 • Forwarding of load group (dark) • 16 process terminals • With 10 AUX terminals	6AG2193-6BP20-4BA0	CC01 to CC05	CC71 to CC73	1
BU type A0 • Forwarding of load group (dark) • 16 process terminals • Without AUX terminals	6AG2193-6BP00-4BA0	CC01 to CC05	--	1

Application

- The SIPLUS ET 200SP CM 4XIO-LINK ST T1 RAIL communication module enables data exchange with up to 4 external IO Link devices via one 3-wire cable each.
- Comprehensive parameterization options make it possible to adapt the controller flexibly to the communication partner.
- Thanks to the compatibility of IO-Link with standard sensors, commercially available sensors in accordance with IEC 61131 Type 1 can also be operated on the IO-Link master.

Design

Usable BaseUnits (BU)

All BUs of type A0 are available for the SIPLUS ET 200SP CM 4XIO-LINK ST T1 RAIL communication module.

Load group formation

A light-colored BU separates the self-assembling, internal voltage buses (P1, P2, AUX) and thus opens a new load group. The supply voltage of a load group must be fed in at the light BU of this load group.

A dark BU forwards the supply voltage of the adjacent light BU on the left via the self-assembling voltage buses P1, P2 and AUX. A new infeed is therefore only required on the next light BU to the right. The setting of a further light BU is required whenever

- a new load group is to be formed (for example, for isolating the supply voltage from module groups) or
- the maximum current simultaneously required by the load group exceeds the permissible limit of 10 A.

Color identification of the terminals

The potentials at the terminals of the BaseUnit are defined by the inserted I/O module in each case. To prevent wiring faults, the potentials of the terminals can optionally be identified by means of module-specific color-coded labels. The color-coded label that matches the respective I/O module is defined by the color code CCxx of the I/O module. This color code is also printed on the front of the module.

For the communications module "CM 4x IO-Link", the color-coding label with the color code CC04 is to be used.

In BaseUnits with the additional ten internally jumpered AUX terminals, these can also be identified with color-coded labels. For the ten AUX terminals, color-coded labels are available in red, blue, and yellow/green.

Labeling

Labeling strips

Labeling strips can be inserted on the front of the interface modules or I/O modules and individually labeled via STEP 7, macros, etc. No special additional holder is required. If required, they can be easily replaced with the component.

Equipment labeling plates

Equipment labeling plates enable the equipment to be easily identified (e.g. compliant with EN 81346). They are easily plugged onto the required component (interface modules, I/O modules and BaseUnits) and when required, they can be easily replaced with the component.

The following labeling components are available:

- Film labeling strips, light-gray, roll with 500 strips, perforated, for thermal transfer printers
- Film labeling strips, yellow, roll with 500 strips, perforated, for thermal transfer printers
- Card labeling strips (180 g/m^2), light gray, DIN A4 sheets with 100 strips each, perforated, for laser printer
- Card labeling strips (180 g/m^2), yellow, DIN A4 sheets with 100 strips each, perforated, for laser printer
- Equipment labeling plates, white, ten sheets each with 16 labels, for thermal transfer card printers or labels

System-integrated shield connection

For the space-saving and EMC-optimized connection of cable shields, a shield connection is available that is quick and easy to mount. This consists of one shield connection element that can be plugged onto the BaseUnit and one shield terminal for each module. The low-impedance connection to the functional ground (DIN rail) is achieved without any additional wiring by the user.

Technical specifications

Article number	**6AG2137-6BD00-1BA0** SIPLUS ET 200SP CM 4XIO-LINK ST T1 RAIL
General information	
Product type designation	CM 4 x IO-Link ST
Product function • I&M data • Isochronous mode	 Yes Yes; For PROFINET only
Engineering with • STEP 7 TIA Portal configurable/integrated from version	 see entry ID: 109746275
Supply voltage	
Rated value (DC)	24 V
Reverse polarity protection	Yes
Encoder supply	
Number of outputs	4
Output current • Rated value	 200 mA
IO-Link	
Number of ports • of which simultaneously controllable	4 4
IO-Link protocol 1.0	Yes
IO-Link protocol 1.1	Yes
Transmission rate	4.8 kBaud (COM1); 38.4 kBaud (COM2), 230.4 kBaud (COM3)
Cycle time, min.	2 ms; dynamic, depending on user data length
Size of process data, input per port	32 byte; max.
Size of process data, input per module	32 byte; max.
Size of process data, output per port	32 byte; max.
Size of process data, output per module	32 byte; max.
Memory size for device parameter	2 kbyte; for each port
Cable length unshielded, max.	20 m; max.
Operating modes • IO-Link • DI • DQ	 Yes Yes Yes; max. 100 mA
Time Based IO • TIO IO-Link IN • TIO IO-Link OUT • TIO IO-Link IN/OUT • TIO Jitter	 Yes Yes Yes 36 µs; typically ±
Connection of IO-Link devices • Port type A • Port type B	 Yes Yes; 24 V DC via external terminal
Isochronous mode	
Equidistance	Yes
Bus cycle time (TDP), min.	250 µs
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Alarms • Diagnostic alarm	 Yes; The port diagnosis is available in the IO-Link mode only.
Diagnoses • Monitoring the supply voltage	 Yes
Diagnostics indication LED • Monitoring of the supply voltage (PWR-LED) • Channel status display • for channel diagnostics • for module diagnostics	 Yes; green PWR LED Yes; one green LED for channel status Qn (SIO mode) and port status Cn (IO-Link mode) per channel Yes; red Fn LED Yes; green/red DIAG LED
Potential separation	
Potential separation channels • between the channels and backplane bus	 Yes

Article number	**6AG2137-6BD00-1BA0** SIPLUS ET 200SP CM 4XIO-LINK ST T1 RAIL
Standards, approvals, certificates	
Railway application	
• EN 50121-3-2	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT2, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155)
• vertical installation, min.	-40 °C; = Tmin
• vertical installation, max.	50 °C; = Tmax
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity	
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance	
• Coolants and lubricants	
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems	
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *
- Against mechanical environmental conditions acc. to EN 60721-3-3	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Use on land craft, rail vehicles and special-purpose vehicles	
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *
- Against mechanical environmental conditions acc. to EN 60721-3-5	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
- against mechanical environmental conditions in agriculture acc. to ISO 15003	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Usage in industrial process technology	
- Against chemically active substances acc. to _EN 60654-4	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark	
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating	
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A
Dimensions	
Width	15 mm
Height	73 mm
Depth	58 mm
Weights	
Weight, approx.	30 g
Other	
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

Version	Article No.
SIPLUS extreme RAIL CM 4x IO-Link communication module Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic Serial communication module for connecting up to 4 IO-Link devices, time-based IO, BU type A0, color code CC04; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +60 °C (+70 °C for 10 min.)	**6AG2137-6BD00-1BA0**
Suitable SIPLUS extreme RAIL BaseUnits, type A0	
SIPLUS ET 200SP BU15-P16+A0+2D TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A); for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP00-4DA0**
SIPLUS ET 200SP BU15-P16+A0+2B TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP00-4BA0**
SIPLUS ET 200SP BU15-P16+A10+2D TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A); for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP20-4DA0**
SIPLUS ET 200SP BU15-P16+A10+2B TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP20-4BA0**
Accessories	
SIPLUS Mounting Kit ET 200SP Mounting accessories for use with increased mechanical vibration and shock loads.	**6AG1193-6AA00-0AA0**

*** You can order this quantity or a multiple thereof.**

Overview

- For data exchange between an ET 200SP system and CAN 2.0A/B or CANopen Manager or Slave (according to CiA 301 & 302)
- CANopen features:
  - Node/lifeguarding
  - Heartbeat
  - SYNC (producer / consumer)
- Integrated in TIA via HSP, TIA Portal V15.1 or higher
- CAN connection with push-in terminals
- Integrated CAN terminating resistor
- Up to 60 CAN nodes
- 128 receiver and 128 transmitter PDOs
- Galvanic isolation between the two networks
- Diagnostic interrupts
- Optionally with function block SIMATIC ECC CHAdeMO: Realization of digital communication as basis for conductible DC charging of electric vehicles in line with the CHAdeMO standard

Application

The SIPLUS ET 200SP communications module CM CAN is designed to connect an ET 200SP system with the CAN or CANopen fieldbus and enables data exchange.

This gives the option of communicating with up to 60 CAN nodes.

The configuration is carried out in TIA Portal (V15.1 or higher). A corresponding HSP is available to the user.

In CANopen mode, external device description files (.eds files) can be imported and exported.

Design

- Design as ET 200SP module with a width of 15 mm.
- Use with type "A0" BaseUnits.
- Connection at CAN Bus via push-in terminals on the BaseUnit.
- Terminating resistors can be connected by wiring to the BaseUnit.
- LEDs for visualizing the operating conditions of the module and connected CAN network.
- Power supply via backplane bus. No external power supply required.
- Operation without fans or batteries. Maintenance-free.
- The maximum allowable wire length of the CAN network is 1 000 m (depending on data transfer rate, cable cross-section, number of participants).

Mode of operation

The cyclic data exchange between the module and the corresponding CPU or interface module takes place via the backplane bus and by updating the I/O image.
Acyclic communication takes place via the "Read/write data record" services.
CAN components are represented as submodules in TIA Portal.
Up to 126 CAN components can be integrated.
The communications module supports 128 receiver and 128 transmitter PDOs.

Function

- Three different operating modes:
  - CANtransparent
  - CANopen Manager
  - CANopen Slave
- Easy engineering and extensive diagnostics options due to optimum TIA integration.
- Data transfer options:
  - After value change/acyclic
  - Cyclic (after parameter assignment at first to 240th "SYNC")
  - On request from the application (RTR)
- Data transfer rates on the CAN side from 10 to 1 000 kBd.
- Optionally with function block SIMATIC ECC CHAdeMO: Realization of digital communication between a DC charging station and an electric vehicle as basis for conductible DC charging of electric vehicles in line with the standard CHAdeMO 1.x…2.0 charging mode 4

Configuration

An HSP is available for configuration and data mapping of the communications module (TIA Portal V15.1 or higher).
In CANopen Manager and CANtransparent operating modes (CAN 2.0A/B), configuration of the communications module takes place completely in TIA Portal. External software is not required for this purpose.
In CANopen Slave operating mode, the user configures the object directory (OD) of the SIMATIC ET 200SP CM CAN and provides it in the form of an .eds file export to the CANopen Manager.
The configuration data of the communications module is saved in the higher-level SIMATIC S7 controller and transferred during ramp-up. A corresponding function block needs to be called for this purpose.
TIA Portal and Siemens Automation Tool (SAT) are available as update mechanisms.

Technical specifications

Article number	**6AG2137-6EA00-2BA0** SIPLUS ET 200SP CM CAN RAIL
General information	
Product type designation	CM 1x CAN ST
Product function	
• I&M data	Yes; I&M0 to I&M3
• Module swapping during operation (hot swapping)	Yes
• Isochronous mode	No
Supply voltage	
Rated value (DC)	24 V
Reverse polarity protection	Yes
1. Interface	
Interface type	CAN according to CiA 303-1
Isolated	Yes; 500 V AC or 707 V DC
Interface types	
• Number of ports	1
• Design of the connection	Push-in terminal
CAN	
• CAN operating modes	CAN Standard CAN 2.0A/B; CANopen Manager / Slave acc. to CiA
• Specification acc. to CiA	CiA 301 & CiA 302
• Transmission rate, min.	10 kbit/s
• Transmission rate, max.	1 000 kbit/s
• Number of slaves, max.	60
• Number of SDOs in parallel	16; Parallel
• Number of PDOs	128; Send / receive
Services	
• Node/life-guarding	Yes
• Heartbeat	Yes
• SYNC	Yes
Interrupts/diagnostics/status information	
Alarms	Yes
Diagnostics function	Yes
Diagnostics indication LED	
• RUN LED	Yes
• ERROR LED	Yes
• MAINT LED	No
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED
Potential separation	
between backplane bus and interface	Yes
Standards, approvals, certificates	
CE mark	Yes
RoHS conformity	Yes
Railway application	
• EN 50121-3-2	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT2, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155); +70 °C continuously with configured slots to the left and right of the module (OT3, ST0 acc. to EN 50155)
• vertical installation, min.	-40 °C; = Tmin
• vertical installation, max.	50 °C; = Tmax
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity	
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation

Article number	**6AG2137-6EA00-2BA0** SIPLUS ET 200SP CM CAN RAIL
Resistance	
• Coolants and lubricants	
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems	
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *
- Against mechanical environmental conditions acc. to EN 60721-3-3	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Use on land craft, rail vehicles and special-purpose vehicles	
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *
- Against mechanical environmental conditions acc. to EN 60721-3-5	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
- against mechanical environmental conditions in agriculture acc. to ISO 15003	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Usage in industrial process technology	
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark	
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating	
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A
Decentralized operation	
to SIMATIC S7-300	No
to SIMATIC S7-400	No
to SIMATIC S7-1200	Yes
to SIMATIC S7-1500	Yes
Dimensions	
Width	15 mm
Height	73 mm
Depth	58 mm
Weights	
Weight, approx.	32 g
Other	
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

	Version	Article No.
	SIPLUS ET 200SP CM CAN RAIL communications module Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic To connect ET 200SP with CAN or CANopen networks CAN 2.0A/B, CANopen Manager according to CiA 301/302, CANopen Slave according to CiA 301/302 With conformal coating, ambient temperature -40...+55°C (70°C for 10 min)	**6AG2137-6EA00-2BA0**
	Suitable SIPLUS extreme BaseUnits, type A0	
	BU15-P16+A10+2D (Extended temperature range and exposure to environmental substances) BU type A0; BaseUnit (light) with 16 push-in terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A)	**6AG1193-6BP20-7DA0**
	BU15-P16+A0+2D (Extended temperature range and exposure to environmental substances) BU type A0; BaseUnit (light) with 16 push-in terminals to the module; for starting a new load group (max. 10 A)	**6AG1193-6BP00-7DA0**
	BU15-P16+A10+2B (Extended temperature range and exposure to environmental substances) BU type A0; BaseUnit (dark) with 16 push-in terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group	**6AG1193-6BP20-7BA0**
	BU15-P16+A0+2B (Extended temperature range and exposure to environmental substances) BU type A0; BaseUnit (dark) with 16 push-in terminals to the module; for continuing the load group	**6AG1193-6BP00-7BA0**
	Accessories	
	SIPLUS Mounting Kit ET 200SP Mounting accessories for use with increased mechanical vibration and shock loads.	**6AG1193-6AA00-0AA0**
	Other accessories	See SIMATIC ET 200SP CM CAN gateway

*** You can order this quantity or a multiple thereof.**

Overview

ISO	TCP/ UDP	PN	MRP	IT	IP-R	PG/OP	S7
	●			●		●	●

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The SIPLUS ET 200SP CP 1542SP-1 IRC TX RAIL communications processor connects the SIPLUS extreme RAIL ET 200SP Distributed Controller with Industrial Ethernet networks.

The module can also be used for integrating the SIPLUS extreme RAIL ET 200SP Distributed Controller into an IPv6-based network. All functions are configured using STEP 7 Professional V14 (TIA Portal) or higher.

The SIPLUS ET 200SP CP 1542SP-1 IRC TX RAIL supports the following communication services:

- PG/OP communication
- S7 communication
- Open communication (Open User Communication)
- IT communication
  - Sending emails via SMTP for authentication on an email server (also with IPv6)
  - SNMPv1 for transfer of network analysis information
- Integration of the ET 200SP Distributed Controller into IPv6-based networks

The SIPLUS ET 200SP CP 1542SP-1 IRC TX RAIL is approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic.

Benefits

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- Network separation for setting up identical machines with the same IP addresses
- Optimum support of maintenance due to
  - Simple diagnostics via the central web server
  - Monitoring with IT network management tools (SNMP)
  - Module replacement without a PG
- Securing the system against unauthorized access with
  - Central access protection for any S7 station
  - Access to the central web server
- Simple alerting by email
- Protection of investment thanks to simple integration of the SIPLUS extreme RAIL ET 200SP Distributed Controller in existing networks with SIMATIC S7-300 / S7-400 via Industrial Ethernet using the SIPLUS ET 200SP CP 1542SP-1 IRC TX RAIL
- Accessibility of the SIPLUS extreme RAIL ET 200SP Distributed Controller from an IPv6-based infrastructure

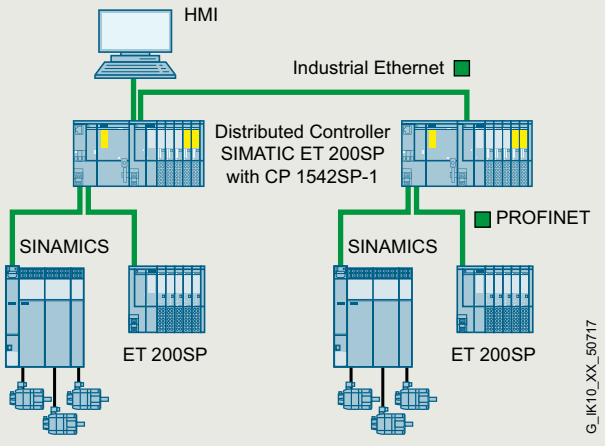
Application

The SIPLUS ET 200SP CP 1542SP-1 IRC TX RAIL is used for connecting the SIPLUS extreme RAIL ET 200SP Distributed Controller to Industrial Ethernet networks. With its own processor, it relieves the CPU of communication tasks.

The SIPLUS ET 200SP CP 1542SP-1 IRC TX RAIL offers communication possibilities with:

- PGs/PCs
- Master computers
- Operator control and monitoring systems
- SIMATIC S7 systems

The SIPLUS ET 200SP CP 1542SP-1 IRC TX RAIL is used in the SIPLUS extreme RAIL ET 200SP system to operate lower-level networks separately, or to implement a separation from the higher-level network.



Application: automation network and lower-level networks are to be operated separately

6

Design

The SIPLUS ET 200SP CP 1542SP-1 IRC TX RAIL exhibits all the advantages of the ET 200SP design:

- Compact, space-saving design:
  - Module powered via separate power supply
  - Three LEDs for displaying the operating state and communication state of the module as well as LEDs on the BusAdapter.
  - Can be operated simultaneously with BA Send module and CM DP module.
- Simple installation:
  The SIPLUS ET 200SP CP 1542SP-1 IRC TX RAIL is mounted on the ET 200SP DIN rail and is connected to the adjacent modules via the backplane bus.
  - The BusAdapter (not included in scope of delivery) makes various connection methods possible
  - For standard ambient conditions, BA 2xRJ45 for connection via RJ45 connector
  - For mechanical loading during operation and/or increased EMC requirements
    BA 2xFC, BA 2xSCRJ, BA SCRJ/RJ45, BA SCRJ/FC
  - The SIPLUS ET 200SP CP 1542SP-1 IRC TX RAIL can be operated without a fan; no back-up battery is necessary
  - The module can be replaced without the need for a programming device
- The CP can be equipped with an equipment labeling plate.
- Optional labeling using light gray or yellow labeling strips. Choice of 2 materials:
  - Film and roll with 500 strips, for thermal transfer roll printer
  - Paper (280 g/m2), DIN A4 sheets with 100 strips each, for laser printer

Scope of delivery:
SIPLUS ET 200SP CP 1542SP-1 IRC TX RAIL, 24 V DC connector (BusAdapter must be ordered separately)

Function

- 2-port interface via BusAdapter with an RJ45 connection with 10/100 Mbps full/half duplex with autosensing functionality
- The SIPLUS ET 200SP CP 1542SP-1 IRC TX RAIL communications processor connects the SIPLUS extreme RAIL ET 200SP Distributed Controllers to additional Industrial Ethernet networks
- Communications services:
  - Open communication (TCP/IP, UDP, ISO-on-TCP):
    Multicast with UDP
  - PG/OP communication: Inter-network with S7 routing
  - S7 communication (client, server)
  - S7 routing
  - IT communication:
    HTTP communication allows access to the web server of the CPU.
  - The e-mail client function enables sending of emails direct from the user program.
    IP address assignment via DHCP for IPv4 or via direct entry in the engineering software and via the T_CONFIG function block
    STEP 7 Professional V14 (TIA Portal) or higher
- Diagnostics and network management:
  - Extensive diagnostic functions of all modules in the ET 200SP system
  - Integration in network management systems through the support of SNMP V1
- Configuration of all functions with STEP 7 Professional V14 (TIA Portal) or higher
- Module replacement without programming device: All information can be stored on the memory card of the CPU.

Technical specifications

Article number product type designation	**6AG2542-6VX00-4XE0** SIPLUS ET 200SP CP 1542SP-1 IRC TX RAIL
transfer rate	
at the 1st interface	10 ... 100 Mbit/s
interfaces	
number of interfaces according to Industrial Ethernet	1
number of electrical connections • at the 1st interface according to Industrial Ethernet	2
type of electrical connection • at the 1st interface according to Industrial Ethernet	via ET 200SP bus adapter (RJ45, FC, SCRJ), integrated switch
supply voltage, current consumption, power loss	
type of voltage of the supply voltage	DC
supply voltage	24 V
supply voltage	19.2 ... 28.8 V
power loss [W]	6 W
ambient conditions	
ambient temperature • for vertical installation during operation • for horizontally arranged busbars during operation • during storage • during transport • note	 -40 ... +50 °C -40 ... +70 °C -40 ... +70 °C -40 ... +70 °C +85 °C for 10 min (OT4, ST1/ST2 according to EN 50155)
installation altitude at height above sea level maximum	2 000 m
ambient condition relating to ambient temperature - air pressure - installation altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
relative humidity • with condensation according to IEC 60068-2-38 maximum	100 %; RH including condensation/frost (no commissioning when condensation is present), horizontal installation
chemical resistance to commercially available cooling lubricants	Yes; incl. airborne diesel and oil droplets

Article number	**6AG2542-6VX00-4XE0**
product type designation	SIPLUS ET 200SP CP 1542SP-1 IRC TX RAIL
resistance to biologically active substances	
• conformity according to EN 60721-3-3	Yes; Class 3B2 mold and fungal spores (excluding fauna), Class 3B3 on request
• conformity according to EN 60721-3-5	Yes; Class 5B2 mold and fungal spores (excluding fauna), Class 5B3 on request
resistance to chemically active substances	
• conformity according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray in accordance with EN 60068-2-52 (Severity 3). The supplied plug covers must remain in place on the unused interfaces during operation.
• conformity according to EN 60721-3-5	Yes; Class 5C3 (RH < 75%) including salt spray acc. to EN 60068-2-52 (Severity level 3). The supplied plug covers must remain in place over the unused interfaces during operation!
resistance to mechanically active substances	
• conformity according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied plug covers must remain in place over the unused interfaces during operation.
• conformity according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust. The supplied plug covers must remain in place over the unused interfaces during operation.
coating for equipped printed circuit board according to EN 61086	Yes; Class 2 for high availability
type of coating protection against pollution according to EN 60664-3	Yes; Protection of the type 1
type of coating for electronic devices in railway applications according to EN 50155	Yes; Protective coating of the Class PC2 according to EN 50155:2017
type of test of the coating according to MIL-I-46058C	Yes; Coating discoloration during service life possible
product conformity of the coating Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, class A
protection class IP	IP20
design, dimensions and weights	
width	60 mm
height	117 mm
depth	74 mm
net weight	0.18 kg
fastening method	
• 35 mm top hat DIN rail mounting	Yes
product features, product functions, product components general	
number of units	
• per CPU maximum	2
• note	2 CPs can be pluged in per CPU, simultaneous operation with BA Send and CM DP is possible
performance data open communication	
number of possible connections for open communication	
• by means of T blocks maximum	32
data volume	
• as user data per ISO on TCP connection for open communication by means of T blocks maximum	65 536 byte
performance data S7 communication	
number of possible connections for S7 communication	
• maximum	16
• with OP connections maximum	16
performance data multi-protocol mode	
number of active connections with multi-protocol mode	32
performance data IT functions	
number of possible connections	
• as email client maximum	1
performance data telecontrol	
suitability for use	
• node station	No
• substation	Yes
• TIM control center	No
control center connection	IEC 60870-5, DNP3, (Modbus TCP by block solutions of the CPU) capable control stations, connection to Telecontrol Server Basic and ST7 capable control station
• by means of a permanent connection	supported
• by means of demand-oriented connection	supported
• note	Connection to SCADA system by IEC 60870-5 104, DNP3, Telecontrol Server Basic and ST7 capable control center
protocol is supported	
• DNP3	Yes
• IEC 60870-5	Yes
• SINAUT ST7 protocol	Yes
product function data buffering if connection is aborted	Yes; TCSB 64000 events, SINAUT ST7 32000 telegrams, DNP3 100000 events, IEC 60870-5 100000 events
number of data points per station maximum	500

Article number	**6AG2542-6VX00-4XE0**
product type designation	SIPLUS ET 200SP CP 1542SP-1 IRC TX RAIL
number of stations for direct communication with Telecontrol Server Basic	
• in send direction maximum	3
• in receive direction maximum	15
product functions management, configuration, engineering	
product function MIB support	Yes
protocol is supported	
• SNMP v1	Yes
• SNMP v3	No
• DCP	Yes
• LLDP	Yes
configuration software	
• required	STEP 7 Professional V14 (TIA Portal) or higher
identification & maintenance function	
• I&M0 - device-specific information	Yes
• I&M1 – higher level designation/location designation	Yes
product functions diagnostics	
product function web-based diagnostics	Yes; via ET 200SP CPU
product functions security	
product function with VPN connection	SINEMA RC
product function	
• blocking of communication via physical ports	Yes
product functions time	
product function SICLOCK support	Yes
product function pass on time synchronization	Yes
protocol is supported	
• NTP	Yes
• NTP (secure)	No
time synchronization	
• from NTP-server	Yes
• from control center	Yes
standards, specifications, approvals	
certificate of suitability	
• fire protection in accordance with EN 45545-2	Yes; Railway vehicles - for proof, see Service & Support
railway application	
certificate of suitability railway application in accordance with EN 50121-3-2	Yes; EMC for railway vehicles
certificate of suitability railway application in accordance with EN 50121-4	Yes; EMC for signal and telecommunication equipment
certificate of suitability railway application in accordance with EN 50124-1	Yes; Railway applications - Overvoltage category OV2 pollution degree PD2 rated impulse voltage UNi = 0.5 kVUNm = DC 24
certificate of suitability railway application in accordance with EN 50125-1	Yes; Railway vehicles - See ambient conditions
certificate of suitability railway application in accordance with EN 50125-2	Yes; Fixed-electrical installations - see ambient conditions
certificate of suitability railway application in accordance with EN 50125-3	Yes; Signal and telecommunications equipment - see Ambient conditions vibrations and shocks: Application point outside the rails (distance 1 m to 3 m from rail)
certificate of suitability railway application in accordance with EN 50155	Yes; Railway vehicles - temperature class OT4, ST1/ST2, horizontal mounting position
certificate of suitability railway application in accordance with EN 61373	Yes; Railway vehicles - Vibrations and shocks Category 1 Class A/B

Selection and ordering data

	Version	Article No.
	SIPLUS ET 200SP CP 1542SP-1 IRC TX RAIL communications processor Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic For connection of SIMATIC S7 ET 200SP to Industrial Ethernet, open IE communication (TCP/IP, ISO-ON-TCP, UDP), PG/OP, S7 routing, IP broadcast/multicast, SNMPV1, DHCP, email, IPv4/IPv6, time synchronization via NTP, access to web server of CPU, BusAdapter required; For areas with extreme medial exposure (conformal coating); Ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2542-6VX00-4XE0**
	SIPLUS extreme RAIL BusAdapter	
	SIPLUS ET 200SP BA 2XRJ45 TX RAIL For PROFINET interface modules in Standard function class or above; max. cable length 50 m; For areas with extreme exposure to environmental substances (conformal coating) Ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6AR00-4AA0**
	SIPLUS ET 200SP BA 2XFC TX RAIL For PROFINET interface modules in Standard function class or above; for increased vibration and EMC load rating; max. cable length 50 m; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6AF00-4AA0**
	Accessories	
	SIPLUS Mounting Kit ET 200SP Mounting accessories for use with increased mechanical vibration and shock loads.	**6AG1193-6AA00-0AA0**

More information

You will find further information on ET 200SP at:
http://www.siemens.com/simatic-et200sp

The TIA Selection Tool is available to assist you in selecting ET 200SP equipment and configuring modular variants:
http://www.siemens.com/tst

You will find more information on the topic of Industrial Security on the Internet at:
An ET 200SP Distributed Controller firmware version ≥ 2.0 is required for operation of the CP 1542SP-1.

Overview

ISO	TCP/ UDP	PN	MRP	IT	IP-R	PG/OP	S7
	●			●		●	●

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The SIPLUS ET 200SP CP 1543SP-1 ISEC TX RAIL communications processor connects the ET 200SP Distributed Controller with Industrial Ethernet networks. By combining a variety of security features such as an SPI (Stateful Packet Inspection) firewall, VPN and data encryption protocols (e.g. SNMPv3), the communications processor protects individual ET 200SP Distributed Controllers or even entire automation cells against unauthorized access.

The module can also be used for integrating the ET 200SP Distributed Controller into an IPv6-based network. All functions can be configured with STEP 7 Professional, V14 (TIA Portal) and higher.

The SIPLUS ET 200SP CP 1543SP-1 ISEC TX RAIL supports the following communication services:

- PG/OP communication
- S7 communication
- Open communication (Open User Communication)
- IT communication
  - Sending emails via SMTP or ESMTP with "SMTP-Auth" for authentication on an email server (also with IPv6)
- Support of SINEMA Remote Connect with autoconfiguration
- Security Integrated
  - Stateful Packet Inspection Firewall
  - Secure communication via VPN (IPsec)
- Protocols for secure communication
  - Secure access to the web server of the CPU via the HTTPS protocol
  - Secure transfer of the time of day (NTP)
  - SNMPv3 for tap-proof transfer of network analysis information
- Integration of the ET 200SP Distributed Controller into IPv6-based networks

The SIPLUS ET 200SP CP 1543SP-1 ISEC TX RAIL is approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic.

Benefits

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- Prevention of data loss, production disruptions or machine damage by protecting against unauthorized access to the SIPLUS extreme Rail ET 200SP Distributed Controller and lower-level networks
- Network segmentation and network separation for setting up identical machines with the same IP addresses
- Connection to SINEMA RC:
  With the optional SINEMA Remote Connect, you can benefit from the user-friendly, secure SINEMA Remote Connect management platform for remote maintenance.
- Optimum support of maintenance due to
  - Simple diagnostics via the central web server
  - Monitoring with IT network management tools (SNMP)
  - Module replacement without a PG
- Securing the system against unauthorized access with
  - Central access protection for any S7 station
  - Secure access to the central web server
- Simple alerting by email
- Protection of investment thanks to simple integration of the SIPLUS extreme RAIL ET 200SP Distributed Controller in existing networks with SIMATIC S7-300 / S7-400 / via Industrial Ethernet using the SIPLUS ET 200SP CP 1543SP-1 ISEC TX RAIL
- Accessibility of the SIPLUS extreme RAIL ET 200SP Distributed Controller from an IPv6-based infrastructure

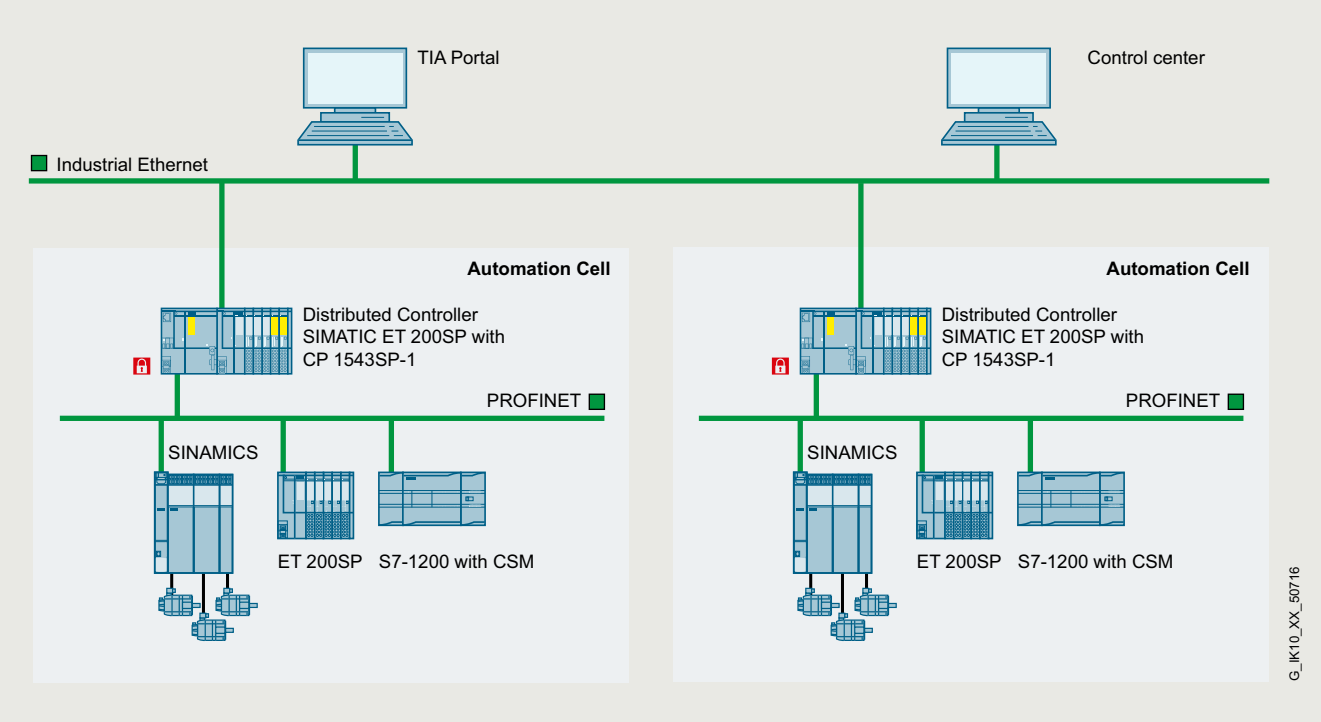
Application

The SIPLUS ET 200SP CP 1543P-1 ISEC TX RAIL is used for connecting the SIPLUS extreme RAIL ET 200SP Distributed Controller to Industrial Ethernet networks. With its own processor, it relieves the CPU of communication tasks.

The SIPLUS ET 200SP CP 1543P-1 ISEC TX RAIL offers communication possibilities with:

- PGs/PCs
- Master computers
- Operator control and monitoring systems
- SIMATIC S7 systems

It can be used to protect the SIPLUS extreme RAIL ET 200SP Distributed Controller automation system from unauthorized access from an Ethernet network. The SIPLUS ET 200SP CP 1543P-1 ISEC TX RAIL allows secure remote access via a LAN and enables the data transfer between devices or network segments to be protected from data manipulation/espionage.



Connection to higher-level network and network separation of automation cells

Design

The SIPLUS ET 200SP CP 1543P-1 ISEC TX RAIL exhibits all the advantages of the ET 200SP design:

- Compact, space-saving design:
  - Module powered via separate power supply
  - Three LEDs for displaying the operating state and communication state of the module as well as LEDs on the BusAdapter.
  - Simultaneously operable with BA Send module and CM DP module.
- Simple installation:
  The SIPLUS ET 200SP CP 1543P-1 ISEC TX RAIL is mounted on the ET 200SP DIN rail and is connected to the adjacent modules via the backplane bus.
  - The BusAdapter (not included in scope of delivery) makes various connection methods possible;
  - For standard ambient conditions, BA 2xRJ45 for connection via RJ45 connector
  - For mechanical loading during operation and/or increased EMC requirements
    BA 2xFC, BA 2xSCRJ, BA SCRJ/RJ45, BA SCRJ/FC
  - The SIPLUS ET 200SP CP 1543P-1 ISEC TX RAIL can be operated without a fan; no back-up battery is necessary
  - The module can be replaced without the need for a programming device
- The CP can be equipped with an equipment labeling plate.
- Optional labeling using light gray or yellow labeling strips.
  There is a choice of two materials:
  - Film and roll with 500 strips, for thermal transfer roll printer
  - Paper (280 g/m2), DIN A4 sheets with 100 strips each, for laser printer

Scope of delivery:
SIPLUS ET 200SP CP 1543P-1 ISEC TX RAIL, 24 V DC connector (BusAdapter must be ordered separately)

Function

- 2-port interface via BusAdapter with an RJ45 connection with 10/100 Mbps full/half duplex with autosensing functionality
- The SIPLUS ET 200SP CP 1543P-1 ISEC TX RAIL communications processor connects the SIPLUS extreme RAIL ET 200SP Distributed Controller to additional Industrial Ethernet networks
- Communications services:
  - Open communication (TCP/IP, UDP, ISO-on-TCP):
    Multicast with UDP
  - PG/OP communication: Inter-network with S7 routing
  - S7 communication (client, server)
  - S7 routing
  - IT communication:
    HTTP communication allows access to the web server of the CPU. With the CP 1543SP-1, HTTPS communication is also possible.
    The email client function allows e-mails to be sent directly from the user program.
    IP address assignment via DHCP for IPv4 or via direct entry in the engineering software and via the T_CONFIG function block
    STEP 7 Professional V14 (TIA Portal) or higher
- Support of SINEMA Remote Connect with autoconfiguration
- Diagnostics and network management:
  - Extensive diagnostic functions of all modules in the ET 200SP system
  - Integration in network management systems due to support of SNMP v1/v3
- Security mechanisms:
  - Access protection with firewall for filtering connections on the basis of their IP and MAC addresses
  - Secure communication via VPN (IPsec)
  - Encrypted HTML pages using SSL (HTTPS)
  - Secure transfer of the time of day (NTPS)
- Configuration of all functions with STEP 7 Professional V14 (TIA Portal) or higher
- Module replacement without programming device: All information can be stored on the memory card of the CPU.

Technical specifications

Article number	**6AG2543-6WX00-4XE0**
product type designation	SIPLUS ET 200SP CP 1543SP-1 ISEC TX RAIL
transfer rate	
transfer rate • at the 1st interface	 10 ... 100 Mbit/s
interfaces	
number of interfaces according to Industrial Ethernet	1
number of electrical connections • at the 1st interface according to Industrial Ethernet	 2
type of electrical connection • at the 1st interface according to Industrial Ethernet	 via ET 200SP bus adapter (RJ45, FC, SCRJ), integrated switch
supply voltage, current consumption, power loss	
type of voltage of the supply voltage	DC
supply voltage	24 V
supply voltage	19.2 ... 28.8 V
power loss [W]	6 W
ambient conditions	
ambient temperature • for vertical installation during operation • for horizontally arranged busbars during operation • during storage • during transport • note	 -40 ... +50 °C -40 ... +70 °C -40 ... +70 °C -40 ... +70 °C +85 °C for 10 min (OT4, ST1/ST2 according to EN 50155)
installation altitude at height above sea level maximum	2 000 m
ambient condition relating to ambient temperature - air pressure - installation altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
relative humidity • with condensation according to IEC 60068-2-38 maximum	 100 %; RH including condensation/frost (no commissioning when condensation is present), horizontal installation
chemical resistance to commercially available cooling lubricants	Yes; incl. airborne diesel and oil droplets
resistance to biologically active substances • conformity according to EN 60721-3-3 • conformity according to EN 60721-3-5	 Yes; Class 3B2 mold and fungal spores (excluding fauna), Class 3B3 on request Yes; Class 5B2 mold and fungal spores (excluding fauna), Class 5B3 on request
resistance to chemically active substances • conformity according to EN 60721-3-3 • conformity according to EN 60721-3-5	 Yes; Class 3C4 (RH < 75 %) incl. salt spray in accordance with EN 60068-2-52 (Severity 3). The supplied plug covers must remain in place on the unused interfaces during operation. Yes; Class 5C3 (RH < 75%) including salt spray acc. to EN 60068-2-52 (Severity level 3). The supplied plug covers must remain in place over the unused interfaces during operation!
resistance to mechanically active substances • conformity according to EN 60721-3-3 • conformity according to EN 60721-3-5	 Yes; Class 3S4 incl. sand, dust. The supplied plug covers must remain in place over the unused interfaces during operation. Yes; Class 5S3 incl. sand, dust. The supplied plug covers must remain in place over the unused interfaces during operation.
coating for equipped printed circuit board according to EN 61086	Yes; Class 2 for high availability
type of coating protection against pollution according to EN 60664-3	Yes; Protection of the type 1
type of coating for electronic devices in railway applications according to EN 50155	Yes; Protective coating of the Class PC2 according to EN 50155:2017
type of test of the coating according to MIL-I-46058C	Yes; Coating discoloration during service life possible
product conformity of the coating Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, class A
protection class IP	IP20
design, dimensions and weights	
width	60 mm
height	117 mm
depth	74 mm
net weight	0.18 kg
fastening method • 35 mm top hat DIN rail mounting	 Yes
product features, product functions, product components general	
number of units • per CPU maximum • note	 2 2 CPs can be pluged in per CPU, simultaneous operation with BA Send and CM DP is possible

Article number	**6AG2543-6WX00-4XE0**
product type designation	SIPLUS ET 200SP CP 1543SP-1 ISEC TX RAIL
performance data open communication	
number of possible connections for open communication	
• by means of T blocks maximum	32
data volume	
• as user data per ISO on TCP connection for open communication by means of T blocks maximum	65 536 byte
performance data S7 communication	
number of possible connections for S7 communication	
• maximum	16
• with OP connections maximum	16
performance data multi-protocol mode	
number of active connections with multi-protocol mode	32
performance data IT functions	
number of possible connections	
• as email client maximum	1
product functions management, configuration, engineering	
product function MIB support	Yes
protocol is supported	
• SNMP v1	Yes
• SNMP v3	Yes
• DCP	Yes
• LLDP	Yes
configuration software	
• required	STEP 7 Professional V14 (TIA Portal) or higher
identification & maintenance function	
• I&M0 - device-specific information	Yes
• I&M1 – higher level designation/location designation	Yes
product functions diagnostics	
product function web-based diagnostics	Yes; via ET 200SP CPU
product functions security	
firewall version	stateful inspection
product function with VPN connection	IPsec, SINEMA RC
type of encryption algorithms with VPN connection	AES-256, AES-192, AES-128, 3DES-168, DES-56
type of authentication procedure with VPN connection	Preshared key (PSK), X.509v3 certificates
type of hashing algorithms with VPN connection	MD5, SHA-1
number of possible connections with VPN connection	4
product function	
• switch-off of non-required services	Yes
• blocking of communication via physical ports	Yes
• log file for unauthorized access	Yes
product functions time	
product function SICLOCK support	Yes
product function pass on time synchronization	No
protocol is supported	
• NTP	Yes
• NTP (secure)	Yes
time synchronization	
• from NTP-server	Yes
standards, specifications, approvals	
certificate of suitability	
• fire protection in accordance with EN 45545-2	Yes; Railway vehicles - for proof, see Service & Support
railway application	
certificate of suitability railway application in accordance with EN 50121-3-2	Yes; EMC for railway vehicles
certificate of suitability railway application in accordance with EN 50121-4	Yes; EMC for signal and telecommunication equipment
certificate of suitability railway application in accordance with EN 50124-1	Yes; Railway applications - Overvoltage category OV2 pollution degree PD2 rated impulse voltage UNi = 0.5 kVUNm = DC 24
certificate of suitability railway application in accordance with EN 50125-1	Yes; Railway vehicles - See ambient conditions
certificate of suitability railway application in accordance with EN 50125-2	Yes; Fixed-electrical installations - see ambient conditions
certificate of suitability railway application in accordance with EN 50125-3	Yes; Signal and telecommunications equipment - see Ambient conditions vibrations and shocks: Application point outside the rails (distance 1 m to 3 m from rail)
certificate of suitability railway application in accordance with EN 50155	Yes; Railway vehicles - temperature class OT4, ST1/ST2, horizontal mounting position
certificate of suitability railway application in accordance with EN 61373	Yes; Railway vehicles - Vibrations and shocks Category 1 Class A/B

Selection and ordering data

	Version	Article No.
	SIPLUS ET 200SP CP 1543SP-1 ISEC TX RAIL communications processor Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic For connecting SIPLUS extreme RAIL ET 200SP to Industrial Ethernet, Security (firewall and VPN), open IE communication (TCP/IP, ISO-on-TCP, UDP) PG/OP, S7 routing, IP broadcast/multicast, SNMPV1/V3, DHCP, secure email, IPV4/IPV6, time synchronization via NTP, access to web server of CPU, BusAdapter required; For areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2543-6WX00-4XE0**
	SIPLUS extreme RAIL BusAdapter	
	SIPLUS ET 200SP BA 2XRJ45 TX RAIL For PROFINET interface modules in Standard function class or above; max. cable length 50 m; for areas with extreme exposure to environmental substances (conformal coating) Ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6AR00-4AA0**
	SIPLUS ET 200SP BA 2XFC TX RAIL For PROFINET interface modules in Standard function class or above; for increased vibration and EMC load rating; max. cable length 50 m; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6AF00-4AA0**
	Accessories	
	SIPLUS Mounting Kit ET 200SP Mounting accessories for use with increased mechanical vibration and shock loads.	**6AG1193-6AA00-0AA0**

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More information

You can find further information on ET 200SP at:
http://www.siemens.com/simatic-et200sp

The TIA Selection Tool is available to assist you in selecting ET 200SP equipment and configuring modular variants:
http://www.siemens.com/tst

An ET 200SP Distributed Controller firmware version ≥ 2.0 is required for operation of the CP 1543SP-1.

*** You can order this quantity or a multiple thereof.**

Overview

The fail-safe modules of SIPLUS extreme RAIL ET 200SP expand the range of the ET 200SP series. They are incorporated seamlessly into the Safety Integrated concept as with ET 200S / ET 200M / ET 200iSP and ET200pro. Safety-related communication via PROFIsafe is also supported. The fail-safe modules for digital inputs and outputs (DI and DQ) are the same size as the standard modules. Their functional safety is certified in accordance with IEC 61508. They are designed for safety-related use up to SIL 2 according to EN 50126, 50128, 50129.

One special feature of the F modules of SIPLUS extreme RAIL ET 200SP is that the F-addresses no longer have to be set manually by means of the DIP switches on the module. They are now assigned during commissioning using the engineering function. When replacing a module, the F-addresses of the module remain in the coding of the BaseUnit. If a new module is inserted, these F-addresses are transferred automatically. New assignment of the F-addresses is therefore unnecessary. This new feature simplifies the set-up process and saves time.

Totally Integrated Automation (TIA)

Safety technology (Safety Integrated) is a component of Totally Integrated Automation and provides complete integration of safety and standard automation.

Whereas standard automation (classical PLCs) and safety automation (electro-mechanics) are still separate today, these two worlds are growing together into a uniform, integrated overall system. Siemens is thus able to present itself as a complete supplier of automation technology, in which safety engineering is part of the standard automation and system-wide integration exists.

Safety Integrated

Information on functional safety, including for ET 200SP:

http://www.siemens.com/safety-integrated

More information

Safety Integrated

Information on functional safety, also for ET 200SP, can be found here:

http://www.siemens.com/safety-integrated

Overview

Digital fail-safe input module:
SIPLUS ET 200SP F-DI 4/8X24VDC RAIL for BU type A0, color code CC01

Important features:

- 8-channel digital fail-safe input module for SIPLUS extreme ET 200SP RAIL
- Approved in accordance with railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic
- For fail-safe reading of sensor information (1 or 2 channels)
- Provides integral discrepancy evaluation for 2-out-of-2 signals
- 8 internal sensor supplies (incl. test function) onboard
- Certified up to SIL 3 (IEC 61508), PL e (ISO 13849)
- Can be plugged into type A0 BaseUnits (BU) with automatic coding
- LED display for error, operation, supply voltage and status
- Clear labeling on the front of module
  - Plain text identification of the module type and function class
  - 2D matrix code (order and serial number)
  - Connection diagram
  - Color coding of the DI module type: White
  - Hardware and firmware version
  - CC color code for module-specific color coding of the potentials at the terminals of the BU
  - Complete article no.
- Optional labeling accessories
  - Labeling strips
  - Equipment labeling plate
- Optional module-specific color identification of the terminals according to the color code CC
- Optional system-integrated shield connection
- The modules support PROFIsafe in both PROFIBUS and PROFINET configurations. They can be used with all fail-safe SIMATIC S7 CPUs.

Application

The fail-safe modules of SIPLUS extreme ET 200SP RAIL can be used to implement the safety-related application requirements as an integral part of the overall automation. The safety functions required for fail-safe operation are integrated in these modules. Communication with the fail-safe SIMATIC S7 CPUs is performed by means of PROFIsafe.

The modules can be operated both in centralized and distributed configurations.

Design

Usable BaseUnits

For a single- or multi-conductor connection, BaseUnits with an appropriate number of terminals are available.

A light BaseUnit opens a new load group. The power supply to the sensors must be fed via this BU. The first BU next to the interface module must always be a light BU.

A dark BaseUnit forwards the power supply of the adjacent light BaseUnit on the left via self-assembling voltage buses. A new infeed is therefore only required on the next light BaseUnit to the right.

All variants that correspond to the BU type of the I/O module can be used as BaseUnits.

Color identification of the terminals

The potentials at the terminals of the BaseUnit are defined by the I/O module. Optionally, the potentials of the terminals can be identified by module-specific color-coding labels to prevent wiring errors. The color-coded label that matches the respective I/O module is defined by the color code CCxx of the I/O module. This color code is also printed on the front of the module.

In BaseUnits with the 10 internally jumpered AUX terminals, these can also be identified with color coding labels. For the 10 AUX terminals, color-coding labels are available in red, blue, and yellow/green.

System-integrated shielded connection

For the connection of cable shields that is both space-saving as well as optimized in terms of EMC, a shield connection is available that is quick and easy to mount. This consists of one shield connection element that can be plugged onto the BaseUnit and one shield terminal for each module. The low-impedance connection to the functional ground (DIN rail) is achieved without any additional wiring by the user.

Technical specifications

Article number	**6AG2136-6BA00-1CA0** SIPLUS ET 200SP F-DI 4/8X24VDC RAIL
General information	
Product type designation	F-DI 8x24VDC HF
Supply voltage	
Rated value (DC)	24 V
Reverse polarity protection	Yes
Encoder supply	
Number of outputs	8
Short-circuit protection	Yes; Electronic (response threshold 0.7 A to 1.8 A)
Output current • up to 60 °C, max.	 0.3 A
24 V encoder supply • 24 V • Short-circuit protection • Output current, max.	 Yes; min. L+ (-1.5 V) Yes 800 mA; Total current of all encoders
Digital inputs	
Number of digital inputs	8
Source/sink input	Yes; P-reading
Input characteristic curve in accordance with IEC 61131, type 1	Yes
Input voltage • Rated value (DC) • for signal "0" • for signal "1"	 24 V -30 to +5 V +15 to +30 V
Input current • for signal "1", typ.	 3.7 mA
Input delay (for rated value of input voltage) • for standard inputs - parameterizable • for technological functions - parameterizable	 Yes No
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Alarms • Diagnostic alarm • Hardware interrupt	 Yes No
Diagnostics indication LED • RUN LED • ERROR LED • Monitoring of the supply voltage (PWR-LED) • Channel status display • for channel diagnostics • for module diagnostics	 Yes; green LED Yes; red LED Yes; green PWR LED Yes; green LED Yes; red LED Yes; green/red DIAG LED
Potential separation	
Potential separation channels • between the channels and backplane bus	 Yes
Standards, approvals, certificates	
Suitable for safety functions	Yes
Highest safety class achievable in safety mode • Performance level according to ISO 13849-1 • SIL acc. to IEC 61508 • SIL in accordance with EN 50126, 50128, 50129	 PLe SIL 3 SIL 2; a higher safety integrity level is possible if tested and approved for the specific application under consideration of all local regulations.
Railway application • EN 50121-3-2 • EN 50121-4 • EN 50124-1 • EN 50125-1 • EN 50125-2 • EN 50125-3 • EN 50155 • EN 61373 • Fire protection acc. to EN 45545-2	 Yes; EMC for rail vehicles Yes; EMC for signal and telecommunications systems Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC Yes; Rail vehicles - see ambient conditions Yes; Stationary electrical equipment - see ambient conditions Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track) Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B Yes; For proof of conformity, see Service & Support

Article number	**6AG2136-6BA00-1CA0** SIPLUS ET 200SP F-DI 4/8X24VDC RAIL
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-30 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155); +70 °C continuously with configured slots to the left and right of the module (OT3, ST0 acc. to EN 50155)
• vertical installation, min.	-30 °C; = Tmin
• vertical installation, max.	50 °C; = Tmax
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity	
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance	
• Coolants and lubricants	
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems	
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *
- Against mechanical environmental conditions acc. to EN 60721-3-3	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Use on land craft, rail vehicles and special-purpose vehicles	
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *
- Against mechanical environmental conditions acc. to EN 60721-3-5	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
- against mechanical environmental conditions in agriculture acc. to ISO 15003	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Usage in industrial process technology	
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark	
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating	
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A
Dimensions	
Width	15 mm
Height	73 mm
Depth	58 mm
Weights	
Weight, approx.	49 g
Other	
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

Version	Article No.
SIPLUS ET 200SP F-DI 8x24VDC High Feature T1 RAIL Approved in accordance with railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic BU type A0, for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -25 ... +60 °C (+70 °C for 10 min.)	**6AG2136-6BA00-1CA0**
SIPLUS ET 200SP F-DI 4/8X24VDC RAIL OT4 Approved in accordance with railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic BU type A0, CC01, for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C ST1/2 (+85 °C for 10 min.)	**6AG2136-6BA01-2CA0**
Suitable BaseUnits	
SIPLUS ET 200SP BU15-P16+A0+2D TX RAIL Approved in accordance with railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A); for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP00-4DA0**
SIPLUS ET 200SP BU15-P16+A0+2B TX RAIL Approved in accordance with railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP00-4BA0**
SIPLUS ET 200SP BU15-P16+A10+2D TX RAIL Approved in accordance with railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A); for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP20-4DA0**
SIPLUS ET 200SP BU15-P16+A10+2B TX RAIL Approved in accordance with railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP20-4BA0**
Accemssories	
SIPLUS Mounting Kit ET 200SP Mounting accessories for use with increased mechanical vibration and shock loads.	**6AG1193-6AA00-0AA0**

*** You can order this quantity or a multiple thereof.**

Overview

Important properties:

- 4-channel digital fail-safe output module for SIPLUS extreme ET 200SP RAIL
- Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic
- Fail-safe 2-channel activation (sinking/sourcing output) by actuators
- Actuators can be controlled up to 2 A or 0.5 A
- Certified up to SIL 3 (IEC 61508), PL e (ISO 13849)
- Can be plugged into type A0 BaseUnits (BU) with automatic coding
- LED display for error, operation, supply voltage and status
- Clear labeling on front of module
  - Plain text identification of the module type and function class
  - 2D matrix code (order and serial number)
  - Connection diagram
  - Color coding of the DI module type: White
  - Hardware and firmware version
  - CC color code for module-specific color coding of the potentials at the terminals of the BU
  - Complete Article No.
- Optional labeling accessories
  - Labeling strips
  - Equipment labeling plate
- Optional module-specific color identification of the terminals according to the color code CC
- Optional system-integrated shield connection
- The modules support PROFIsafe in both PROFIBUS and PROFINET configurations
- They can be used with all fail-safe SIMATIC S7 CPUs

Application

The fail-safe modules of SIPLUS extreme ET 200SP RAIL can be used to implement the safety-related application requirements as an integral part of the overall automation. The safety functions required for fail-safe operation are integrated in these modules. Communication with the fail-safe SIMATIC S7 CPUs is performed by means of PROFIsafe.

The modules can be operated both in centralized and distributed configurations.

Design

Suitable BaseUnits

BaseUnits with an appropriate number of terminals are available for single and multi-conductor connections.

A light BaseUnit opens a new load group. The supply voltage to the sensors must be fed via this BU. The first BU next to the interface module must always be a light BU.

A dark BaseUnit forwards the supply voltage of the adjacent light BaseUnit on the left via self-assembling voltage buses. A new infeed is therefore only required on the next light BaseUnit to the right.

All variants that correspond to the BU type of the I/O module can be used as BaseUnits.

Color coding of the terminals

The potentials at the terminals of the BaseUnit are defined by the I/O module. Optionally, the potentials of the terminals can be identified by module-specific color-coding labels to prevent wiring errors. The color-coded label that matches the respective I/O module is defined by the color code CCxx of the I/O module. This color code is also printed on the front of the module.

In BaseUnits with the 10 internally jumpered AUX terminals, these can also be identified with color-coding labels. For the 10 AUX terminals, color-coding labels are available in red, blue, and yellow/green.

System-integrated shield connection

For the space-saving and EMC-optimized connection of cable shields, a shield connection is available that is quick and easy to mount. This consists of one shield connection element that can be plugged onto the BaseUnit and one shield terminal for each module. The low-impedance connection to the functional ground (DIN rail) is achieved without any additional wiring by the user.

Technical specifications

Article number	**6AG2136-6DB00-1CA0** SIPLUS ET 200SP F-DQ 4X24VDC/2A PM RAIL	**6AG2136-6DC00-1CA0** SIPLUS ET 200SP F-DQ 8x24VDC 0.5A RAIL
General information		
Product type designation	F-DQ 4x24VDC HF	F-DQ 8x24 V DC/0.5 A PP HF
Supply voltage		
Rated value (DC)	24 V	24 V
Reverse polarity protection	Yes	Yes
Digital outputs		
Type of digital output	Transistor	Transistor
Number of digital outputs	4	8
Digital outputs, parameterizable	Yes	Yes
Short-circuit protection	Yes	Yes
Open-circuit detection	Yes	No
Overload protection	Yes	
Limitation of inductive shutdown voltage to	typ. 2*47V	Typ. -39 V
Controlling a digital input		Yes
Switching capacity of the outputs • with resistive load, max. • on lamp load, max.	 2 A 10 W	 0.5 A 2 W
Load resistance range • lower limit • upper limit	 12 Ω 2 000 Ω	 48 Ω 12 000 Ω
Output voltage • for signal "1", min.	 24 V; L+ (-0.5 V)	 24 V; L+ (-0.5 V)
Output current • for signal "1" rated value • for signal "0" residual current, max.	 2 A 0.5 mA	 0.5 A 0.5 mA
Switching frequency • with resistive load, max. • with inductive load, max. • with capacitive load, max. • on lamp load, max.	 30 Hz; Symmetrical 0.1 Hz; according to IEC 60947-5-1, DC-13, symmetrical 10 Hz; Symmetrical	 30 Hz; Symmetrical 0.1 Hz; according to IEC 60947-5-1, DC-13, symmetrical 2 Hz; Symmetrical 10 Hz; Symmetrical
Total current of the outputs • Current per channel, max. • Current per module, max.	 2 A; note derating data in the manual 6 A; note derating data in the manual	 0.5 A; note derating data in the manual 3 A; note derating data in the manual
Total current of the outputs (per module) • horizontal installation - up to 40 °C, max. - up to 50 °C, max. - up to 60 °C, max. - up to 70 °C, max. • vertical installation - up to 50 °C, max.	 6 A; note derating data in the manual 5 A; note derating data in the manual 4 A; note derating data in the manual 4 A; note derating information in the manual; only with configured slots to the left and right of the module	 3 A; note derating data in the manual 2.5 A; note derating data in the manual 2 A; note derating data in the manual 2 A; note derating information in the manual; only with configured slots to the left and right of the module 2 A; note derating data in the manual
Interrupts/diagnostics/status information		
Diagnostics function	Yes	Yes
Substitute values connectable	No	No
Alarms • Diagnostic alarm	 Yes	 Yes
Diagnostics indication LED • RUN LED • ERROR LED • Monitoring of the supply voltage (PWR-LED) • Channel status display • for channel diagnostics • for module diagnostics	 Yes; green LED Yes; red LED Yes; green PWR LED Yes; green LED Yes; red LED Yes; green/red DIAG LED	 Yes; green LED Yes; red LED Yes; green PWR LED Yes; green LED Yes; red LED Yes; green/red DIAG LED
Potential separation		
Potential separation channels • between the channels and backplane bus	 Yes	 Yes
Standards, approvals, certificates		
Suitable for safety functions	Yes	Yes
Highest safety class achievable in safety mode • Performance level according to ISO 13849-1 • SIL acc. to IEC 61508 • SIL in accordance with EN 50126, 50128, 50129	 PLe SIL 3 SIL 2; a higher safety integrity level is possible if tested and approved for the specific application under consideration of all local regulations.	 PLe SIL 3 SIL 2; a higher safety integrity level is possible if tested and approved for the specific application under consideration of all local regulations.

Article number	**6AG2136-6DB00-1CA0** SIPLUS ET 200SP F-DQ 4X24VDC/2A PM RAIL	**6AG2136-6DC00-1CA0** SIPLUS ET 200SP F-DQ 8x24VDC 0.5A RAIL
Railway application		
• EN 50121-3-2	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support
Ambient conditions		
Ambient temperature during operation		
• horizontal installation, min.	-30 °C; = Tmin (incl. condensation/frost)	-30 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155); +70 °C continuously with configured slots to the left and right of the module (OT3, ST0 acc. to EN 50155)	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155); +70 °C continuously with configured slots to the left and right of the module (OT3, ST0 acc. to EN 50155)
• vertical installation, min.	-30 °C; = Tmin	-30 °C; = Tmin
• vertical installation, max.	50 °C; = Tmax	50 °C; = Tmax
Altitude during operation relating to sea level		
• Installation altitude above sea level, max.	2 000 m	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity		
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance		
• Coolants and lubricants		
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems		
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *
- Against mechanical environmental conditions acc. to EN 60721-3-3	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Use on land craft, rail vehicles and special-purpose vehicles		
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *
- Against mechanical environmental conditions acc. to EN 60721-3-5	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
- against mechanical environmental conditions in agriculture acc. to ISO 15003	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)

Article number	**6AG2136-6DB00-1CA0** SIPLUS ET 200SP F-DQ 4X24VDC/2A PM RAIL	**6AG2136-6DC00-1CA0** SIPLUS ET 200SP F-DQ 8x24VDC 0.5A RAIL
• Usage in industrial process technology		
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichloreth-ylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichloreth-ylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark		
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating		
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A
Dimensions		
Width	15 mm	15 mm
Height	73 mm	73 mm
Depth	58 mm	58 mm
Weights		
Weight, approx.	57 g	48 g
Other		
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

Version	Article No.
SIPLUS ET 200SP F-DQ 4x24VDC High Feature T1 RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type A0, color code CC02; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -25 ... +60 °C (+70 °C for 10 min.)	**6AG2136-6DB00-1CA0**
SIPLUS ET 200SP F-DQ 8x24VDC 0.5A RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type A0, color code CC02; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -30 ... +60 °C (+70 °C for 10 min.)	**6AG2136-6DC00-1CA0**
Suitable BaseUnits	
SIPLUS ET 200SP BU15-P16+A0+2D TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type A0; BaseUnit (light) with 16 push-in terminals to the module; for starting a new load group (max. 10 A); for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP00-4DA0**
SIPLUS ET 200SP BU15-P16+A0+2B TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type A0; BaseUnit (dark) with 16 push-in terminals to the module; for continuing the load group; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP00-4BA0**
SIPLUS ET 200SP BU15-P16+A10+2D TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type A0; BaseUnit (light) with 16 push-in terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A); for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP20-4DA0**
SIPLUS ET 200SP BU15-P16+A10+2B TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type A0; BaseUnit (dark) with 16 push-in terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP20-4BA0**
Accessories	
SIPLUS Mounting Kit ET 200SP Mounting accessories for use with increased mechanical vibration and shock loads.	**6AG1193-6AA00-0AA0**

* You can order this quantity or a multiple thereof.

Overview

The digital F-electronic module SIPLUS ET 200SP F-RQ 24VDC230VAC/5A RAIL has the following properties:

- Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic
- 1 relay output (2 NO contacts)
- Total output current 5 A
- Rated load voltage 24 V DC and 24 ... 230 V AC
- The control circuit of the two safety relays must be routed from the outside to the respective terminals.

The attainable safety integrity level is SIL 3 (IEC 61508) when the control of the F-RQ module is implemented via a fail-safe output (e.g. of SIPLUS ET 200SP F-DQ 4x24VDC High Feature T1 RAIL).

Application

The 1 F-RQ module is very versatile and can be used in multiple ways, e.g.

- for switching of external voltages,
- when floating signals are needed,
- for controller releases,
- when higher switching capacities (> 2 A) or other voltage levels are needed.

Design

Control must be carried out from the outside via a fail-safe electronic module to the respective IN P and IN M terminals. The ET 200SP 4 F-DQ (6AG2136-6DB00-1CA0) can be used for this, for example.

One channel of the 4 F-DQ module can be used to control a further 1 F-RQ module. The output signal can be looped through for this purpose: OUT P and OUT M of the first 1F-RQ module are wired to IN P and IN M of the second 1F-RQ module.

Technical specifications

Article number	**6AG2136-6RA00-1BF0** SIPLUS ET 200SP F-RQ 24VDC230VAC/5A RAIL
General information	
Product type designation	F-RQ 1x24 V DC/24 ... 230 V AC/5 A
Supply voltage	
Rated value (DC)	24 V; Coil voltage
Digital outputs	
Type of digital output	Relays
Number of digital outputs	1
Limitation of inductive shutdown voltage to	No
Controlling a digital input	Yes
Switching capacity of the outputs • with resistive load, max. • on lamp load, max.	 5 A 25 W
Switching frequency • with resistive load, max. • with inductive load, max. • with inductive load (acc. to IEC 60947-5-1, DC13), max. • with inductive load (acc. to IEC 60947-5-1, AC15), max.	 2 Hz 0.1 Hz; See data in manual 0.1 Hz 2 Hz
Total current of the outputs (per module) • horizontal installation - up to 40 °C, max. - up to 50 °C, max. - up to 60 °C, max. - up to 70 °C, max. • vertical installation - up to 50 °C, max.	 5 A; note derating data in the manual 4 A; note derating data in the manual 3 A; note derating data in the manual 3 A; note derating information in the manual; only with configured slots to the left and right of the module 3 A; note derating data in the manual
Relay outputs • Number of relay outputs • Rated supply voltage of relay coil L+ (DC) • Current consumption of relays (coil current of all relays), max. • external protection for relay outputs • Relay approved acc. to UL 508	 1; 2 NO contacts 24 V 70 mA yes; 6 A, see data in manual Yes; Pilot Duty B300, R300

Article number	**6AG2136-6RA00-1BF0** SIPLUS ET 200SP F-RQ 24VDC230VAC/5A RAIL
Switching capacity of contacts	
• with inductive load, max.	see additional description in the manual
• with resistive load, max.	see additional description in the manual
• Thermal continuous current, max.	5 A
• Switching current, min.	1 mA
• Switching current after exceeding 300 mA, min.	10 mA
• Switching current after exceeding 300 mA, max.	5 A
• Rated switching voltage (DC)	24 V
• Rated switching voltage (AC)	230 V
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Diagnostics indication LED	
• RUN LED	Yes; green/red DIAG LED
• Channel status display	Yes; green LED
Potential separation	
Potential separation channels	
• between the channels and backplane bus	Yes
Standards, approvals, certificates	
Suitable for safety functions	Yes
Highest safety class achievable in safety mode	
• Performance level according to ISO 13849-1	PLe
• SIL acc. to IEC 61508	SIL 3
• SIL in accordance with EN 50126, 50128, 50129	SIL 2; a higher safety integrity level is possible if tested and approved for the specific application under consideration of all local regulations.
Railway application	
• EN 50121-3-2	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV3; pollution degree PD2; UNm = 230 V AC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-30 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155); +70 °C continuously with configured slots to the left and right of the module (OT3, ST0 acc. to EN 50155)
• vertical installation, min.	-30 °C; = Tmin
• vertical installation, max.	50 °C; = Tmax
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity	
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance	
• Coolants and lubricants	
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems	
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *
• Use on land craft, rail vehicles and special-purpose vehicles	
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *
• Usage in industrial process technology	
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark	
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating	
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A

Article number	**6AG2136-6RA00-1BF0** SIPLUS ET 200SP F-RQ 24VDC230VAC/5A RAIL
Dimensions	
Width	20 mm
Height	73 mm
Depth	58 mm
Weights	
Weight, approx.	56 g
Other	
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

	Version	Article No.
	SIPLUS ET 200SP F-RQ 24VDC230VAC/5A RAIL Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type F0, relay output (2 NO contacts), total output current 5 A, load voltages 24 V DC and 24 ... 230 V AC; can be used up to SIL3 / Category 4/PL e if controlled via F-DQ	**6AG2136-6RA00-1BF0**
	Suitable BaseUnits	
	SIPLUS ET 200SP BU20-P8+A4+0B TX RAIL Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type F0; BaseUnit (dark) with 8 process terminals to the module and additional 4 internally jumpered AUX terminals (1 A to 4 A); for continuing the load group	**6AG2193-6BP20-4BF0**

*** You can order this quantity or a multiple thereof.**

Overview

Analog fail-safe input module:

- F-AI 4xI 0(4)..20 mA 2/4-wire High Feature for BU types A0 and A1, color code CC00
- F-AI 4xU 0..10 V HF, BU type A0, A1, color code CC00

Important features:

- Approved in accordance with railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic
- 4-channel analog fail-safe input module for ET 200SP
- 4 analog inputs with galvanic isolation between channels and backplane bus
- Measuring ranges: (0)4...20 mA
- Connection option for current sensors for measuring temperature, pressure, flow, level, distance measurement, etc.
- Short-circuit-proof power supply for analog sensors
- Resolution: 16 bits including sign
- Certified up to SIL 3 (IEC 61508), PL e (ISO 13849)
- Can be plugged onto type A0 and A1 BaseUnits (BU)
- LED display for error, operation, supply voltage and status
- Interference frequency suppression, smoothing
- Diagnostics: Wire break, short-circuit
- Firmware update
- Identification data I&M
- Value status
- Clear labeling on the front of module
  - Plain text identification of the module type and function class
  - 2D matrix code (order and serial number)
  - Connection diagram
  - Color coding of the DI module type: White
  - Hardware and firmware version
  - CC color code for module-specific color coding of the potentials at the terminals of the BU
  - Complete article no.
- Optional labeling accessories
  - Labeling strips
  - Equipment labeling plate
- Optional module-specific color identification of the terminals according to the color code CC
- Optional system-integrated shield connection
- The modules support PROFIsafe in both PROFIBUS and PROFINET configurations. They can be used with all fail-safe SIMATIC S7 CPUs.

Application

The fail-safe modules of ET 200SP can be used to implement the safety-related application requirements as an integral part of the overall automation. The safety functions required for fail-safe operation are integrated in these modules. Communication with the fail-safe SIMATIC S7 CPUs is performed by means of PROFIsafe.

The modules can be operated both in centralized and distributed configurations.

Design

Suitable BaseUnits

BaseUnits with an appropriate number of terminals are available for single and multi-conductor connections.

A light BaseUnit opens a new load group. The supply voltage to the sensors must be fed via this BU. The first BU next to the interface module must always be a light BU.

A dark BaseUnit forwards the supply voltage of the adjacent light BaseUnit on the left via self-assembling voltage buses. A new infeed is therefore only required on the next light BaseUnit to the right.

All variants that correspond to the BU type of the I/O module can be used as BaseUnits.

Color identification of the terminals

The potentials at the terminals of the BaseUnit are defined by the I/O module. Optionally, the potentials of the terminals can be identified by module-specific color-coding labels to prevent wiring errors. The color-coded label that matches the respective I/O module is defined by the color code CCxx of the I/O module. This color code is also printed on the front of the module.

System-integrated shield connection

For the space-saving and EMC-optimized connection of cable shields, a shield connection is available that is quick and easy to mount. It consists of one shield connection element that can be plugged onto the BaseUnit and one shield terminal for each module. The low-impedance connection to the functional ground (DIN rail) is achieved without any additional wiring by the user.

Technical specifications

Article number	**6AG2136-6AA00-1CA1** SIPLUS ET 200SP F-AI 4xI 2/4-w HF RAIL	**6AG2136-6AB00-1CA1** SIPLUS ET 200SP F-AI 4xU 0..10V HF RAIL
General information		
Product type designation	F-AI 4xI 0(4)..20mA 2-/4-wire HF	F-AI 4XU 0..10V HF
Operating mode		
• cyclic measurement		Yes
• Oversampling		No
• MSI		No
Supply voltage		
Rated value (DC)	24 V	24 V
Reverse polarity protection	Yes	Yes
Analog inputs		
Number of analog inputs		
• For current measurement	4	4
• For voltage measurement	4	4
permissible input voltage for voltage input (destruction limit), max.		35 V
permissible input current for current input (destruction limit), max.	35 mA	
Input ranges (rated values), voltages		
• 0 to +10 V		Yes
Input ranges (rated values), currents		
• 0 to 20 mA	Yes	
• 4 mA to 20 mA	Yes	
Cable length		
• shielded, max.	1 000 m	200 m
Analog value generation for the inputs		
Integration and conversion time/resolution per channel		
• Resolution with overrange (bit including sign), max.	16 bit	16 bit
• Integration time, parameterizable	Yes	Yes
• Integration time (ms)	20 / 16,667	20 / 16,667
• Interference voltage suppression for interference frequency f1 in Hz	50 / 60 Hz	50 / 60 Hz
Smoothing of measured values		
• Number of smoothing levels	7	7
• parameterizable	Yes	Yes
• Average value filter		Yes
Encoder		
Connection of signal encoders		
• for voltage measurement		Yes
• for current measurement as 2-wire transducer	Yes	
- Burden of 2-wire transmitter, max.	650 Ω	
• for current measurement as 4-wire transducer	Yes	
Errors/accuracies		
Basic error limit (operational limit at 25 °C)		
• Voltage, relative to input range, (+/-)		0.1 %
• Current, relative to input range, (+/-)	0.1 %	
Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency		
• Series mode interference (peak value of interference < rated value of input range), min.	40 dB	40 dB
• Common mode voltage, max.		10 V
• Common mode interference, min.	70 dB	70 dB
Interrupts/diagnostics/status information		
Diagnostics function	Yes	Yes
Alarms		
• Diagnostic alarm	Yes	Yes
• Limit value alarm	Yes	No
Diagnoses		
• Monitoring the supply voltage	Yes	Yes
• Wire-break	Yes; Measuring range 4 to 20 mA only	Yes
• Short-circuit	Yes	
Diagnostics indication LED		
• RUN LED	Yes; green LED	Yes; green LED
• ERROR LED	Yes; red LED	Yes; red LED
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED	Yes; green PWR LED
• Channel status display	Yes; green LED	Yes; green LED
• for channel diagnostics	Yes; red LED	Yes; red LED
• for module diagnostics	Yes; green/red LED	Yes; green/red DIAG LED
Potential separation		
Potential separation channels		
• between the channels and backplane bus	Yes	Yes

Article number	**6AG2136-6AA00-1CA1** SIPLUS ET 200SP F-AI 4xI 2/4-w HF RAIL	**6AG2136-6AB00-1CA1** SIPLUS ET 200SP F-AI 4xU 0..10V HF RAIL
Standards, approvals, certificates		
Highest safety class achievable in safety mode		
• Performance level according to ISO 13849-1	PLe	PLe
• SIL acc. to IEC 61508	SIL 3	SIL 3
• SIL in accordance with EN 50126, 50128, 50129	SIL 2; a higher safety integrity level is possible if tested and approved for the specific application under consideration of all local regulations.	SIL 2; a higher safety integrity level is possible if tested and approved for the specific application under consideration of all local regulations.
Probability of failure (for service life of 20 years and repair time of 100 hours)		
• Low demand mode: PFDavg in accordance with SIL3	< 5.00E-05	< 5.00E-05
• High demand/continuous mode: PFH in accordance with SIL3	< 1.00E-09 1/h	< 1.00E-09 1/h
Railway application		
• EN 50121-3-2	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support
Ambient conditions		
Ambient temperature during operation		
• horizontal installation, min.	-30 °C; = Tmin (incl. condensation/frost)	-30 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155); +70 °C continuously with configured slots to the left and right of the module (OT3, ST0 acc. to EN 50155)	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155); +70 °C continuously with configured slots to the left and right of the module (OT3, ST1/ST2 acc. to EN 50155)
• vertical installation, min.	-30 °C; = Tmin	-30 °C; = Tmin
• vertical installation, max.	50 °C; = Tmax	50 °C; = Tmax
Altitude during operation relating to sea level		
• Installation altitude above sea level, max.	2 000 m	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity		
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance		
• Coolants and lubricants		
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems		
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *
- Against mechanical environmental conditions acc. to EN 60721-3-3	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)

Article number	**6AG2136-6AA00-1CA1** SIPLUS ET 200SP F-AI 4xI 2/4-w HF RAIL	**6AG2136-6AB00-1CA1** SIPLUS ET 200SP F-AI 4xU 0..10V HF RAIL
• Use on land craft, rail vehicles and special-purpose vehicles		
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *
- Against mechanical environmental conditions acc. to EN 60721-3-5	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
- against mechanical environmental conditions in agriculture acc. to ISO 15003	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Usage in industrial process technology		
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichloreth-ylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichloreth-ylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark		
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating		
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A
Dimensions		
Width	15 mm	15 mm
Height	73 mm	73 mm
Depth	58 mm	58 mm
Weights		
Weight, approx.	48 g	48 g
Other		
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

Version	Article No.
SIPLUS ET 200SP F-AI 4xI 2/4-w HF RAIL Approved in accordance with railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic BU type A0, A1, color code CC00; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -30 ... +55 °C T1 (+70 °C for 10 min.)	**6AG2136-6AA00-1CA1**
SIPLUS ET 200SP F-AI 4xU 0..10V HF RAIL OT2 Approved in accordance with railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic BU type A0, A1, color code CC00; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -25 ... +70 °C ST1/2 (85 °C for 10min)	**6AG2136-6AB00-1CA1**
Suitable SIPLUS extreme RAIL BaseUnits, type A0	
SIPLUS ET 200SP BU15-P16+A0+2D TX RAIL Approved in accordance with railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A); for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP00-4DA0**
SIPLUS ET 200SP BU15-P16+A0+2B TX RAIL Approved in accordance with railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP00-4BA0**
SIPLUS ET 200SP BU15-P16+A10+2D TX RAIL Approved in accordance with railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A); for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP20-4DA0**
SIPLUS ET 200SP BU15-P16+A10+2B TX RAIL Approved in accordance with railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP20-4BA0**
SIPLUS extreme RAIL BaseUnits type A1 (with temperature detection)	
SIPLUS ET 200SP BU15-P16+A0+2D/T TX RAIL Approved in accordance with railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic BU type A1; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A)	**6AG2193-6BP00-4DA1**
Accessories	
SIPLUS Mounting Kit ET 200SP Mounting accessories for use with increased mechanical vibration and shock loads. Can be used with SIPLUS BaseUnits with heights up to 117 mm, types A0/A1 without AUX or add-on terminals as well as types B0, B1, C0, C1, D0, U0	**6AG1193-6AA00-0AA0**
Other accessories	See SIMATIC ET 200SP analog F-input modules

*** You can order this quantity or a multiple thereof.**

Overview

Digital fail-safe power module:
F-PM-E PPM 24 V DC/8 A for BU type C0, color code CC52

Other properties:

- Certified up to SIL 3 (IEC 61508), PL e (ISO 13849)
- Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic
- Safety-related shutdown of output modules within the potential group of the F-PM-E
- Two fail-safe digital inputs, for reading of sensor information (1 or 2 channels)
- One fail-safe digital output onboard (ppm switching, up to 2 A, up to SIL 3/PL e)
- Fail-safe digital output and potential supply pp or pm switching can be parameterized
- Parameterizable onboard evaluation of the fail-safe inputs for control of the fail-safe digital outputs and of the potential group
- Digital standard output modules can be shut down up to PL d (ISO 13849) and SIL 2 (IEC 61508) (up to 8 A).
- Can be plugged into type C0 BaseUnits (BU) with automatic coding
- LED display for error, operation, supply voltage and status
- Clear labeling on front of module
  - Plain text identification of the module type and function class
  - 2D matrix code (order and serial number)
  - Connection diagram
  - Color coding of the module type DI: white
  - Hardware and firmware version
  - Color code CC for module-specific color coding of the potentials at the BU terminals
  - Complete Article No.
- Optional labeling accessories
  - Labeling strips
  - Equipment labeling plate
- Optional module-specific color identification of the terminals according to the color code CC
- Optional system-integrated shield connection
- The modules support PROFIsafe in both PROFIBUS and PROFINET configurations.
- They can be used with all fail-safe SIMATIC S7 CPUs

Application

The fail-safe modules of SIPLUS extreme ET 200SP RAIL can be used to implement the safety-related application requirements as an integral part of the overall automation. The safety functions required for fail-safe operation are integrated in these modules. Communication with the fail-safe SIMATIC S7 CPUs is performed by means of PROFIsafe.

The modules can be operated both in centralized and distributed configurations.

Design

Usable BaseUnits

For a single- or multi-conductor connection, BaseUnits with an appropriate number of terminals are available.

A light BaseUnit opens a new load group. The power supply to the sensors must be fed via this BU. The first BU next to the interface module must always be a light BU.

A dark BaseUnit forwards the power supply of the adjacent light BaseUnit on the left via self-assembling voltage buses. A new infeed is therefore only required on the next light BaseUnit to the right.

All variants that correspond to the BU type of the I/O module can be used as BaseUnits.

Color identification of the terminals

The potentials at the terminals of the BaseUnit are defined by the I/O module. Optionally, the potentials of the terminals can be identified by module-specific color-coding labels to prevent wiring errors. The color-coded label that matches the respective I/O module is defined by the color code CCxx of the I/O module. This color code is also printed on the front of the module.

In BaseUnits with the 10 internally jumpered AUX terminals, these can also be identified with color coding labels. For the 10 AUX terminals, color-coding labels are available in red, blue, and yellow/green.

System-integrated shielded connection

For the connection of cable shields that is both space-saving as well as optimized in terms of EMC, a shield connection is available that is quick and easy to mount. This consists of one shield connection element that can be plugged onto the BaseUnit and one shield terminal for each module. The low-impedance connection to the functional ground (DIN rail) is achieved without any additional wiring by the user.

Technical specifications

Article number	**6AG2136-6PA00-1BC0** SIPLUS ET 200SP F-PM-E 24VDC/8A PPM RAIL
General information	
Product type designation	F-PM-E PPM 24VDC
Product function • I&M data	 Yes; I&M0 to I&M3
Supply voltage	
Rated value (DC)	24 V
Reverse polarity protection	Yes
Encoder supply	
Number of outputs	2
Short-circuit protection	Yes; Electronic (response threshold 0.7 A to 2.1 A)
Output current • up to 60 °C, max.	 0.3 A
24 V encoder supply • 24 V • Short-circuit protection • Output current, max.	 Yes; min. L+ (-1.5 V) Yes 600 mA; Total current of all encoders

Article number	**6AG2136-6PA00-1BC0** SIPLUS ET 200SP F-PM-E 24VDC/8A PPM RAIL
Digital inputs	
Number of digital inputs	2
Source/sink input	Yes; P-reading
Input characteristic curve in accordance with IEC 61131, type 1	Yes
Input voltage • Type of input voltage • Rated value (DC) • for signal "0" • for signal "1"	 DC 24 V -30 to +5 V +15 to +30 V
Input current • for signal "1", typ.	 3.7 mA
Input delay (for rated value of input voltage) • for standard inputs - parameterizable • for technological functions - parameterizable	 Yes No
Digital outputs	
Number of digital outputs	1
Digital outputs, parameterizable	Yes
Short-circuit protection	Yes
Open-circuit detection	Yes
Overload protection	Yes
Limitation of inductive shutdown voltage to	max. 1.5 V
Switching capacity of the outputs • with resistive load, max. • on lamp load, max.	 8 A 100 W
Load resistance range • lower limit • upper limit	 3 Ω 2 000 Ω
Output voltage • for signal "1", min.	 24 V; L+ (-0.5 V)
Output current • for signal "1" rated value • for signal "0" residual current, max.	 8 A 1.5 mA; PP-switching: max. 1.5 mA; PM-switching: max. 1 mA
Switching frequency • with resistive load, max. • with inductive load, max. • on lamp load, max.	 10 Hz; Symmetrical 0.1 Hz; according to IEC 60947-5-1, DC-13, symmetrical 4 Hz; Symmetrical
Total current of the outputs • Current per channel, max. • Current per module, max.	 8 A; note derating data in the manual 8 A; note derating data in the manual
Total current of the outputs (per module) • horizontal installation - up to 40 °C, max. - up to 50 °C, max. - up to 60 °C, max. - up to 70 °C, max.	 8 A; note derating data in the manual 6 A; note derating data in the manual 4 A; note derating data in the manual 4 A; note derating information in the manual; only with configured slots to the left and right of the module
Cable length • shielded, max. • unshielded, max.	 1 000 m 500 m
Interrupts/diagnostics/status information	
Substitute values connectable	No
Alarms • Diagnostic alarm • Hardware interrupt	 Yes No
Diagnostics indication LED • RUN LED • ERROR LED • Monitoring of the supply voltage (PWR-LED) • Channel status display • for channel diagnostics • for module diagnostics	 Yes; green LED Yes; red LED Yes; green PWR LED Yes; green LED Yes; red LED Yes; green/red DIAG LED
Potential separation	
Potential separation channels • between the channels and backplane bus	 Yes
Standards, approvals, certificates	
Suitable for safety functions	Yes
Highest safety class achievable in safety mode • Performance level according to ISO 13849-1 • SIL acc. to IEC 61508 • SIL in accordance with EN 50126, 50128, 50129	 PLe SIL 3 SIL 2; a higher safety integrity level is possible if tested and approved for the specific application under consideration of all local regulations.

Article number	**6AG2136-6PA00-1BC0** SIPLUS ET 200SP F-PM-E 24VDC/8A PPM RAIL
Probability of failure (for service life of 20 years and repair time of 100 hours)	
• Low demand mode: PFDavg in accordance with SIL2	< 2.00E-04
• Low demand mode: PFDavg in accordance with SIL3	< 2.00E-05
• High demand/continuous mode: PFH in accordance with SIL2	< 1.00E-08 1/h
• High demand/continuous mode: PFH in accordance with SIL3	< 1.00E-09 1/h
Railway application	
• EN 50121-3-2	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-30 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155); +70 °C continuously with configured slots to the left and right of the module (OT3, ST0 acc. to EN 50155)
• vertical installation, min.	-30 °C; = Tmin
• vertical installation, max.	50 °C; = Tmax
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity	
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance	
• Coolants and lubricants	
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems	
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *
- Against mechanical environmental conditions acc. to EN 60721-3-3	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Use on land craft, rail vehicles and special-purpose vehicles	
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *
- Against mechanical environmental conditions acc. to EN 60721-3-5	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
- against mechanical environmental conditions in agriculture acc. to ISO 15003	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Usage in industrial process technology	
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark	
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating	
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A
Dimensions	
Width	20 mm
Height	72 mm
Depth	55 mm
Weights	
Weight, approx.	70 g
Other	
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

	Version	Article No.
	SIPLUS ET 200SP F-PM-E 24VDC/8A PPM RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type C0, color code CC52. 2 inputs, 1 output, SIL3/Cat.4/PLe; for areas with extreme exposure to media (conformal coating); ambient temperature -25 ... +55 °C (+70 °C for 10 min.)	**6AG2136-6PA00-1BC0**
	Suitable SIPLUS extreme RAIL BaseUnits, type C0	
	SIPLUS ET 200SP BU20-P6+A2+4D TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type C0; BaseUnit (light) with 6 push-in terminals (1...6) to the module and 2 AUX terminals; new load group	**6AG2193-6BP20-4DC0**
	Accessories	
	SIPLUS Mounting Kit ET 200SP Mounting accessories for use with increased mechanical vibration and shock loads.	**6AG1193-6AA00-0AA0**

* You can order this quantity or a multiple thereof.

Overview

With the BaseUnits (BUs), the SIPLUS extreme RAIL ET 200SP offers a rugged and service-friendly design with permanent wiring:

- Approved in accordance with the railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic
- No tools needed for one-handed wiring using push-in terminals
- Actuation of the spring NC contacts with a standard screwdriver, with a blade width up to 3.5 mm
- Outstanding access due to arrangement of measuring tap, spring NC contacts and cable entry in columns, while at the same time reducing the space required by 64%
- Fault-proof color coding of the spring NC contacts for better orientation in the terminal panel
- Replacement of I/O modules during operation without affecting the wiring
- Operation with module gaps (gaps without I/O module)
- Automatic coding of the I/O modules prevents destruction of the electronics if a module is accidentally inserted in the wrong slot during replacement
- High EMC interference immunity:
  - Self-assembling shielded backplane bus
  - multi-layer conductor plate with shield levels for interference-free signal transmission from the terminal to the I/O module,
  - System-integrated, space-saving shield connection for quick installation
- Self-assembling potential groups without external wiring or jumpers
- Replaceable terminal box
- Side-by-side latching of the BUs for high mechanical and EMC loads
- Optional module-specific color identification of the terminals according to the color code CC
- Optional equipment marking using slide-in equipment labeling plates

Design

The different BaseUnits (BU) facilitate the exact adaptation to the required type of wiring. This enables users to select economical connection systems for the I/O modules used for their task. The TIA Selection Tool assists in the selection of the BaseUnits most suitable for the application.

BaseUnits with the following functions are available:

- Single-conductor connection, with direct connection of the shared return conductor
- Direct multi-conductor connection (2, 3 or 4-wire connection)
- Recording of the terminal temperature for the internal temperature compensation for thermocouple measurements
- AUX or additional terminals for individual use as voltage distribution terminal

The BaseUnits (BU) can be plugged onto DIN mounting rails compliant with EN 60715 (35 x 7.5 mm or 35 mm x 15 mm). The BUs are arranged next to one another beside the interface module, thereby safeguarding the electromechanical link between the individual system components. An I/O module is plugged onto the BUs, which ultimately determines the function of the respective slot and the potentials of the terminals.

Load group formation

Scalable I/O systems usually offer the possibility of individual load group formation. In the case of distributed I/O devices, this previously required an additional power module (feed module) that provided the separation from the left-hand load group as well as the infeed, display, monitoring, and diagnostics of the load voltage. It also featured a filter function against external interference and offered protection against polarity reversal.

All of these functions are now integrated into the basic components of the system in the ET 200SP. For users, this means the elimination of the power module. This saves an additional slot for each load group, resulting in greater flexibility in terms of configuration and ultimately, a saving of storage space.

A light-colored BU separates the self-assembling, internal voltage buses (P1, P2, AUX) and thus opens a new load group. The power supply of a load group must be fed in at the light BU of this load group.

A dark BU forwards the power supply of the adjacent light BU on the left via the self-assembling voltage buses P1, P2 and AUX. A new infeed is therefore only required on the next light BU to the right. The setting of a further light BU is required whenever

- a new load group is to be formed (for example, for isolating the supply voltage from module groups) or
- the maximum current simultaneously required by the load group exceeds the permissible limit of 10 A.

Labeling

Equipment labeling plates

Equipment labeling plates enable the equipment to be easily identified (e.g. compliant with EN 81346). They are easily plugged onto the required component (interface modules, I/O modules and BaseUnits) and when required, they can be easily replaced with the component.

The following labeling components are available:

- Equipment labeling plates, white, ten sheets each with 16 labels, for thermal transfer card printers or labels

SIPLUS extreme RAIL BaseUnits

Color identification of the terminals

The potentials at the terminals of the BaseUnit are defined by the I/O module. Optionally, the potentials of the terminals can be identified by module-specific color-coded labels to prevent wiring errors. The color-coded label that matches the respective I/O module is defined by the color code CCxx of the I/O module. This color code is also printed on the front of the module.

In BaseUnits with 10 internally jumpered AUX terminals, these can also be identified with color-coded labels. For the 10 AUX terminals, color-coded labels are available in red, blue, and yellow/green.

System-integrated shielded connection

For the space-saving and EMC-optimized connection of cable shields, a shield connection is available that is quick and easy to mount. This consists of one shield connection element that can be plugged onto the BaseUnit and one shield terminal for each module. The low-impedance connection to the functional ground (DIN rail) is achieved without any additional wiring by the user.

The BaseUnits can be equipped with an equipment labeling plate.

Technical specifications

Article number	**6AG2193-6BP00-4BA0** SIPLUS ET 200SP BU15-P16+A0+2B TX RAIL	**6AG2193-6BP00-4DA0** SIPLUS ET 200SP BU15-P16+A0+2D TX RAIL	**6AG2193-6BP20-4BA0** SIPLUS ET 200SP BU15-P16+A10+2B TX RAIL	**6AG2193-6BP20-4DA0** SIPLUS ET 200SP BU15-P16+A10+2D TX RAIL
General information				
Product type designation	BU type A0	BU type A0	BU type A0	BU type A0
Hardware configuration				
Slots				
• Number of slots	1	1	1	1
Standards, approvals, certificates				
Railway application				
• EN 50121-3-2	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support
Ambient conditions				
Ambient temperature during operation				
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)
• vertical installation, min.	-40 °C; = Tmin	-40 °C; = Tmin	-40 °C; = Tmin	-40 °C; = Tmin
• vertical installation, max.	50 °C; = Tmax	50 °C; = Tmax	50 °C; = Tmax	50 °C; = Tmax
Altitude during operation relating to sea level				
• Installation altitude above sea level, max.	2 000 m	2 000 m	2 000 m	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity				
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation

Article number	**6AG2193-6BP00-4BA0**	**6AG2193-6BP00-4DA0**	**6AG2193-6BP20-4BA0**	**6AG2193-6BP20-4DA0**
	SIPLUS ET 200SP BU15-P16+A0+2B TX RAIL	SIPLUS ET 200SP BU15-P16+A0+2D TX RAIL	SIPLUS ET 200SP BU15-P16+A10+2B TX RAIL	SIPLUS ET 200SP BU15-P16+A10+2D TX RAIL
Resistance				
• Coolants and lubricants				
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems				
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *
- Against mechanical environmental conditions acc. to EN 60721-3-3	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Use on land craft, rail vehicles and special-purpose vehicles				
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *
- Against mechanical environmental conditions acc. to EN 60721-3-5	Yes; Class 5M2 using the SIPLUS Mounting Kit ET200SP (6AG1193-6AA00-0AA0)	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 5M2 using the SIPLUS Mounting Kit ET (6AG1193-6AA00-0AA0)
- against mechanical environmental conditions in agriculture acc. to ISO 15003	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Usage in industrial process technology				
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark				
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating				
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection	Yes; Type 1 protection	Yes; Type 1 protection	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A
Dimensions				
Width	15 mm	15 mm	15 mm	15 mm
Height	117 mm	117 mm	141 mm	141 mm
Depth	35 mm	35 mm	35 mm	35 mm
Weights				
Weight, approx.	40 g	40 g	50 g	50 g

SIPLUS extreme RAIL BaseUnits

Article number	6AG2193-6BP00-4BA0 SIPLUS ET 200SP BU15-P16+A0+2B TX RAIL	6AG2193-6BP00-4DA0 SIPLUS ET 200SP BU15-P16+A0+2D TX RAIL	6AG2193-6BP20-4BA0 SIPLUS ET 200SP BU15-P16+A10+2B TX RAIL	6AG2193-6BP20-4DA0 SIPLUS ET 200SP BU15-P16+A10+2D TX RAIL
Other				
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Article number	SIPLUS ET 200SP BU20-P12+A0+4B TX RAIL	SIPLUS ET 200SP BU20-P6+A2+4D TX RAIL	SIPLUS ET 200SP BU20-P12+A0+0B TX RAIL	SIPLUS ET 200SP BU15-P16+A0+2D/T TX RAIL	SIPLUS ET 200SP BU20-P8+A4+0B TX RAIL
General information					
Product type designation	BU type B1	BU type C0	BU type D0	BU type A1	BU type F0
Hardware configuration					
Slots					
• Number of slots	1	1	1	1	1
Standards, approvals, certificates					
Railway application					
• EN 50121-3-2	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV3; pollution degree PD2; UNm = 230 V AC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV3; pollution degree PD2; UNm = 230 V AC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV3; pollution degree PD2; UNm = 230 V AC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support
Ambient conditions					
Ambient temperature during operation					
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)
• vertical installation, min.	-40 °C; = Tmin	-40 °C; = Tmin	-40 °C; = Tmin	-40 °C; = Tmin	-40 °C; = Tmin
• vertical installation, max.	50 °C; = Tmax	50 °C; = Tmax	50 °C; = Tmax	50 °C; = Tmax	50 °C; = Tmax
Altitude during operation relating to sea level					
• Installation altitude above sea level, max.	2 000 m	2 000 m	2 000 m	2 000 m	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)

Article number	SIPLUS ET 200SP BU20-P12+A0+4B TX RAIL	SIPLUS ET 200SP BU20-P6+A2+4D TX RAIL	SIPLUS ET 200SP BU20-P12+A0+0B TX RAIL	SIPLUS ET 200SP BU15-P16+A0+2D/T TX RAIL	SIPLUS ET 200SP BU20-P8+A4+0B TX RAIL
Relative humidity					
With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance					
• Coolants and lubricants					
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems					
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *
- Against mechanical environmental conditions acc. to EN 60721-3-3	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Use on land craft, rail vehicles and special-purpose vehicles					
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *
- Against mechanical environmental conditions acc. to EN 60721-3-5	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
- against mechanical environmental conditions in agriculture acc. to ISO 15003	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Usage in industrial process technology					
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark					
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!

SIPLUS extreme RAIL BaseUnits

Article number	SIPLUS ET 200SP BU20-P12+A0+4B TX RAIL	SIPLUS ET 200SP BU20-P6+A2+4D TX RAIL	SIPLUS ET 200SP BU20-P12+A0+0B TX RAIL	SIPLUS ET 200SP BU15-P16+A0+2D/T TX RAIL	SIPLUS ET 200SP BU20-P8+A4+0B TX RAIL
Conformal coating					
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection	Yes; Type 1 protection	Yes; Type 1 protection	Yes; Type 1 protection	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A
Dimensions					
Width	20 mm	20 mm	20 mm	15 mm	20 mm
Height	117 mm	117 mm	117 mm	117 mm	117 mm
Depth	35 mm	35 mm	35 mm	35 mm	35 mm
Weights					
Weight, approx.	48 g	47 g	47 g	40 g	48 g
Other					
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Article number	**6AG2193-6BP00-4DU0** SIPLUS ET 200SP BU20-P16+A0+2D TX RAIL	**6AG2193-6BP00-4BU0** SIPLUS ET 200SP BU20-P16+A0+2B TX RAIL
General information		
Product type designation	BU type U0	BU type U0
Hardware configuration		
Slots		
• Number of slots	1	1
Standards, approvals, certificates		
Railway application		
• EN 50121-3-2	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV3; pollution degree PD2; UNm = 230 V AC	Yes; Railway applications - overvoltage category OV3; pollution degree PD2; UNm = 230 V AC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support
Ambient conditions		
Ambient temperature during operation		
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)
• vertical installation, min.	-40 °C; = Tmin	-40 °C; = Tmin
• vertical installation, max.	50 °C; = Tmax	50 °C; = Tmax
Altitude during operation relating to sea level		
• Installation altitude above sea level, max.	2 000 m	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity		
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation

Article number	**6AG2193-6BP00-4DU0** SIPLUS ET 200SP BU20-P16+A0+2D TX RAIL	**6AG2193-6BP00-4BU0** SIPLUS ET 200SP BU20-P16+A0+2B TX RAIL
Resistance		
• Coolants and lubricants		
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems		
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *
- Against mechanical environmental conditions acc. to EN 60721-3-3	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Use on land craft, rail vehicles and special-purpose vehicles		
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *
- Against mechanical environmental conditions acc. to EN 60721-3-5	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
- against mechanical environmental conditions in agriculture acc. to ISO 15003	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Usage in industrial process technology		
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark		
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating		
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A
connection method / header		
Terminals		
• Terminal type	Push-in terminal	Push-in terminal
• Conductor cross-section, min.	0.14 mm^2; 0.2 mm^2 without wire end ferrule	0.14 mm^2; 0.2 mm^2 without wire end ferrule
• Conductor cross-section, max.	2.5 mm^2; 1.5 mm^2 with wire end ferrule	2.5 mm^2; 1.5 mm^2 with wire end ferrule
• Number of process terminals to I/O module	16	16
• Number of terminals to AUX bus	0	0
• Number of add-on terminals	0	0
• Number of terminals with connection to P1 and P2 bus	2	2
Dimensions		
Width	20 mm	20 mm
Height	117 mm	117 mm
Depth	35 mm	35 mm
Weights		
Weight, approx.	50 g	50 g
Other		
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

Version	Article No.
Suitable SIPLUS extreme RAIL BaseUnits, type A0	
SIPLUS ET 200SP BU15-P16+A0+2D TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A); for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP00-4DA0**
SIPLUS ET 200SP BU15-P16+A0+2B TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP00-4BA0**
SIPLUS ET 200SP BU15-P16+A10+2D TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A); for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP20-4DA0**
SIPLUS ET 200SP BU15-P16+A10+2B TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP20-4BA0**
Suitable SIPLUS extreme RAIL BaseUnits, type B1	
SIPLUS ET 200SP BU20-P12+A0+4B TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type B1; BaseUnit (dark) with 12 process terminals to the module; for continuing the load group; 1 unit	**6AG2193-6BP20-4BB1**
Suitable SIPLUS extreme RAIL BaseUnits, type C0	
SIPLUS ET 200SP BU20-P6+A2+4D TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type C0; BaseUnit (light) with 6 push-in terminals (1...6) to the module and 2 AUX terminals; new load group	**6AG2193-6BP20-4DC0**
Suitable SIPLUS extreme RAIL BaseUnits, type D0	
SIPLUS ET 200SP BU20-P12+A0+0B TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type D0; BaseUnit with 12 push-in terminals, without AUX terminals, bridged to the left; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6BP00-4BD0**
Suitable SIPLUS extreme type A1 RAIL BaseUnits (with temperature detection)	
SIPLUS ET 200SP BU15-P16+A0+2D/T TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type A1; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A)	**6AG2193-6BP00-4DA1**
Suitable SIPLUS extreme RAIL BaseUnits, type F0	
SIPLUS ET 200SP BU20-P8+A4+0B TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type F0; BaseUnit (dark) with 8 process terminals to the module and an additional 4 internally jumpered AUX terminals (1 A to 4 A); for continuing the load group	**6AG2193-6BP20-4BF0**

* You can order this quantity or a multiple thereof.

Version	Article No.
Usable SIPLUS extreme RAIL BaseUnits, type U0	
SIPLUS ET 200SP BU20-P16+A0+2B TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type U0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group	**6AG2193-6BP00-4BU0**
SIPLUS ET 200SP BU20-P16+A0+2D TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic BU type U0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A)	**6AG2193-6BP00-4DU0**
Accessories	
SIPLUS Mounting Kit ET 200SP Mounting accessories for use with increased mechanical vibration and shock loads. Can be used with SIPLUS BaseUnits with heights up to 117 mm, types A0/A1 without AUX or add-on terminals as well as types B0, B1, C0, C1, D0, U0	**6AG1193-6AA00-0AA0**

*** You can order this quantity or a multiple thereof.**

SIPLUS extreme RAIL BusAdapters

Overview

BusAdapters (BA) are available for the SIPLUS extreme RAIL ET 200SP:

- SIPLUS extreme RAIL BusAdapter for the free selection of the connection system (pluggable or direct connection) of PROFINET to devices with a SIPLUS extreme RAIL BusAdapter interface. Another benefit of the SIPLUS extreme RAIL BusAdapter: only the adapter needs to be replaced for subsequent conversion to the rugged FastConnect technology or to repair defective RJ45 sockets.

Application

SIPLUS extreme RAIL BusAdapter

In standard applications with moderate mechanical and EMC loads, SIMATIC BusAdapters with an RJ45 interface can be used, e.g. the BusAdapter BA 2xRJ45.

For machines and systems in which higher mechanical and/or EMC loads act on the devices, a SIMATIC BusAdapter with connection via FastConnect (FC) or fiber-optic cable (SCRJ or LC) is recommended.

An overview of the essential properties of the PN interfaces is shown in the table below

PN interfaces for SIMATIC BusAdapters	Cable connection (FOC)	max. cable length	EMC and mechanical loading	Can be used on devices with SIMATIC BA-interface
RJ45	PROFINET copper cable, pluggable	50 m	Moderate	All
FC (FastConnect)	PROFINET copper cable, direct connection	50 m	Increased 5 times	All

Design

SIPLUS extreme RAIL BusAdapter

- Are plugged onto the device with SIMATIC BusAdapter interface and can be equipped with an equipment labeling plate for identification of the equipment.
- BusAdapters with a copper interface can be used on all devices with a SIPLUS extreme RAIL BusAdapter interface.
- BusAdapter with FOC interface can be used on selected devices with SIMATIC BusAdapter interface (e.g. ET 200SP interface modules with High Feature function class or above, CPU 1512SP (F), etc.)
- Versions with two PN copper interfaces (RJ45 or FastConnect (FC)):
  - BA 2xRJ45 with 2 RJ45 sockets
  - BA 2xFC with 2 FastConnect connections

Assembly

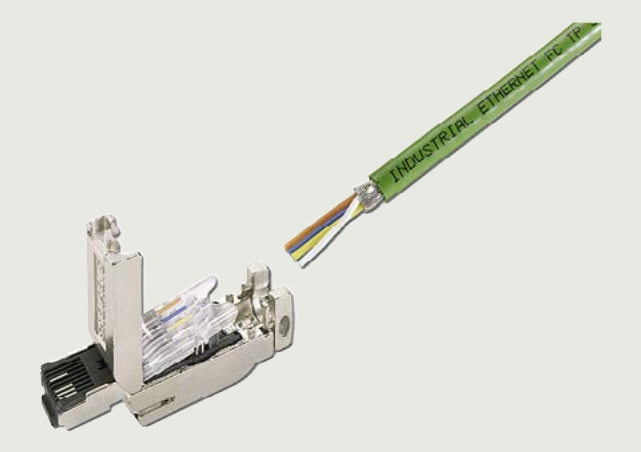
FastConnect (FC)

Using the FastConnect stripping tool, the outer sheath and braided shielding can be quickly and conveniently removed from Industrial Ethernet FastConnect cables in one simple operation. The detached PN bus cable is connected directly to the FC connector by means of the FastConnect terminals – in a similar way to the PROFIBUS connector, tried and tested in millions of applications. It is then only necessary to close the cover and lock it with the slider (no tools required).

FastConnect stripping tool

RJ45

In principle, all industry standard RJ45 Ethernet connectors can be used here. If the PN cable is to be assembled on site, the FastConnect stripping tool can also be used here in connection with the "Industrial Ethernet FastConnect RJ45 Plug 180" connector.



IE FC RJ45 Plug 180

Technical specifications

Article number	**6AG2193-6AR00-4AA0** SIPLUS ET 200SP BA 2XRJ45 TX RAIL	**6AG2193-6AF00-4AA0** SIPLUS ET 200SP BA 2XFC TX RAIL	**6AG2193-6AM00-4AA0** SIPLUS ET 200SP BA 2xM12 RAIL
General information			
Product type designation	BA 2x RJ45	BA 2xFC	BA 2x M12 BusAdapter
Interfaces			
Number of PROFINET interfaces	1	1	1
Supports protocol for PROFINET IO • Number of RJ45 ports • Number of FC (FastConnect) connections • Number of M12 ports	2	2	2
Cable length • Cu conductors	100 m	100 m	100 m
Standards, approvals, certificates			
Railway application			
• EN 50121-3-2	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support

SIPLUS extreme RAIL BusAdapters

Article number	6AG2193-6AR00-4AA0	6AG2193-6AF00-4AA0	6AG2193-6AM00-4AA0
	SIPLUS ET 200SP BA 2XRJ45 TX RAIL	SIPLUS ET 200SP BA 2XFC TX RAIL	SIPLUS ET 200SP BA 2xM12 RAIL
Ambient conditions			
Altitude during operation relating to sea level			
• Installation altitude above sea level, max.	2 000 m	2 000 m	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity			
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance			
• Coolants and lubricants			
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems			
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *
- Against mechanical environmental conditions acc. to EN 60721-3-3		Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Use on land craft, rail vehicles and special-purpose vehicles			
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *
- Against mechanical environmental conditions acc. to EN 60721-3-5		Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
- against mechanical environmental conditions in agriculture acc. to ISO 15003		Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Usage in industrial process technology			
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark			
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating			
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection	Yes; Type 1 protection	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A
Dimensions			
Width	20 mm	20 mm	20 mm
Height	69.5 mm	69.5 mm	73.5 mm
Depth	59 mm	59 mm	59 mm

Article number	**6AG2193-6AR00-4AA0** SIPLUS ET 200SP BA 2XRJ45 TX RAIL	**6AG2193-6AF00-4AA0** SIPLUS ET 200SP BA 2XFC TX RAIL	**6AG2193-6AM00-4AA0** SIPLUS ET 200SP BA 2xM12 RAIL
Weights			
Weight, approx.	46 g	53 g	59 g
Other			
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

Version	Article No.
SIPLUS extreme RAIL BusAdapter	
SIPLUS ET 200SP BA 2XRJ45 TX RAIL For PROFINET interface modules in Standard function class or above; max. cable length 50 m; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6AR00-4AA0**
SIPLUS ET 200SP BA 2XFC TX RAIL For PROFINET interface modules in Standard function class or above; for increased vibration and EMC load rating; max. cable length 50 m; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2193-6AF00-4AA0**
SIPLUS ET 200SP BA 2xM12 RAIL OT4 2 x M12 push-pull sockets, D-coding, also suitable for standard M12, suitable for PROFINET For areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C ST1/2 (+85 °C for 10 min.)	**6AG2193-6AM00-4AA0**
Accessories	
Equipment labeling plate 10 sheets of 16 labels, for printing with thermal transfer card printer or plotter	**6ES7193-6LF30-0AW0**
SIPLUS Mounting Kit ET 200SP Mounting accessories for use with increased mechanical vibration and shock loads. Not approved for SIPLUS BusAdapter BA 2xRJ45	**6AG1193-6AA00-0AA0**

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*** You can order this quantity or a multiple thereof.**

SIPLUS ET 200MP IM 155-5 PN ST TX RAIL

Overview

- Interface modules for linking the ET 200MP to PROFINET
- Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic
- They handle data exchange with the PROFINET IO Controller in the PLC
- Integrated 2-port switch for line topology
- Max. 30 I/O modules
- Shortest bus cycle 250 µs

- Linking to the isochronous task of the CPU
- Prioritized fast startup (FSU) with 500 ms (max. 12 I/O modules)
- Media Redundancy Protocol (MRP)
- Shared device on up to 2 I/O controllers (when configuring using GSD file; depends on the respective configuration tool)
- Omission of SIMATIC Memory Card (SMC); IM replacement without PG using LLDP
- Operation of F-modules and PROFIsafe

As of firmware version 2.0.0, the SIPLUS ET 200MP interface module IM 155-5 PN ST TX RAIL offers the following new functions:

- Submodule-granular shared device with up to two IO controllers
- Configuration control (option handling)
- Module shared input and module shared output (MSI/MSO), i.e. the inputs or outputs of a module can be made available simultaneously to up to two IO controllers

SIPLUS ET 200MP interface module IM155-5 PN HF T1 RAIL features the following additional functions:

- Shared device on up to 4 IO controllers
- Module internal shared input and module shared output (MSI/MSO) on up to four IO controllers
- Operation on a high-availability SIMATIC S7-400H
- Support for the MRPD function (media redundancy with planned duplication)

Article number	**IM 155-5 PN ST TX RAIL** 6AG2155-5AA00-4AB0	**IM155-5 PN HF T1 RAIL** 6AG2155-5AA00-1AC0
Quantity structures		
IO modules	All	All
Max. number IO modules / IM	30	30
Max. number of bytes / slot	256 inputs, 256 outputs	256 inputs, 256 outputs
Max. number bytes / station	512 inputs, 512 outputs	512 inputs, 512 outputs
Update time	250 µs	250 µs
Configuration		
GSDML	Yes	Yes
STEP 7	GSDML	GSDML
TIA Portal	Yes	Yes
PCS 7	No	No
General functions		
Reset to factory settings	TIA Portal	TIA Portal
Device replacement without programming device	LLDP	LLDP
Configuration management (option handling)	Yes	Yes
I&M data	IM 0 … 3	IM 0 … 3
Isochronous mode	Yes	Yes
PROFIsafe	Yes	Yes
PROFINET functions		
RT	Yes	Yes
IRT	Yes	Yes
MRP	Yes	Yes
MRPD	No	No
S2 redundancy	No	Yes
Fast startup	Yes	Yes
Shared device	Yes; up to 2 ctrls.	Yes; up to 4 ctrls.
MSI / MSO	Yes	Yes
Submodules	Yes	Yes

Application

SIPLUS ET 200MP IM 155-5 PN ST TX RAIL and IM 155-5 PN HF T1 RAIL interface modules enables connection of the ET 200MP to PROFINET and handle communication between the modules and the higher-level I/O controller autonomously.

Design

SIPLUS ET 200MP IM 155-5 PN ST TX RAIL and IM 155-5 PN HF T1 RAIL interface modules are directly screwed onto the S7-1500 mounting rail. They feature:

- Diagnostics displays for errors (Error), operation (RUN), maintenance (MAINT), and one link LED per port
- Connection to PROFINET using RJ45 connector
- 24 V DC supply unit for looping through the supply voltage
- Protection of interface module against unauthorized access possible using lock, seal or cable tie

Technical specifications

Article number	**6AG2155-5AA00-1AC0** SIPLUS ET 200MP IM 155-5 PN HF T1 RAIL	**6AG2155-5AA01-4AB0** SIPLUS ET 200MP IM155-5 PN ST TX RAIL
General information		
Product type designation	IM 155-5 PN HF	IM 155-5 PN ST
Product function • I&M data • Isochronous mode	 Yes; I&M0 to I&M3 Yes	 Yes; I&M0 to I&M3 Yes
Engineering with • STEP 7 TIA Portal configurable/integrated from version	 see entry ID: 109746275	 see entry ID: 109746275
Supply voltage		
Rated value (DC)	24 V	24 V
Reverse polarity protection	Yes	Yes
Short-circuit protection	Yes	Yes
Input current		
Current consumption (rated value)	0.2 A	0.2 A
Address area		
Address space per station • Address space per station, max.	 512 byte; per input / output	 512 byte; per input / output
Hardware configuration		
Integrated power supply	Yes	Yes
Rack • Modules per rack, max.	 30; I/O modules	 30; I/O modules
Interfaces		
Number of PROFINET interfaces	1	1
1. Interface		
Interface types • RJ 45 (Ethernet) • Number of ports • integrated switch	 Yes 2 Yes	 Yes 2 Yes
Protocols • PROFINET IO Device • Media redundancy	 Yes Yes; PROFINET MRP	 Yes Yes; PROFINET MRP
Interface types		
RJ 45 (Ethernet) • Transmission procedure • 100 Mbps • Autonegotiation • Autocrossing	 PROFINET with 100 Mbit/s full duplex (100BASE-TX) Yes Yes Yes	 PROFINET with 100 Mbit/s full duplex (100BASE-TX) Yes Yes Yes
Protocols		
PROFINET IO Device • Services - IRT - PROFIenergy - Prioritized startup - Shared device - Number of IO Controllers with shared device, max.	 Yes No Yes Yes 4	 Yes No Yes Yes 2
Redundancy mode • PROFINET system redundancy (S2)	 Yes	 No
Media redundancy • MRP • MRPD	 Yes No	 Yes No
Open IE communication • TCP/IP • SNMP • LLDP	 Yes Yes Yes	 Yes Yes Yes

SIPLUS ET 200MP IM 155-5 PN ST TX RAIL

Article number	**6AG2155-5AA00-1AC0** SIPLUS ET 200MP IM 155-5 PN HF T1 RAIL	**6AG2155-5AA01-4AB0** SIPLUS ET 200MP IM155-5 PN ST TX RAIL
Isochronous mode		
Equidistance	Yes	Yes
shortest clock pulse	250 µs	250 µs
max. cycle	4 ms	4 ms
Interrupts/diagnostics/status information		
Status indicator	Yes	Yes
Alarms	Yes	Yes
Diagnostics function	Yes	Yes
Diagnostics indication LED		
• RUN LED	Yes; green LED	Yes; green LED
• ERROR LED	Yes; red LED	Yes; red LED
• MAINT LED	Yes; Yellow LED	Yes; Yellow LED
• Connection display LINK TX/RX	Yes; Yellow LED	Yes; 2x green-yellow LEDs
Standards, approvals, certificates		
Railway application		
• EN 50121-3-2	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support
Ambient conditions		
Ambient temperature during operation		
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost); start-up @ -25 °C	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155)	70 °C; = Tmax; from > +60 °C no module permissible left of the IM; +85 °C for 10 min. (OT4, ST1/ST2 acc. to EN 50155)
• vertical installation, min.	-40 °C; = Tmin; Startup @ -25 °C	-40 °C; = Tmin
• vertical installation, max.	40 °C; = Tmax	40 °C; = Tmax
Altitude during operation relating to sea level		
• Installation altitude above sea level, max.	2 000 m	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity		
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance		
• Coolants and lubricants - Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air
- Use in stationary industrial systems - to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
• to chemically active substances according to EN60721-3-3 - to mechanically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); * Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); * Yes; Class 3S4 incl. sand, dust, *
• Use on land craft, rail vehicles and special-purpose vehicles - to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
• to chemically active substances according to EN60721-3-5 - to mechanically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); * Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); * Yes; Class 5S3 incl. sand, dust; *

Article number	**6AG2155-5AA00-1AC0** SIPLUS ET 200MP IM 155-5 PN HF T1 RAIL	**6AG2155-5AA01-4AB0** SIPLUS ET 200MP IM155-5 PN ST TX RAIL
• Usage in industrial process technology		
• Against chemically active substances acc. to EN60654-4	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark		
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating		
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN50155	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A
connection method / header		
ET-Connection		
• via BU/BA Send	No	No
Dimensions		
Width	35 mm	35 mm
Height	147 mm	147 mm
Depth	129 mm	129 mm
Weights		
Weight, approx.	350 g	250 g
Other		
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

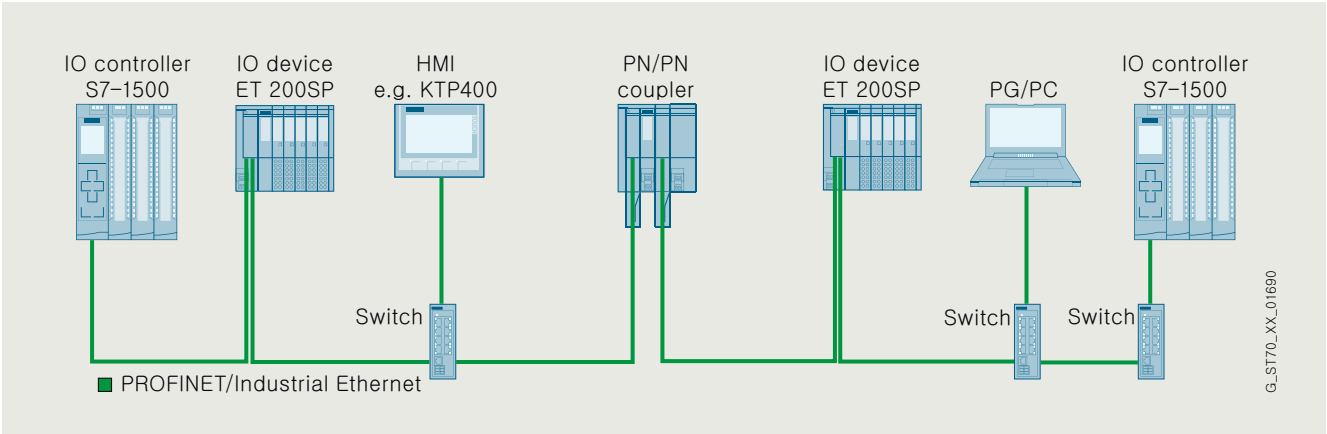
Version	Article No.
SIPLUS ET 200MP interface module IM 155-5 PN ST TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic IP 20 degree of protection, module width 35 mm, mounted on S7-1500 mounting rail; standard functions; for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2155-5AA01-4AB0**
SIPLUS ET 200MP interface module IM 155-5 PN HF T1 RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic IP 20 degree of protection, module width 35 mm, mounted on S7-1500 mounting rail; High Feature version with additional functions for areas with extreme exposure to environmental substances (conformal coating); ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2155-5AA00-1AC0**

*** You can order this quantity or a multiple thereof.**

SIPLUS NET PN/PN Coupler T1 RAIL

Overview

- Fast deterministic data exchange between CPUs with PROFINET controller, even beyond network boundaries
- Configuration with two PROFINET devices completely independent of the communication technology



Data transmission between two S7-1500 IO controllers beyond a PROFINET limit

- Very simple configuration of the data exchange via virtual IO modules or alternatively via data records for larger amounts of data
- Simultaneous data transfer to up to 3 CPUs on own network side and/or up to 4 CPUs on opposite network side
- Easy to integrate into any PROFINET network with 2 ports per network side
- Fieldbus connection via a SIMATIC BusAdapter;
  this allows free selection of the connection system (RJ45, FC cable direct connection) and connection hardware (copper, POF, PCF, glass fiber). FO-to-copper media conversion can also be realized economically and without external converters.

Additional functions

- Quantity structures
  - Cyclic transmission: Up to 1440 bytes each for input and output data
  - Data record transfer: Up to 4096 bytes per slot. Buffering of up to eight data records per slot
  - Maximum 16 input/output areas for data exchange
  - Max. 254 bytes of input and 253 bytes of output data per module
- Exchange of fail-safe data between two F-CPUs via F-SendDP and F_ReceiveDP
- Shared device with up to four IO controllers per network side
- Module-internal shared input / shared output (MSI/MSO)
- Device replacement without programming device
  - With topological configuration via proximity detection (LLDP)
  - Without topological configuration via redundant storage of the station name in the BusAdapter. A separate removable memory card is not required.
- Reset button for restoring the factory settings
- Redundant power supply
- Electrical isolation between the two PROFINET IO subnets
- Media redundancy (MRP and MRPD)
- I&M data
- Firmware update
- Support for Ethernet services (ping, arp, SNMP, MIP-2, LLDP)
- Comprehensive diagnostics via LED displays and interrupts
- Extensive compatibility with the PN/PN coupler up to firmware version V3.0

Application

The PN/PN coupler is used whenever easy-to-configure, fast (deterministic) data exchange between PROFINET controllers is required. Data transmission can be performed both beyond network boundaries as well as within a single network side.

Design

The PN/PN coupler features an enclosure with the dimensions 100 x 117 x 75 mm (WxHxD). It is snapped onto a DIN rail (7.5 mm or 15 mm).

Two galvanically isolated plug-in connections are available for the power supply.

Accessories (not included in the PN/PN coupler scope of supply):

- SIMATIC BusAdapter:
  For connecting the PN/PN coupler to the PROFINET PN IO networks.
- Labeling strips (material: Foil or paper, color: light gray or yellow) and reference identification labels:
  For the labeling.
- Strain relief:
  The space-saving system-integrated strain relief for the PROFINET cable is quickly assembled and allows the use of the PN/PN coupler even with increased mechanical stress.
- Connector:
  Suitable connectors for the PROFINET cable may be required depending on the BusAdapter used.

Function

The PN/PN coupler provides the output data of the writing CPU as input data to the receiving CPUs within a PN cycle. Both failsafe data (via F_SendDP/F_ReceiveDP of a SIMATIC F-CPU only) and standard data can be transmitted.

- Transfer to the opposite side of the network:
  In a PN cycle, the writing CPU provides its output data as input data at the same time as up to four CPUs connected to the other side of the network. The network separation between the two network sides remains completely intact.
- Transfer to the same side of the network:
  In a PN cycle, the writing CPU provides its output data as input data at the same time as up to three other CPUs connected to its own side of the network.

Two basically different methods are available for data transmission:

- Data exchange via virtual I/O modules (coupling modules):
  The local CPU reads the values that the CPU of the other subnet writes over the configured outputs of the coupling partner through the configured inputs of a slot. The local CPU writes values via the configured outputs of a slot. These values are received by the CPU of the other subnet via the configured inputs of the coupling partner.
- Data record transfer:
  Publisher and Storage modules types are used. These consist of read and write combinations. The module types address the data record order by module addresses during data record transfer.

The PN/PN coupler provides extensive diagnostic information about LEDs, interrupts and status bytes. In this way, errors can be quickly located and commissioning and downtimes minimized.

The PN/PN coupler supports a variety of SIMATIC BusAdapters for flexible connection to PROFINET.

Technical specifications

Article number	**6AG2158-3AD10-4XA0** SIPLUS PN/PN Coupler TX RAIL
General information	
Product type designation	PN/PN coupler
Product function	
• I&M data	Yes; I&M0 to I&M3
• Isochronous mode	No; For operation on isochronous bus
• Tool changer	Yes; Docking station and docking unit
• Local coupling, IO data	Yes
- Number of coupling modules	16
- Number of coupling submodules per module	4; 1x write, 3x read
• Local coupling, data records	Yes
- Number of coupling modules	16
- Number of coupling submodules per module	4; 1x write, 3x read
- Record length, max.	4 096 byte
- FIFO depth in storage mode	8
Engineering with	
• STEP 7 TIA Portal configurable/integrated from version	see entry ID: 109746275
Installation type/mounting	
Mounting	Mounting rail 7.5 mm and 15 mm
Supply voltage	
Rated value (DC)	24 V
Reverse polarity protection	Yes
Mains buffering	
• Mains/voltage failure stored energy time	10 ms
Input current	
Current consumption, max.	360 mA; For 19.2 V input voltage at the right-hand supply terminal, including 2 plugged BA 2x LC
from supply voltage 1L+, max.	320 mA; For 19.2 V input voltage at the left-hand supply terminal, including 2 plugged BA 2x LC
Power loss	
Power loss, typ.	4 W; For 24 V input voltage and 2 plugged BA 2x RJ45 If BusAdapters with an optical interface are plugged, there is an additional 750 mW per optical interface (3 W with 2 plugged BA 2x LC)
Address area	
Address space per module	
• Address space per module, max.	254 byte; max. 254 bytes of input data and 253 bytes of output data
Address space per station	
• Address space per station, max.	1 440 byte; per input / output
Hardware configuration	
Submodules	
• Number of submodules per station, max.	116
Interfaces	
Number of PROFINET interfaces	2; One PROFINET interface per line side
Optical interface	Yes; Via SIMATIC BusAdapter
Transmission rate, max.	100 Mbit/s

SIPLUS NET PN/PN Coupler T1 RAIL

Article number	**6AG2158-3AD10-4XA0** SIPLUS PN/PN Coupler TX RAIL
1. Interface	
Interface types	
• Number of ports	2; via BusAdapter
• integrated switch	Yes
• BusAdapter (PROFINET)	Yes; Compatible BusAdapter: BA 2x RJ45, BA 2x FC, BA 2x SCRJ, BA SCRJ / RJ45, BA SCRJ / FC, BA 2x LC, BA LC / RJ45, BA LC / FC
Protocols	
• PROFINET IO Device	Yes
• Open IE communication	Yes
• Media redundancy	Yes; As MRP or MRPD client; max. 50 or 30 devices in the ring
2. Interface	
Interface types	
• Number of ports	2; via BusAdapter
• integrated switch	Yes
Protocols	
• PROFINET IO Device	Yes
• Open IE communication	Yes
• Media redundancy	Yes; As MRP or MRPD client; max. 50 or 30 devices in the ring
Interface types	
RJ 45 (Ethernet)	
• Transmission procedure	PROFINET with 100 Mbit/s full duplex (100BASE-TX)
• 10 Mbps	No
• 100 Mbps	Yes; PROFINET with 100 Mbit/s full duplex (100BASE-TX)
• Autonegotiation	Yes
• Autocrossing	Yes
Protocols	
Supports protocol for PROFINET IO	Yes
Protocols (Ethernet)	
• TCP/IP	Yes
• SNMP	Yes
• LLDP	Yes
• ping	Yes
• ARP	Yes
PROFINET IO Device	
• Services	
• IRT	Yes
• PROFIenergy	No
• Prioritized startup	Yes
• Shared device	Yes
• Number of IO Controllers with shared device, max.	4; per line side
Redundancy mode	
• PROFINET system redundancy (S2)	Yes; NAP S2 acc. to IEC
• H-Sync forwarding	Yes
Media redundancy	
• MRP	Yes
• MRPD	Yes
Open IE communication	
• TCP/IP	Yes
• SNMP	Yes
• LLDP	Yes
Interrupts/diagnostics/status information	
Status indicator	Yes
Alarms	Yes
Diagnostics function	Yes; Parameterizable
Diagnostics indication LED	
• RUN LED	Yes; green LED
• ERROR LED	Yes; red LED
• MAINT LED	Yes; Yellow LED
• LINK LED	Yes; 2x green link LEDs on BusAdapter
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED
Potential separation	
between supply voltage and electronics	Yes; to power input 2
between Ethernet and electronics	Yes

Article number	**6AG2158-3AD10-4XA0** SIPLUS PN/PN Coupler TX RAIL
Standards, approvals, certificates	
Network loading class	3
Security level	According to Security Level 1 Test Cases V1.1.4
Railway application	
• EN 50121-3-2	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support
Ambient conditions	
Ambient temperature during operation	
• min.	-40 °C; = Tmin (incl. condensation/frost)
• max.	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Resistance	
• Coolants and lubricants	
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems	
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *
- Against mechanical environmental conditions acc. to EN 60721-3-3	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Use on land craft, rail vehicles and special-purpose vehicles	
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *
- Against mechanical environmental conditions acc. to EN 60721-3-5	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
- against mechanical environmental conditions in agriculture acc. to ISO 15003	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
• Usage in industrial process technology	
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark	
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating	
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A
Mechanics/material	
Strain relief	Yes; Optional, for RJ45 and FC BusAdapter only
Dimensions	
Width	100 mm; Minimized with good handling
Height	117 mm
Depth	74 mm; with mounting rail
Weights	
Weight, approx.	200 g; without BusAdapter
Other	
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

Version	Article No.
SIPLUS PN/PN Coupler TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic For deterministic data exchange between max. 4 PN controllers per side, also beyond network boundaries; transfer of PROFIsafe, I/O, MSI, MSO and data record communication, redundant power supply PN connection via SIMATIC BusAdapter (BA); supplied without BusAdapter; Suitable for areas with extreme exposure to environmental substances (conformal coating); Ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2158-3AD10-4XA0**

*** You can order this quantity or a multiple thereof.**

Overview

- For data exchange between PROFINET and CAN Bus 2.0A/B or CANopen Manager or Slave (according to CiA 301 & 302)
- Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic
- CANopen features:
  - Node / lifeguarding
  - Heartbeat
  - SYNC (producer / consumer)
- Integrated in TIA via HSP, TIA Portal V14 or higher
- PROFINET switch and 9-pin D-sub plug integrated for CAN
- Up to 126 CAN nodes
- 512 receiver/transmitter PDOs
- Electrical isolation between the two networks
- Diagnostic interrupts
- Controllers supported: S7-1200, S7-1500, ET 200SP, Open Controller

Application

The SIMATIC PN/CAN LINK connects a PROFINET network to the CAN or CANopen fieldbus, and enables the data exchange.

This gives the user the option of communicating with up to 126 CAN nodes.

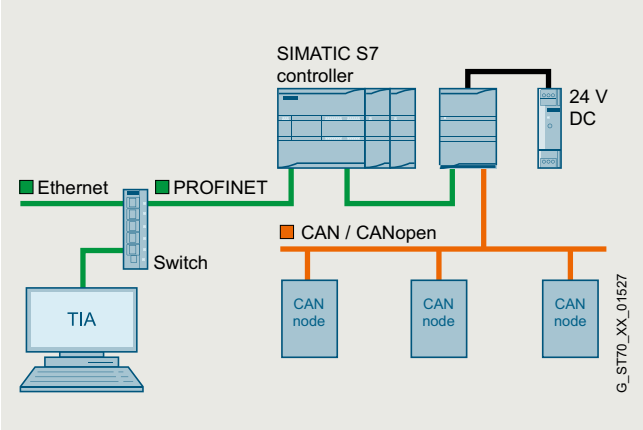
The configuration is made in the TIA Portal V14 or higher. A corresponding HSP is available to the user.

In CANopen mode, external device description files (.eds files) can be imported and exported.

The SIMATIC PN/CAN LINK has an internal PROFINET switch and integrates itself seamlessly into a PROFINET network.

Design

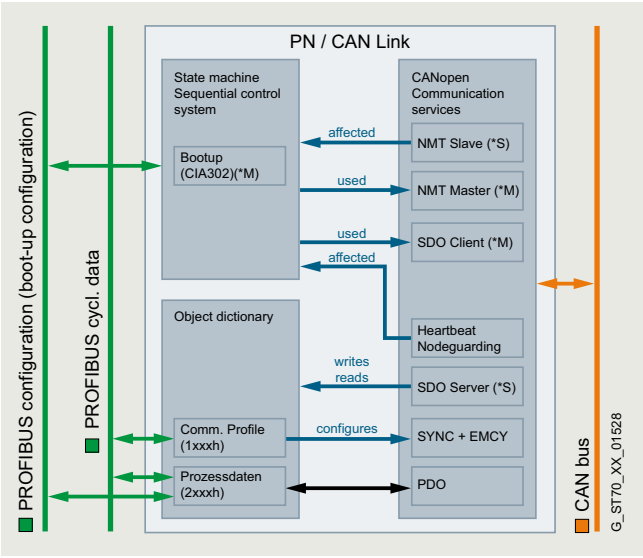
- S7-1200-type enclosure, width 70 mm
- Can be mounted on a standard DIN rail or a control panel
- Connection to PROFINET PN IO networks exclusively via PROFINET by RJ45 connectors
- Connection to CAN Bus via a D-sub connector (9-pin, socket)
- 3-pin connection of the external 24 V DC supply voltage
- Operation without fans or batteries
- LED for visualization of the operating states for CAN, PROFINET and PROFINET ports
- Maximum permissible cable length of the CAN network up to 1 000 m (depending on data transmission rate, cable cross-section, number of participants)



SIMATIC PN/CAN link gateway System configuration

Mode of operation

The following overview diagram shows the communication relationships between CAN and PROFINET:



SIMATIC PN/CAN link gateway CANopen communication principle

SIPLUS PN/CAN LINK TX RAIL

Function

- PROFINET IO device
- Controllers supported: S7-1200, S7-1500, ET 200SP, Open Controller
- Supports 512 receiver and 512 transmitter PDOs
- Baud rate from 50 kbaud to 1 000 kbaud on the CAN side
- Three different operating modes:
  - CANtransparent
  - CANopen Manager
  - CANopen Slave
- Data transmission options:
  - After value change / acyclic
  - Cyclic (after parameter assignment at first to 240th "SYNC")
  - On request out of the application (RTR)
- Cyclic data exchange between the PN/CAN LINK and the connected SIMATIC S7-CPU via update of the IO image
- Acyclic communication via the "Read/write data record" services
- Easy engineering and extensive diagnostics options due to optimum TIA integration

Configuration

- Configuration or data mapping of the SIMATIC PN/CAN LINK via HSP (TIA Portal V14 and higher)
  - CANopen Manager and CANtransparent operating modes (CAN Bus 2.0A/B):
    Complete configuration of the PN/CAN LINK in the TIA Portal. External software is not required.
  - CANopen Slave operating mode
    Configuration of the object directory (OD) of the PN/CAN LINK. The OD is then made available to the CANopen Manager with .EDS file export.
- Saving the configuration data of the SIMATIC PN/CAN LINK in the higher-level SIMATIC S7 controller, automatic transmission during start up
- Representation of the CAN components as submodules in the TIA Portal. Up to 126 CAN components can be integrated.
- Update mechanisms: TIA Portal and Siemens Automation Tool (SAT)

Technical specifications

Article number	**6AG2620-0AA00-4AA0** SIPLUS PN/CAN LINK TX RAIL
General information	
Product type designation	PN/CAN Link
Engineering with • STEP 7 TIA Portal configurable/integrated from version	 see entry ID: 109746275
Installation type/mounting	
Mounting	DIN rail, wall mounting, portrait mounting
Mounting position	any
Recommended mounting position	Horizontal
Rail mounting	Yes
Control cabinet installation	Yes
Supply voltage	
Type of supply voltage	DC
Rated value (DC)	24 V
Reverse polarity protection	Yes
Overvoltage protection	Yes
Short-circuit protection	Yes
Mains buffering • Mains/voltage failure stored energy time	 10 ms
Input current	
Current consumption (rated value)	0.09 A
Current consumption, max.	0.11 A
Power loss	
Power loss, typ.	2.2 W
Interfaces	
Interfaces/bus type	2x Ethernet (RJ45), 1x Sub-D (9-pin)
Supports protocol for PROFINET IO • automatic detection of transmission rate • Transmission rate, max. • Number of RJ45 ports • Number of FC (FastConnect) connections	 No 100 Mbit/s 2 2
PROFINET functions • Assignment of the IP address, supported • Assignment of the device name, supported	 Yes Yes
1. Interface	
Interface type	CAN according to CiA 303-1
Isolated	Yes; 500 V AC or 707 V DC
Interface types • Number of ports • Design of the connection	 1 9-pin sub D socket

Article number	**6AG2620-0AA00-4AA0** SIPLUS PN/CAN LINK TX RAIL
CAN	
• CAN operating modes	CAN Standard CAN 2.0A/B; CANopen Manager / Slave acc. to CiA
• Specification acc. to CiA	CiA 301 & CiA 302
• Transmission rate, min.	50 kbit/s
• Transmission rate, max.	1 000 kbit/s
• Number of slaves, max.	126
• Number of SDOs in parallel	16; Parallel
• Number of PDOs	512; Send / receive
Services	
• Node/life-guarding	Yes
• Heartbeat	Yes
• SYNC	Yes
2. Interface	
Interface type	PROFINET
Isolated	Yes; 1 500 V AC or 2 250 V DC
Interface types	
• RJ 45 (Ethernet)	Yes
• Number of ports	2
• integrated switch	Yes
Protocols	
• PROFINET IO Device	Yes
Interrupts/diagnostics/status information	
Status indicator	Yes
Alarms	Yes
Diagnostics function	Yes
Diagnostics indication LED	
• RUN LED	Yes
• ERROR LED	Yes
• MAINT LED	Yes
• LINK LED	Yes
• RX/TX LED	Yes
Potential separation	
Potential separation exists	Yes
Degree and class of protection	
IP degree of protection	IP20
Standards, approvals, certificates	
Railway application	
• EN 50121-3-2	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)
• vertical installation, min.	-40 °C; = Tmin
• vertical installation, max.	55 °C; = Tmax
• ceiling installation, min.	-40 °C; = Tmin
• ceiling installation, max.	45 °C; = Tmax
• floor installation, min.	-40 °C; = Tmin
• floor installation, max.	45 °C; = Tmax
Ambient temperature during storage/transportation	
• min.	-40 °C
• max.	85 °C
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity	
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation

SIPLUS PN/CAN LINK TX RAIL

Article number	**6AG2620-0AA00-4AA0** SIPLUS PN/CAN LINK TX RAIL
Resistance	
• Coolants and lubricants	
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems	
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *
• Use on land craft, rail vehicles and special-purpose vehicles	
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *
• Usage in industrial process technology	
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark	
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating	
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A
Dimensions	
Width	70 mm
Height	112 mm
Depth	75 mm
Weights	
Weight, approx.	212 g
Other	
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

Version	Article No.
SIPLUS PN/CAN LINK TX RAIL Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic PROFINET network transition according to CAN Bus 2.0A/B, CANopen Manager according to CiA301/302, CANopen Slave according to CiA301/302; IP20 Ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2620-0AA00-4AA0**

* You can order this quantity or a multiple thereof.

Overview

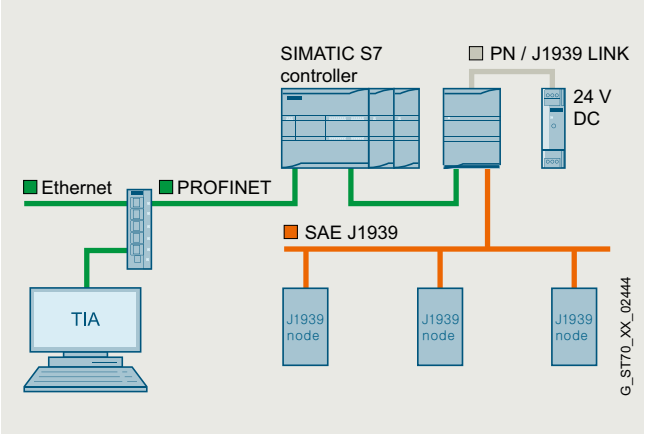
- For data exchange between PROFINET and SAE J1939 networks
- Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic
- J1939 functions:
  - Broadcast Announce Message (BAM)
  - Connection Mode Data Transfer (CMDT)
  - PDU 1 & 2
- Integrated into Totally Integrated Automation via gsdml file in TIA Portal. No separate software required
- Integrated PROFINET switch with 9-pin D-sub socket for J1939
- Up to 253 logical nodes
- Up to 30 addressable ECUs
- Electrical isolation between the two networks
- Diagnostic interrupts
- Supported controllers: S7-1200, S7-1500, ET 200SP, Open Controller

Application

The SIMATIC PN/J1939 LINK integrates seamlessly into PROFINET networks and facilitates data exchange between the network and the SAE J1939 fieldbus. Communication with up to 253 logical nodes is possible.

Design

- S7-1200-type enclosure, width 70 mm
- Can be mounted on a DIN rail or a control panel
- LEDs for visualizing the operating states for J1939, PROFINET and PROFINET ports
- Internal PROFINET switch
- Connection to PROFINET PN IO networks exclusively via PROFINET with RJ45 plug connectors
- Connection to SAEJ1939 bus via D-sub (9-pin, socket)
- 3-pin connection of the external 24 V DC supply voltage
- Operation without fans or batteries
- Maximum permissible cable length of the J1939 network up to 1 000 m (depending on data transmission rate, cable cross-section, number of participants). Baud rates of 100 kbaud, 250 kbaud and 500 kbaud are supported.



SIMATIC PN/J1939 LINK Gateway system configuration

Mode of operation

The SIMATIC PN/J1939 LINK configuration data is stored in the higher-level SIMATIC S7 PLC and automatically transmitted during start up.

Cyclic data exchange between the PN/J1939 LINK and the connected SIMATIC S7 CPUs is performed by updating the IO image.

Acyclic communication is via the "Read/write data record" services.

LEDs visualize the operating states for J1939, PROFINET and PROFINET ports.

Function

- PROFINET IO device
- Supported controllers: S7-1200, S7-1500, ET 200SP, Open Controller
- Easy engineering and extensive diagnostics options due to optimum TIA integration
- Update mechanisms via TIA Portal and the Siemens Automation Tool (SAT)
- J1939 functions:
  - Broadcast Announce Message (BAM)
  - Connection Mode Data Transfer (CMDT)
  - PDU 1 & 2

Configuration

- Configuration in the TIA Portal via .gsdml file. No separate software required
- PGNs (Parameter Group Number) freely configurable

Technical specifications

Article number	**6AG2623-0AA00-4AA0** SIPLUS PN/J1939 LINK TX RAIL
General information	
Product type designation	PN/J1939 LINK
Product function • I&M data • Isochronous mode	 Yes No
Engineering with • STEP 7 TIA Portal configurable/integrated from version	 see entry ID: 109746275
Installation type/mounting	
Mounting	DIN rail, wall mounting, portrait mounting
Mounting position	any
Recommended mounting position	Horizontal
Rail mounting	Yes
Control cabinet installation	Yes
Supply voltage	
Type of supply voltage	DC
Rated value (DC)	24 V
Reverse polarity protection	Yes
Overvoltage protection	Yes
Short-circuit protection	Yes
Mains buffering • Mains/voltage failure stored energy time	 10 ms; PN side
Input current	
Current consumption (rated value)	0.09 A
Current consumption, max.	0.11 A
Power loss	
Power loss, typ.	2.2 W
Interfaces	
Interfaces/bus type	2x Ethernet (RJ45), 1x Sub-D (9-pin)
Supports protocol for PROFINET IO • automatic detection of transmission rate • Transmission rate, max. • Number of RJ45 ports • Number of FC (FastConnect) connections	 No 100 Mbit/s 2 2
PROFINET functions • Assignment of the IP address, supported • Assignment of the device name, supported	 Yes Yes
1. Interface	
Interface type	J1939 according to the standard "SAE J1939"
Isolated	Yes; 500 V AC or 707 V DC
Interface types • Number of ports • Design of the connection	 1 9-pin sub D socket
CAN • CAN operating modes • Transmission rate, min. • Transmission rate, max. • Number of slaves, max.	 J1939 according to the standard "SAE J1939" 100 kbit/s 500 kbit/s 30
J1939 • Addressable ECUs, max. • Logical nodes, max. • PDU 1 • PDU 2 • DM data • BAM • CMDT	 30 253 Yes Yes Yes Yes Yes
2. Interface	
Interface type	PROFINET
Isolated	Yes; 1 500 V AC or 2 250 V DC
Interface types • RJ 45 (Ethernet) • Number of ports • integrated switch	 Yes 2 Yes
Protocols • PROFINET IO Device	 Yes

Article number	**6AG2623-0AA00-4AA0** SIPLUS PN/J1939 LINK TX RAIL
Interrupts/diagnostics/status information	
Status indicator	Yes
Alarms	Yes
Diagnostics function	Yes
Diagnostics indication LED	
• RUN LED	Yes
• ERROR LED	Yes
• MAINT LED	Yes
• LINK LED	Yes
• RX/TX LED	Yes
Potential separation	
Potential separation exists	Yes
Degree and class of protection	
IP degree of protection	IP20
Standards, approvals, certificates	
Railway application	
• EN 50121-3-2	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)
• vertical installation, min.	-40 °C; = Tmin
• vertical installation, max.	55 °C; = Tmax
• ceiling installation, min.	-40 °C; = Tmin
• ceiling installation, max.	45 °C; = Tmax
• floor installation, min.	-40 °C; = Tmin
• floor installation, max.	45 °C; = Tmax
Ambient temperature during storage/transportation	
• min.	-40 °C
• max.	85 °C
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity	
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance	
• Coolants and lubricants	
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems	
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *
• Use on land craft, rail vehicles and special-purpose vehicles	
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *
• Usage in industrial process technology	
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark	
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating	
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A

SIPLUS PN/J1939 LINK TX RAIL

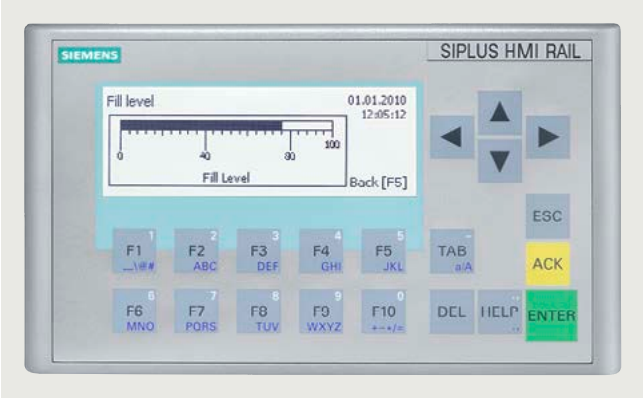
Article number	**6AG2623-0AA00-4AA0** SIPLUS PN/J1939 LINK TX RAIL
Dimensions	
Width	70 mm
Height	112 mm
Depth	75 mm
Weights	
Weight, approx.	212 g
Other	
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

	Version	Article No.
	SIPLUS PN/J1939 LINK TX RAIL Approved in accordance with EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic Network transition from PROFINET to J1939 networks; IP20 Ambient temperature -40 ... +70 °C (+85 °C for 10 min.)	**6AG2623-0AA00-4AA0**

* You can order this quantity or a multiple thereof.

Overview



- Basic Panel 3.6 inches for operating and monitoring compact machines and systems
- Approved in accordance with the railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic
- Clear process representation through the use of full-graphic displays
- Intuitive operation via touch and tactile function keys
- Equipped with all the necessary basic functions such as reporting, recipe management, curve representation, vector graphics, and language selection
- Easy connection to the controller via integrated Ethernet interface

Benefits

- An integral component of Totally Integrated Automation (TIA): Increased productivity, minimum engineering overhead, reduction in life-cycle costs
  - Short configuring and commissioning times
  - Service-friendly thanks to maintenance-free design and long service life of the backlighting display
- Simple and user-friendly representation of process values thanks to, for example, input/output fields, vector graphics, trend curves, bar charts, text and bitmaps
- Graphics library available with off-the-shelf picture objects
- Can be used worldwide:
  - 32 languages can be configured (incl. Asian and Cyrillic character sets)
  - You can switch between up to 5 languages online
  - Language-dependent texts and graphics

Application

The SIMATIC HMI Basic Panels can be used wherever compact machines and plants are controlled and monitored locally.

Design

The SIMATIC HMI Basic Panels are installation-compatible with the existing touch devices of the product family of Panels and Multi Panels.

KP300 Basic mono PN

- 3.6" FSTN pixel graphics, monochrome
- 1 Ethernet interface (TCP/IP, PROFINET)
- Touch device with 10 function keys and 10 system keys
- Innovative successor to the Text Displays (TD 100C, TD 200/TD 200C, TD 400C) as well as the OP 73 and OP 73micro

Function

- Input/output fields
  for displaying and modifying process parameters
- Buttons
  are used for direct triggering of functions and actions. Up to 16 functions can be configured simultaneously on buttons.
- Graphics
  can be used as icons instead of text to "label" function keys or buttons. They can also be used as full-screen background images.
  The configuration tool contains a library with extensive graphics and diverse objects. All editors with an OLE interface (such as PaintShop, Designer or CorelDraw) can be used as graphics editors
- Vector graphics
  Simple geometric basic forms (line, circle and rectangle) can be created direct in the configuring tool
- Predefined texts
  for labeling function keys, process pictures and process values in different font sizes
- Curve functions and bars
  are used for graphical display of dynamic values
- Language switching:
  - 5 online languages, 32 configuration languages incl. Asian and Cyrillic character sets
  - Language-dependent texts and graphics
- User administration (security) in accordance with the requirements of the different industries
  - Authentication with user ID and password
  - User-group-specific rights
- Alarm logging system
  - Discrete messages
  - Analog messages
  - Freely-definable message classes (e.g. status/fault messages) for definition of acknowledgment response and display of message events
  - Message history
- Recipe management
- Help texts
  for process screens, messages and variables
- Arithmetic functions
- Limit value monitoring
  for reliable process control of inputs and outputs
- Indicator light
  for indicating machine and plant statuses
- Scheduler for global function execution in case of global events
- Template concept for creation of screen templates (screen elements configured in the template appear in every screen)
- Simple maintenance and configuration thanks to
  - Backup/restore of configuration, operating system and firmware on/from a PC using ProSave
  - Configuration download via MPI/PROFIBUS DP or PROFINET
  - Automatic transfer detection
  - Individual contrast or brightness setting (except 6" color) and calibration
  - Clean screen
  - No battery required

Configuration

The configuration is implemented using the engineering software SIMATIC WinCC Basic, Comfort, Professional or SIMATIC STEP 7 Basic (with integrated WinCC Basic).

Integration

The Basic Panels can be connected to:

- SIMATIC S7 controllers
- Non-Siemens controllers (applies for DP devices)
  - Allen Bradley DF1
  - Modicon Modbus RTU
  - Mitsubishi FX
  - Omron Hostlink/Multilink
- Non-Siemens controllers (non-Siemens drivers for PN devices)
  - Allen Bradley Ethernet/IP
  - Modicon Modbus TCP/IP
  - Mitsubishi MC TCP/IP

Note:

For further information, see "System interfaces".

Technical specifications

Article number	**6AG2647-0AH11-1AX0** SIPLUS HMI KP300 BASIC MONO 3,6" T1 RAIL
General information	
Product type designation	KP300 Basic mono PN
Display	
Design of display	FSTN
Screen diagonal	3.6 in
Number of colors	4; backlit display only (white, red, green, yellow)
Resolution (pixels) • Horizontal image resolution • Vertical image resolution	 240 pixel 80 pixel
Backlighting • MTBF backlighting (at 25 °C)	 50 000 h
Control elements	
Keyboard fonts • Function keys - Number of function keys	 10
Touch operation • Design as touch screen	 No; without
Installation type/mounting	
Mounting in portrait format possible	No
Supply voltage	
Rated value (DC)	24 V
Memory	
Memory available for user data	1 Mbyte
Type of output	
Acoustics • Buzzer	 No
Time of day	
Clock • Software clock • retentive • synchronizable	 Yes No Yes
Interfaces	
Number of industrial Ethernet interfaces	1
Number of RS 485 interfaces	0
Number of USB interfaces	0
Number of SD card slots	0
Protocols	
PROFINET	Yes
IRT	No
PROFIBUS	No
MPI	No
Degree and class of protection	
IP (at the front)	IP65
IP (rear)	IP20
NEMA (front) • Enclosure Type 4x at the front	 Yes

Article number	**6AG2647-0AH11-1AX0** SIPLUS HMI KP300 BASIC MONO 3,6" T1 RAIL
Standards, approvals, certificates	
Railway application	
• EN 50121-3-2	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; rail vehicles - temperature class OT1, ST1/ST2, horizontal at vertical mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support
Ambient conditions	
Ambient temperature during operation	
• Operation (vertical installation)	
- For vertical installation, min.	-25 °C; = Tmin
- For vertical installation, max.	55 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155)
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity	
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning when condensation present), horizontal at vertical mounting position
Resistance	
• Coolants and lubricants	
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems	
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *
• Use on land craft, rail vehicles and special-purpose vehicles	
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *
• Usage in industrial process technology	
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark	
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating	
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A
configuration / header	
Configuration software	
• STEP 7 Basic (TIA Portal)	Yes; via integrated WinCC Basic (TIA Portal)
• WinCC flexible Compact	No
• WinCC Basic (TIA Portal)	Yes
Languages	
Online languages	
• Number of online/runtime languages	5
Functionality under WinCC (TIA Portal)	
Task planner	
• time-controlled	No
• task-controlled	Yes
Message system	
• Bit messages	
- Number of bit messages	200
• Analog messages	
- Number of analog messages	15
• Message buffer	
- Number of entries	256
- Circulating buffer	Yes
- retentive	Yes
Recipe management	
• Number of recipes	5
• Size of internal recipe memory	40 kbyte
• Recipe memory expandable	No

SIPLUS extreme RAIL Basic Panels (1st Generation)

Article number	**6AG2647-0AH11-1AX0** SIPLUS HMI KP300 BASIC MONO 3,6" T1 RAIL
Variables	
• Number of variables per device	250
• Number of variables per screen	30
Images	
• Number of configurable images	50
Archiving	
• Number of archives per device	0
Security	
• Number of user groups	50
• Number of users	50
• SIMATIC Logon	No
Transfer (upload/download)	
• MPI/PROFIBUS DP	No
• Ethernet	Yes
Process coupling	
• S7-1200	Yes
• S7-1500	Yes
• S7-200	Yes
• S7-300/400	Yes
• LOGO!	Yes
• WinAC	Yes
• SIMOTION	No
• Allen Bradley (EtherNet/IP)	Yes
• Allen Bradley (DF1)	No
• Mitsubishi (MC TCP/IP)	Yes
• Mitsubishi (FX)	No
• OMRON (FINS TCP)	No
• OMRON (LINK/Multilink)	No
• Modicon (Modbus TCP/IP)	Yes
• Modicon (Modbus)	No
Peripherals/Options	
Printer	No
SIMATIC HMI MM memory card: Multi Media Card	No
SIMATIC HMI SD memory card: Secure Digital memory card	No
USB memory	No
Mechanics/material	
Enclosure material (front)	
• Plastic	Yes
• Aluminum	No
• Stainless steel	No
Dimensions	
Width of the housing front	165 mm
Height of housing front	97 mm
Mounting cutout, width	149 mm
Mounting cutout, height	82 mm
Overall depth	30 mm
Weights	
Weight (without packaging)	0.25 kg
Other	
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

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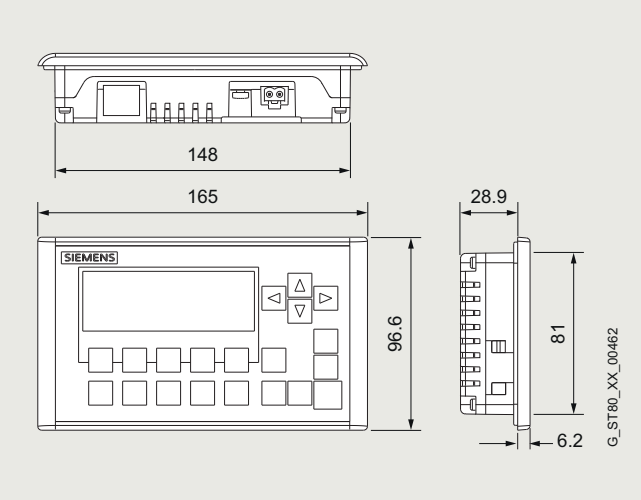
Selection and ordering data

Version	Article No.
SIPLUS HMI KP300 Basic mono PN T1 RAIL Approved in accordance with the railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic Key operation; 3" FSTN LCD display, black and white, PROFINET interface For areas with extreme exposure to environmental substances (conformal coating); ambient temperature -25 ... +55 °C (+70 °C for 10 min.)	**6AG2647-0AH11-1AX0**

* You can order this quantity or a multiple thereof.

Dimensional drawings

All dimensions in mm. For installation cutout, see technical specifications.



KP300 Basic

More information

More information is available on the internet at

http://www.siemens.com/simatic-basic-panels

Note

Do you require a specific modification or extension to the products described here? Then look up "Customized products", where you will find information about additional and generally available sector-specific products as well as options for customer-specific modifications and adaptations.

SIPLUS HMI Comfort Panels Outdoor RAIL

Overview

SIPLUS HMI Comfort Panels Outdoor RAIL

Special HMI Panels have been developed which are designed to withstand outdoor environments.

It's not only extreme temperatures which call for robust hardware. Direct sunlight, too, must not be allowed to impair display readability and the panel front must be protected from UV radiation. The specially-bonded Outdoor fronts and the rugged hardware of the Outdoor Panels make the SIMATIC HMI Comfort Panels Outdoor a reliable partner in this environment.

- Approved in accordance with the railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic
- For outdoor operation without additional measures
- 7" and 15" daylight-readable display, widescreen
- Automatic, central or manual dimming of the backlight, with integrated sensor
- Panel front 100% UV protected
- Front resistant to salt mist
- Front IP66 and Nema4 x (indoor/outdoor)
- Extended operating temperature range: from -30 °C to +60 °C at 3 000 m installation altitude
- TIA Portal central engineering tool (WinCC V13 SP1&HSP or higher)
- Comfort Panel functionality and performance

Notice:

The 7" Comfort Panel corresponds to a 7" Comfort Panel Standard, the 15" Comfort Panel Outdoor corresponds to a 12" Comfort Panel Standard in respect of performance, functionality and quantity structure.

Benefits

- No additional expense or measures in the outdoor area for:
  - Climatic adaptations
  - UV protection
  - Glare protection
  - Automatic dimming
- Integral component of Totally Integrated Automation (TIA): Increased productivity, minimum engineering overhead, reduction in life-cycle costs.
- Can also be deployed in an upright position in a laterally limited installation space (all touch devices).
- Seamless compatibility across the Comfort Panel range for existing projects from Standard to Outdoor.
  This means that TP700 Comfort Standard and TP1200 Comfort Standard projects can be used without issue on TP700 Comfort Outdoor and/or TP1500 Comfort Outdoor Panels. The TP1500 Comfort Outdoor Panel displays the configuration of the TP1200 Comfort Standard proportionately larger.
- Projects can be created with a Standard Panel, and subsequently also used on an Outdoor Panel (device switchover).

Application

The Outdoor Panels can be operated in outdoor environments without the need for additional measures. Additional heating or cooling units are not required. The daylight-readable display is optically bonded to the unit and is glare-free thanks to special polarizing films. So the screen contents are highly legible even in daylight.

The Panel is just at home In the marine sector as it is offshore. Drilling platforms, ships, special vehicles or other, awkwardly located fields of application can now be easily accessed.

Design

- The mechanical design of the SIMATIC HMI Comfort Outdoor Panels differentiates them from other units in that they have an extremely rugged appearance.
- The front is made from milled, powder-coated aluminum.
- Special powder coating protects the front against ultraviolet radiation and salt mist.
- The GFG Touch (glass-foil-glass) is bonded to the display to form a single optical unit. This ensures that no moisture can get between the two layers to cause fogging and also prevents reflective phenomena to the largest possible extent.
- This high-quality bonding enables energy-saving backlight to be used, in contrast to very bright, energy-intensive backlit displays which achieve the same effects.
- The dimension drawings can be found in the manual available as a free download in the SIMATIC Support area. Online 3D CAD drawings are also available.
- An integrated PN switch provides two PN interfaces for operation in ring or line topologies. This enables hardware configurations that do not require additional network components.
- For applications where there are aggressive substances in the atmosphere, the electrical components can have customized hardening (see also SIPLUS variants).

Function

The functionality is identical to that of the corresponding Standard Panel - a TP700 Comfort Standard is the equivalent of TP700 Comfort Outdoor, just as a TP1200 Comfort Standard is the equivalent of a TP1500 Comfort Outdoor. The sole distinguishing feature is their size.

The complete functionality and all the details of the devices are thoroughly described in their corresponding manuals. A comprehensive online help resource is also available for direct support in the TIA Portal.

Integration

SIMATIC HMI Comfort Outdoor Panels can be connected to:

- SIMATIC S7 controllers
- Third-party controllers
  - Allen Bradley DF1, Allen Bradley Ethernet/IP
  - Modicon MODBUS RTU, Modicon MODBUS TCP/IP
  - Mitsubishi FX, Mitsubishi MC TCP/IP
  - Omron Hostlink/Multilink
- OPC UA client or OPC DA server
- Multi-protocol capability
- http communication with other SIMATIC HMI systems
- Over Ethernet (TCP/IP) to a higher-level PC, network printer

Note:

Further information can be found under "System interfaces".

Technical specifications

Article number	**6AG2124-0GC13-1AX0** SIPLUS HMI TP700 OUTDOOR T1 RAIL	**6AG2124-0QC13-1AX0** SIPLUS HMI TP1500 OUTDOOR T1 RAIL
General information		
Product type designation	TP700 Outdoor	TP1500 Outdoor
Display		
Design of display	TFT, bonded, daylight-readable	TFT, bonded, daylight-readable
Screen diagonal	7 in	15.4 in
Number of colors	16 777 216	16 777 216
Resolution (pixels) • Horizontal image resolution • Vertical image resolution	 800 pixel 480 pixel	 1 280 pixel 800 pixel
Backlighting • MTBF backlighting (at 25 °C)	 50 000 h	 50 000 h
Control elements		
Keyboard fonts • Function keys - Number of function keys	 0	 0
Touch operation • Design as touch screen	 Yes; Analog-resistive	 Yes; Analog-resistive
Installation type/mounting		
Mounting in portrait format possible	Yes	Yes
Supply voltage		
Rated value (DC)	24 V	24 V
Memory		
Memory available for user data	12 Mbyte	12 Mbyte
Type of output		
Acoustics • Speaker	 Yes	 Yes
Time of day		
Clock • Hardware clock (real-time) • retentive • synchronizable	 Yes Yes; Back-up duration typically 6 weeks Yes	 Yes Yes; Back-up duration typically 6 weeks Yes
Interfaces		
Number of industrial Ethernet interfaces	2	2
Number of RS 485 interfaces	1; RS 422 / 485 combined	1; RS 422 / 485 combined
Number of USB interfaces • USB Mini B	2; USB 2.0, see Entry ID: 64847814 1; 5-pole	2; USB 2.0, see Entry ID: 64847814 1; 5-pole
Number of SD card slots	2	2
Industrial Ethernet • Number of ports of the integrated switch	 2	 2
Protocols		
PROFINET	Yes	Yes
IRT	Yes	Yes
PROFIBUS	Yes	Yes
MPI	Yes	Yes
Redundancy mode		
Media redundancy • MRP	 Yes	 Yes
Degree and class of protection		
IP (at the front)	IP66	IP66
IP (rear)	IP20	IP20
NEMA (front) • Enclosure Type 4x at the front	 Yes	 Yes

SIPLUS HMI Comfort Panels Outdoor RAIL

Article number	6AG2124-0GC13-1AX0 SIPLUS HMI TP700 OUTDOOR T1 RAIL	6AG2124-0QC13-1AX0 SIPLUS HMI TP1500 OUTDOOR T1 RAIL
Standards, approvals, certificates		
CE mark	Yes	Yes
Railway application		
• EN 50121-3-2	Yes; EMC for rail vehicles	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; rail vehicles - temperature class OT1, ST1/ST2, horizontal at vertical mounting position	Yes; rail vehicles - temperature class OT1, ST1/ST2, horizontal at vertical mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support	Yes; For proof of conformity, see Service & Support
Ambient conditions		
Suited for indoor use	Yes	Yes
Suited for outdoor use	Yes; Powder-coated, UV resistant	Yes; Powder-coated, UV resistant
Ambient temperature during operation		
• Operation (vertical installation)		
- For vertical installation, min.	-30 °C; = Tmin (incl. condensation/frost)	-30 °C; = Tmin (incl. condensation/frost)
- For vertical installation, max.	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155)	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155)
Altitude during operation relating to sea level		
• Installation altitude above sea level, max.	2 000 m	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity		
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning when condensation present), horizontal at vertical mounting position	100 %; RH incl. condensation/frost (no commissioning when condensation present), horizontal at vertical mounting position
Resistance		
• Coolants and lubricants		
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems		
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN -3-3	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *
• Use on land craft, rail vehicles and special-purpose vehicles		
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *	Yes; Class 5S3 incl. sand, dust; *
- Against contaminant acc. to EN 60721-3-5	Yes; Class 5F3 (excluding gasoline)	Yes; Class 5F3 (excluding gasoline)
• Usage in industrial process technology		
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark		
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!

Article number	**6AG2124-0GC13-1AX0** SIPLUS HMI TP700 OUTDOOR T1 RAIL	**6AG2124-0QC13-1AX0** SIPLUS HMI TP1500 OUTDOOR T1 RAIL
Conformal coating		
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A
configuration / header		
Configuration software		
• WinCC Comfort (TIA Portal)	Yes	Yes
Languages		
Online languages		
• Number of online/runtime languages	32	32
Functionality under WinCC (TIA Portal)		
Applications/options		
• Web browser	Yes	Yes
• Pocket Word	Yes	Yes
• Pocket Excel	Yes	Yes
• PDF Viewer	Yes	Yes
• Media Player	Yes	Yes
• SIMATIC WinCC Sm@rtServer	Yes	Yes
• SIMATIC WinCC Audit	Yes	Yes
Number of Visual Basic Scripts	Yes	Yes
Task planner		
• time-controlled	Yes	Yes
• task-controlled	Yes	Yes
Message system		
• Bit messages		
- Number of bit messages	4 000	4 000
• Analog messages		
- Number of analog messages	200	200
Recipe management		
• Number of recipes	300	300
• Size of internal recipe memory	2 Mbyte	2 Mbyte
• Recipe memory expandable	Yes	Yes
Variables		
• Number of variables per device	2 048	2 048
• Number of variables per screen	400	400
Images		
• Number of configurable images	500	500
Archiving		
• Number of archives per device	50	50
Security		
• Number of user groups	50	50
• Number of users	50	50
• SIMATIC Logon	Yes	Yes
Logging through printer		
• Alarms	Yes	Yes
• Report (shift log)	Yes	Yes
• Hardcopy	Yes	Yes
• Electronic print to file	Yes; PDF, HTML	Yes; PDF, HTML
Transfer (upload/download)		
• MPI/PROFIBUS DP	Yes	Yes
• Ethernet	Yes	Yes
Process coupling		
• S7-1200	Yes	Yes
• S7-1500	Yes	Yes
• S7-200	Yes	Yes
• S7-300/400	Yes	Yes
• LOGO!	Yes	Yes
• WinAC	Yes	Yes
• SIMOTION	Yes	Yes
• Allen Bradley (EtherNet/IP)	Yes	Yes
• Allen Bradley (DF1)	Yes	Yes
• Mitsubishi (MC TCP/IP)	Yes	Yes
• Mitsubishi (FX)	Yes	Yes
• OMRON (FINS TCP)	No	No
• OMRON (LINK/Multilink)	Yes	Yes
• Modicon (Modbus TCP/IP)	Yes	Yes
• Modicon (Modbus)	Yes	Yes
• OPC UA Client	Yes	Yes
• OPC UA Server	Yes	Yes

SIPLUS HMI Comfort Panels Outdoor RAIL

Article number	**6AG2124-0GC13-1AX0** SIPLUS HMI TP700 OUTDOOR T1 RAIL	**6AG2124-0QC13-1AX0** SIPLUS HMI TP1500 OUTDOOR T1 RAIL
Peripherals/Options		
Printer	Yes	Yes
SIMATIC HMI MM memory card: Multi Media Card	Yes	Yes
SIMATIC HMI SD memory card: Secure Digital memory card	Yes	Yes
USB memory	Yes	Yes
Network camera	Yes	Yes; See FAQ Entry ID: 62383298 and entry ID: 65647473
Mechanics/material		
Enclosure material (front) • Plastic • Aluminum • Stainless steel	 No Yes; Powder-coated, UV resistant No	 No Yes; Powder-coated, UV resistant No
Dimensions		
Width of the housing front	214 mm	415 mm
Height of housing front	158 mm	310 mm
Mounting cutout, width	197 mm	396 mm
Mounting cutout, height	141 mm	291 mm
Overall depth	67 mm	77 mm
Weights		
Weight (without packaging)	1.5 kg	4 kg
Other		
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

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Selection and ordering data

Version	Article No.
SIPLUS HMI Comfort Outdoor Panels RAIL	
SIPLUS HMI TP700 Comfort Panel Outdoor RAIL Approved in accordance with the railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic Touch operation, 7" widescreen TFT display, 16 million colors, PROFINET interface, MPI/PROFIBUS DP interface, 12 MB configuration memory, Windows CE 6.0, configurable as from WinCC Comfort V13, SP1, HSP For areas with extreme exposure to environmental substances (conformal coating); ambient temperature -25 ... +60 °C (+70 °C for 10 min.)	**6AG2124-0GC13-1AX0**
SIPLUS HMI TP1500 Comfort Panel Outdoor RAIL Approved in accordance with the railway standards EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 for use in rail traffic Touch operation, 15" widescreen TFT display, 16 million colors, PROFINET interface, MPI/PROFIBUS DP interface, 12 MB configuration memory, Windows CE 6.0, configurable as from WinCC Comfort V13, SP1, HSP For areas with extreme exposure to environmental substances (conformal coating); ambient temperature -25 ... +70 °C (+85 °C for 10 min.)	**6AG2124-0QC13-1AX0**
Accessories	See "Operator Control and Monitoring Systems SIMATIC HMI" -> "Accessories"

More information

Note:

The SIPLUS HMI TP700 Comfort Panel Outdoor RAIL is comparable with the TP700 Comfort Panel Standard.

The SIPLUS HMI TP1500 Comfort Panel Outdoor RAIL is comparable with the TP1200 Comfort Panel Standard with a 15" display.

A TP1500 Comfort Standard unit with the maximum possible configuration cannot be installed on a SIPLUS HMI TP1500 Comfort Panel Outdoor.

*** You can order this quantity or a multiple thereof.**

Overview

SIPLUS IPC227E ET RAIL (Nanobox PC): The Box PC with optimized performance in compact design – maintenance-free and rugged

The Nanobox PC is an extremely compact and flexible embedded industrial PC.

Thanks to its closed, dust-protected all-metal enclosure, the IPC227E offers maximum industrial functionality for flexible use under harsh conditions – while remaining maintenance-free.

Modern interfaces and the option for expansion via a PCIe slot mean this box PC can be easily integrated into the automation system. In the version with pre-installed Industrial Edge Runtime, it also supports modern Edge architectures. The latest Intel Quad Core processors ensure excellent performance here in an ultra-compact design.

Benefits

Low space requirements and installation flexibility

- Maximum compactness with approx. 1 liter enclosure volume or more with integrated industrial power supply for minimum space requirements in the control cabinet
- Excellent flexibility thanks to three installation variants and interfaces on one side suitable for any installation situation

High degree of ruggedness for maintenance-free continuous operation

- Maximum industrial functionality thanks to closed enclosure for optimum dust protection and high electromagnetic compatibility
- Backup of important system data thanks to non-volatile retentive memory (NVRAM, optional)
- Designed for continuous operation at ambient temperatures up to 60 °C and high vibration/shock requirements
- Maintenance-free operation – without fans (operation without battery possible)

Optimized for use as gateway and for control and visualization tasks

- High-performance and energy-saving Quad Core Intel processors
- Diverse interfaces and configuration options (USB 3.0, 2 x Gbit Ethernet, RS232/RS485/RS422, SSD/CFast/HDD)
- Optimized for headless operation with LEDs for efficient self-diagnostics

High level of investment security for reducing engineering costs

- Long-term availability: Service & support period up to 11 years
- Ideal platform for SIMATIC Software Controller and/or WinCC RT Advanced / WinCC Unified PC RT
- Simple integration into automation solutions with the TIA Portal and on-board PROFINET interfaces

Extended temperature range

The SIPLUS IPC227E ET RAIL is also available for the extended temperature range from -25 °C to +60 °C.

The following options for this are available and must always be selected together when configuring the device:

- Celeron E3845 ET (4C/4T) / TPM
- 4 GB RAM ET / NVRAM
- 60 GB SSD ET

Application

The Nanobox PC has a diverse range of applications:

- Control, visualization and communication tasks in areas like mechanical engineering, transportation systems or power transmission
- Acquisition, further processing and visualization of data
- Machine-level applications that additionally require C/C++ programs
- Applications such as shipbuilding, building automation, and storage & logistics
- For Industrial Edge applications for simple, scalable and reliable use of software for data processing (with pre-installed Industrial Edge Runtime):
  - Collection, analysis, saving and forwarding of production data
  - Installation and scaling of software using container technology
  - Central management of devices and software on location or in the cloud
  - Full data control from the shop floor to the cloud

Design

Basic design

- All-metal enclosure, resistant to vibrations and shocks, also with high electromagnetic compatibility
- Isolated power supply:
  - 24 V DC (19.2 to 28.8 V)
- Graphics connection DisplayPort
  - Resolution: Up to 2 560 x 1 600 pixels
- Interfaces (accessible from one side):
  - 2 x LAN 10/100/1000 Mbps Ethernet interface (RJ45)
  - 1 x USB V3.0, 3 x USB V2.0
- Fieldbus
  - PROFINET Realtime via Standard Ethernet interface

SIPLUS IPC227E ET RAIL with extended temperature range

The following options are available for this version and must always be selected together when configuring the device:
- Celeron E3845 ET (4C/4T) / TPM
- 4 GB RAM ET / NVRAM
- 60 GB SSD ET

SIPLUS IPC227E ET RAIL

SIPLUS IPC227E ET RAIL (bottom)

Integrated diagnostics DiagBase

- Integrated, parameterizable monitoring functions (program execution/watchdog, internal enclosure temperature, mass storage)

Technical specifications

Article number	**6AG2647-8BE72-1HA1** SIPLUS IPC 227E ET RAIL
General information	
Product type designation	IPC227E
Installation type/mounting	
Mounting	DIN rail, wall mounting, portrait mounting
Design	Box PC, built-in unit
Supply voltage	
Type of supply voltage	24 V DC
Mains buffering • Mains/voltage failure stored energy time	 20 ms
Processor	
Processor type	Intel Atom E3845
Chipset	SoC
Graphic	
Graphics controller	Integrated
Drives	
SSD	Yes
Memory	
Type of memory	DDR3L SO-DIMM
Data areas and their retentivity	
Retentive data area (incl. timers, counters, flags), max.	512 kbyte; 128 KB can be stored in the buffer time; optional
Hardware configuration	
Slots • free slots	 1x PCIe (x1) (optional)
Interfaces	
Number of industrial Ethernet interfaces	2; 2x Ethernet (RJ45)
Number of PROFINET interfaces	1
USB port	1x USB 3.0 / 3x USB 2.0
Connection for keyboard/mouse	USB / USB
serial interface	Without / 2x COM (RS 232 / 422 / 485), selectable in the BIOS
Video interfaces • Graphics interface	 1x DisplayPort
Industrial Ethernet • Industrial Ethernet interface - 100 Mbps - 1000 Mbps	 2x Ethernet (RJ45) Yes Yes
Integrated Functions	
Monitoring functions • Temperature monitoring • Watchdog • Status LEDs • Fan • Monitoring function via network	 Yes Yes 1x power, 3x user No Optional

Article number	**6AG2647-8BE72-1HA1** SIPLUS IPC 227E ET RAIL
EMC	
Interference immunity against discharge of static electricity	
• Interference immunity against discharge of static electricity	±6 kV contact discharge acc. to IEC 61000-4-2; ±8 kV air discharge acc. to IEC 61000-4-2
Interference immunity against high-frequency electromagnetic fields	
• Interference immunity against high frequency radiation	20 V/m for 80 ... 1 000 MHz, 80 % AM acc. to IEC 61000-4-3; 10 V/m for 1 ... 6 GHz, 80 % AM acc. to IEC 61000-4-3
Interference immunity to cable-borne interference	
• Interference immunity on supply cables	±2 kV acc. to IEC 61000-4-4, burst; ±1 kV acc. to IEC 61000-4-5, surge symmetric; ±2 kV acc. to IEC 61000-4-5, surge asymmetric
• Interference immunity on signal cables >30m	±2 kV acc. to IEC 61000-4-5, surge, length > 30 m
• Interference immunity on signal cables < 30m	±1 kV acc. to IEC 61000-4-4; burst; length < 3 m; ±2 kV acc. to IEC 61000-4-4; burst; length > 3 m
Interference immunity against voltage surge	
• asymmetric interference	±2 kV acc. to IEC 61000-4-5, surge asymmetric
• symmetric interference	±1 kV acc. to IEC 61000-4-5, surge symmetric
Interference immunity to magnetic fields	
• Interference immunity to magnetic fields at 50 Hz	100 A/m; to IEC 61000-4-8
Emission of conducted and non-conducted interference	
• Interference emission via line/AC current cables	EN 61000-6-3, EN 61000-6-4, CISPR 22 Class B, FCC Class A
Degree and class of protection	
IP (rear)	IP40
Standards, approvals, certificates	
Railway application	
• EN 50121-3-2	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support
Ambient conditions	
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity	
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Vibrations	
• Vibration resistance during operation acc. to IEC 60068-2-6	tested to DIN IEC 60068-2-6: 10 Hz to 58 Hz: 0.075 mm, 58 Hz to 200 Hz: 9.8 m/s² (1 g)
Shock testing	
• Shock load during operation	Tested according to IEC 60068-2-27: 150 m/s², 11 ms
Resistance	
• Coolants and lubricants	
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air
• Use in stationary industrial systems	
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Available soon
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *
• Use on land craft, rail vehicles and special-purpose vehicles	
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
- to chemically active substances according to EN 60721-3-5	Available soon
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *
• Usage in industrial process technology	
- Against chemically active substances acc. to EN 60654-4	Available soon
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Available soon
• Remark	
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating	
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A

SIPLUS IPC227E ET RAIL

Article number	**6AG2647-8BE72-1HA1** SIPLUS IPC 227E ET RAIL
Operating systems	
pre-installed operating system	Windows 10 IoT Enterprise 2019 LTSC, 64 bit, MUI
without operating system	Yes; Optional
Software	
SIMATIC Software	Optionally with pre-installed SIMATIC WinCC RT Advanced / Software Controller CPU 1500S software bundle
Dimensions	
Width	191 mm
Height	100 mm
Depth	60 mm
Other	
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

Selection and ordering data

Version	Article No.
SIPLUS IPC227E ET RAIL (Box PC) Approved in accordance with the EN 50155, EN 15121, EN 50124, EN 50125 and EN 45545 railway standards for use in rail traffic with conformal coating, -25…+60 °C, OT1 with ST1/2 (+70 °C for 10 min.), 1x display port; 2x 10/100/1000 Mbps Ethernet RJ45; 1x USB3.0, 3x USB2.0; CFast slot; 24 V DC industrial power supply Celeron E3845 ET (4C/4T) with TPM (not for China); 4 GB ET with NVRAM; box: Basis with COM 1/2; Windows 10 IoT Enterprise LTSB 2016, 64 bit, MUI (en, de, fr, it, es) 60 GB SSD ET, not replaceable	**6AG2647-8BE72-1HA1**

*** You can order this quantity or a multiple thereof.**

Overview

The design and functionality of the SIPLUS PS 305 and PS 307 1-phase load power supplies (system and load current supply) with automatic range switchover of the input voltage are an optimal match for the SIMATIC S7-300 in design and functionality. By means of the connecting comb that is supplied with the system and load current supply, the supply to the CPU is quickly established. It is also possible to provide a 24 V supply to other S7-300 system components, input/output circuits of the input/output modules and, if necessary, the sensors and actuators. Comprehensive certifications, such as UL, ATEX or GL facilitate universal use (does not apply to outdoor use).

Note

SIPLUS extreme products are based on Siemens standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS PS 305, PS 307			
Article No.	**6AG1305-1BA80-2AA0**	**6AG1307-1EA01-7AA0**	**6AG1307-1KA02-7AA0**
Article No. based on	**6ES7305-1BA80-0AA0**	**6ES7307-1EA01-0AA0**	**6ES7307-1KA02-0AA0**
Ambient temperature range	-25 ... +70 °C		
Conformal coating	Coating of the printed circuit boards and the electronic components		
Technical specifications	The technical specifications of the standard product apply, except for the ambient conditions.		
Ambient conditions			

Extended range of environmental conditions
• with reference to ambient temperature, air pressure and altitude
	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) //
	Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) //
	Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)		

Relative humidity • with condensation, max.	100 %; RH incl. bedewing/frost (no commissioning in bedewed state)		
Resistance • to biologically active substances/compliance with EN 60721-3-3 • to chemically active substances/compliance with EN 60721-3-3 • to mechanically active substances, compliance with EN 60721-3-3	Yes; Class 3B2 mold and fungal spores (except fauna); the supplied plug covers must remain in place on the unused interfaces during operation. Yes; Class 3C4 (RH < 75%) incl. salt spray in accordance with EN 60068-2-52 (severity 3); the supplied plug covers must remain in place on the unused interfaces during operation. Yes; Class 3S4 incl. sand, dust; the supplied plug covers must remain in place on unused interfaces during operation.		

Design

- The system and load current supplies are screwed directly onto the S7-300 DIN rail and can be mounted directly to the left of the CPU (no installation clearance required)
- Diagnostics LED for indicating "Output voltage 24 V DC OK"
- ON/OFF switches (operation/stand-by) for possible swapping of modules
- Strain-relief assembly for input voltage connection cable

Function

- Connection to all 1-phase 50/60 Hz networks (120 / 230 V AC) through automatic range switching (PS307) or manual switching (PS307, outdoor)
- Short-term power failure backup
- Output voltage 24 V DC, stabilized, short circuit-proof, open circuit-proof
- Parallel connection of two power supplies for enhanced performance

Technical specifications

Article number	**6AG1305-1BA80-2AA0** SIPLUS S7-300 PS 305 2 A (EN50155)	**6AG1307-1EA01-7AA0** SIPLUS PS307 AC 120/230V / DC 24 V/5 A	**6AG1307-1KA02-7AA0** SIPLUS_PS307_10A
Supply voltage			
Rated value (DC)			
• 24 V DC	Yes		
• 48 V DC	Yes		
• 72 V DC	Yes		
• 96 V DC	Yes		
• 120 V DC	Yes; Rated value 110 V DC		
Rated value (AC)			
• 120 V AC		Yes; 85 to 132 V AC	Yes; 85 to 132 V AC
• 230 V AC		Yes; 170 to 264 V AC	Yes; 170 to 264 V AC
Overvoltage strength		2.3x Ue rated, 1.3 ms	2.3x Ue rated, 1.3 ms

1-phase, 24 V DC (for S7-300 and ET200M)

Article number	**6AG1305-1BA80-2AA0** SIPLUS S7-300 PS 305 2 A (EN50155)	**6AG1307-1EA01-7AA0** SIPLUS PS307 AC 120/230V / DC 24 V/5 A	**6AG1307-1KA02-7AA0** SIPLUS_PS307_10A
Line frequency			
• permissible range, lower limit		47 Hz	47 Hz
• permissible range, upper limit		63 Hz	63 Hz
Mains buffering			
• Mains/voltage failure stored energy time	10 ms; Corresponds to S2 and C1 of EN 50155	20 ms; min., for Ia rated	20 ms; min., for Ia rated and Ue = 93 / 187 V
• Repeat rate, min.	1 s	1 s	1 s
Input current			
Rated value at 24 V DC	2.7 A		
Rated value at 48 V DC	1.3 A		
Rated value at 72 V DC	0.9 A		
Rated value at 96 V DC	0.65 A		
Rated value at 110 V DC	0.6 A		
Rated value at 120 V AC		2.3 A	4.2 A
Rated value at 230 V AC		1.2 A	1.9 A
Inrush current, max.	20 A	20 A; max. at 25 °C, duration max. 3 ms	55 A; max. at 25 °C, duration max. 3 ms
I^2t	5 $A^2 \cdot s$	1.2 $A^2 \cdot s$	3.3 $A^2 \cdot s$
Leakage current, typ.	0.7 mA	0.5 mA	0.6 mA
Leakage current, max.	3.5 mA	3.5 mA	3.5 mA
Overcurrent overload capability	270 ms on short circuit during startup and operation		80 ms on short circuit during startup and operation
output voltage / header			
Rated value (DC)	24 V	24 V	24 V; stable at no-load max. 2.5 s
Power up time, max.	3 s	2 s	2 s
Voltage rise time, typ.		10 ms	10 ms
Overvoltage protection		Additional control circuit, cutoff at < 28.8 V, automatic restart	Additional control circuit, cutoff at < 28.8 V, automatic restart
Short-circuit protection		electronic trip, automatic restart	electronic trip, automatic restart
Residual ripple, typ.	30 mV; Peak - peak	10 mV; Peak - peak	15 mV; Peak - peak
Residual ripple, max.	150 mV; Peak - peak	50 mV; Peak - peak	50 mV; Peak - peak
Output current			
Current output (rated value)	2 A; 2 for connection in parallel	5 A; 3 A @ > 60 °C, can be switched in parallel	10 A; 7 A @ > 60 °C, can be switched in parallel
Short-circuit protection	Yes; Electronic		Yes; Electronic
Continuous short-circuit current, max.			12 A
Power			
Active power input, typ.	64 W	138 W	267 W
Efficiency	75 %	87 %; approx., at Ua rated, Ia rated	90 %; approx., at Ua rated, Ia rated
Interrupts/diagnostics/status information			
Diagnostics indication LED			
• Status indicator output 24 V OK (green)	Yes	Yes	Yes
Potential separation			
primary/secondary	Yes; SELV output voltage Ua according to EN 60950-1 and EN 50178	Yes; SELV output voltage Ua according to EN 60950-1 and EN 50178	Yes; SELV output voltage Ua according to EN 60950-1 and EN 50178
EMC			
EMC interference immunity	EN 61000-6-2	EN 61000-6-2	EN 61000-6-2
EMC interference emission	EN 55011 Class A	EN 55022 Class B	EN 55022 Class B
Degree and class of protection			
Equipment protection class	I	I	I, with protective conductor
Standards, approvals, certificates			
CE mark	Yes	Yes	Yes
Standard for line harmonics limit		EN 61000-3-2	EN 61000-3-2
Railway application			
• EN 50155	Yes; Sections 4, 5 and 12; no further agreements apply; T1, Category 1, Class A/B, EN 50155:2007		

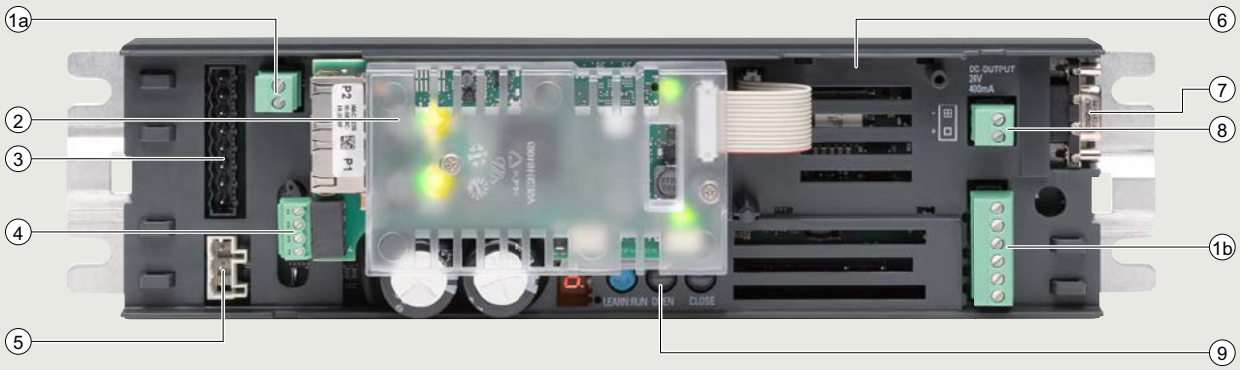
Article number	**6AG1305-1BA80-2AA0** SIPLUS S7-300 PS 305 2 A (EN50155)	**6AG1307-1EA01-7AA0** SIPLUS PS307 AC 120/230V / DC 24 V/5 A	**6AG1307-1KA02-7AA0** SIPLUS_PS307_10A
Ambient conditions			
Ambient temperature during operation			
• min.	-25 °C; = Tmin	-25 °C; = Tmin	-25 °C; = Tmin
• max.	70 °C; = Tmax; for use on railway vehicles according to EN 50155, the rated temperature range -25 ... +55 °C (T1) or 60 °C @ UL/UL hazardous use applies	70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use	70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use
Altitude during operation relating to sea level			
• Installation altitude above sea level, max.	2 000 m	2 000 m	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax - 20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m); above 2 000 m max. 75 V DC	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax - 20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m); above 2 000 m max. 75 V DC	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax - 20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m); above 2 000 m max. 75 V DC
Relative humidity			
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)
Resistance			
• Use in stationary industrial systems			
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *
• Use on land craft, rail vehicles and special-purpose vehicles			
- to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request		
- to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 50155 (ST2); *		
- to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *		
• Use on ships/at sea			
- to biologically active substances according to EN 60721-3-6	Yes; Class 6B2 mold and fungal spores (excluding fauna); Class 6B3 on request	Yes; Class 6B2 mold and fungal spores (excluding fauna); Class 6B3 on request	Yes; Class 6B2 mold and fungal spores (excluding fauna); Class 6B3 on request
- to chemically active substances according to EN 60721-3-6	Yes; Class 6C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 6C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 6C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-6	Yes; Class 6S3 incl. sand, dust; *	Yes; Class 6S3 incl. sand, dust; *	Yes; Class 6S3 incl. sand, dust; *
• Usage in industrial process technology			
- Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)	Yes; Class 3 (excluding trichlorethylene)
- Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
• Remark			
- Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!
Dimensions			
Width	80 mm	60 mm	80 mm
Height	125 mm	125 mm	125 mm
Depth	120 mm	120 mm	120 mm
Weights			
Weight, approx.	740 g	0.6 kg	0.8 kg

Selection and ordering data

	Version	Article No.
	SIPLUS power supplies	
	For industrial applications with extended ambient conditions	
	SIPLUS S7-300 PS 305 (Extended temperature range and medial exposure) Input: 24 … 110 V DC, Output: 24 V DC/2 A	**6AG1305-1BA80-2AA0**
	SIPLUS S7-300 PS 307 5 A (Extended temperature range and medial exposure) Incl. connection bracket 120/230 V AC; 24 V DC Output current 5 A (dimensions 60 x 125 x 120)	**6AG1307-1EA01-7AA0**
	SIPLUS S7-300 PS 307 10 A (Extended temperature range and medial exposure) Incl. connection bracket 120/230 V AC; 24 V DC Output current 10 A (dimensions 80 x 125 x 120)	**6AG1307-1KA02-7AA0**
	For rolling stock railway applications	
	SIPLUS S7-300 PS 305 (Extended temperature range and medial exposure) Input: 24 … 110 V DC, Output: 24 V DC/2 A	**6AG1305-1BA80-2AA0**
	Accessories	
	SIMATIC S7-300 mounting adapter For snapping the PS 307 onto a 35 mm DIN rail (EN 60715)	**6EP1971-1BA00**
	Spare part	
	SIMATIC S7-300 mounting adapter; for snapping the PS 307 onto 35 mm standard rails	**6ES7390-6BA00-0AA0**

*** You can order this quantity or a multiple thereof.**

Overview



1a 1b Input signal connection
2 PROFINET modul (2PN incl. status LEDs)
3 SIDOOR EC direct drive connection
4 Power supply connection (SIDOOR Transformer or SITOP)
5 Output signal connection
6 Fan (only for SIDOOR ATE531S)
7 Connection
- software kit or
- service tool
8 24 V DC / 400 mA output
9 Display status and push button service

G_SP01_XX_00071

SIDOOR ATE530S coated/531S wiring diagram

The SIDOOR ATE53xS door controller is an “intelligent” door drive which can be used for safety-oriented operation of platform screen doors and gates (PSDs & PSGs), according to individual requirements.
Siemens has once again shown just how easy integration can be with the innovative SIDOOR ATE53xS platform screen door drive in conjunction with SIDOOR MED280 or MEG251 motors.
The PROFINET module integrated in the SIDOOR ATE53xS enables standardized, certified connection to PROFINET IO systems.

- Use of standard automation components
- Full integration into TIA Portal and STEP 7 thanks to PROFINET connection
- Parameter assignment and monitoring of door control parameters via the PROFINET interface (function blocks available as example applications in SIOS).
- Application example:
  Synchronization of two-panel and independent platform screen doors with SIDOOR ATE530S PROFINET EC door drive and S7-1500 CPU via TIA Portal
  https://support.industry.siemens.com/cs/de/en/view/109480495
- Application example:
  Safety-oriented automation of platform screen doors with SIDOOR ATE530S PROFINET EC door drive and S7-1500 CPU via TIA Portal
  https://support.industry.siemens.com/cs/de/en/view/109477186
- Read-in of two safe signals (two-channel, antivalent)
- High level of system safety thanks to safe torque off (e.g. self-release in the event of a fault)
- Firmware update for all SIDOOR controllers on an entire platform possible centrally via TCP/IP
- SIL 2 according to IEC 62061

Technical specifications

Article number	**6FB1231-3BM12-7AT0** SIDOOR ATE530S COATED	**6FB1231-3BM11-7AT0** SIDOOR ATE531S
General information		
Product brand name	SIDOOR	
Product version	With PROFINET interface and protective coating	With PROFINET interface, protective coating, and temperature extension
Optional product expansion	Standard mounting rail holder 6FB1144-0AT00-3AS0	
Manufacturer's article no. of the usable motor	6FB1203-0AT12-7DA0, 6FB1203-5AT00-7MP0, 6FB1203-5AT01-7MP0	
Manufacturer's article no. of the usable power supply unit	6FB1112-0AT20-2TR0	
Installation type/mounting		
Installation and mounting instructions	No direct exposure to the sun	
Supply voltage		
Rated value (DC)	36 V; With MED280: At 24 V DC max. door speed of 500 mm/s, at 28.8 V DC max. door speed of 800 mm/s. With MEG251: At 24 V DC max. door speed of 500 mm/s, at 28.8 V DC max. door speed of 750 mm/s	
Power		
Active power input (standby mode)	7 W	
Digital inputs		
Control inputs isolated	Yes	
Control inputs p-switching	Yes	
Protection in case of DC supply	Use of a circuit breaker in the supply path according to 60898-1, 8A, C-characteristic type SIEMENS: 5SY4108-7 or 5SY4108-7KK11	

Article number	**6FB1231-3BM12-7AT0** SIDOOR ATE530S COATED	**6FB1231-3BM11-7AT0** SIDOOR ATE531S
Input voltage • per DC input, min. • per DC input, max.	 10 V; Observe polarity ! 28 V; Observe polarity !	
Input current • per DC input, min. • per DC input, max.	 3 mA 15 mA	
Digital outputs		
short-circuit proof	Yes	
Overload-proof	Yes	
Remark	Ensure correct polarity! CAUTION: Do not supply with external voltage!	
Output voltage • Output voltage (DC)	 24 V	
Output current • For output (24 V DC), max.	 400 mA	
Relay outputs		
Switching capacity of contacts • at 30 V DC, min. • at 30 V DC, max.	 0.01 A 0.5 A	
Mechanical data		
Opening width of door, min.	0.35 m	
Opening width of door, max.	5 m	
Weight of door, max.	280 kg	
Operating cycle frequency of door, max.	180 1/h	
Kinetic energy, max.	75 J	
Interfaces		
Interfaces/bus type	PROFINET according to Conformance Class A, B, C; integrated switch for linear and ring structure	
Isolation		
Overvoltage category	2	
Degree and class of protection		
IP degree of protection	IP20	
Standards, approvals, certificates		
CE mark	Yes	No
UL approval	No	
TÜV Inspectorate approval	Yes	
Standard for EMC	EN 61000-6-2 / EN 61000-6-4 / EN 61326-3-1 / EN 50121-3-2 / EN50121-4 / EN50121-5	
Standard for safety	EN 60950-1 / EN 60335-1 / EN 14752 / EN ISO 13849-1 Cat. 2 PL d / IEC 62061: SIL 2	
Ambient conditions		
Ambient temperature during operation • min. • max. • Remark	 -25 °C 50 °C Screw control device thermally conductive onto a metallic mounting surface or standard rail mounting, otherwise the maximum operating temperature is only 40 °C	 70 °C To ensure compliance with MTBF value, ensure that the ambient temperature is less than 50 °C for 90 % of operating time and screw the control unit onto a metallic mounting surface in a manner that ensures thermal conductivity or use standard rail mounting. At operating temperatures above 50 °C, the maximum output current of the 24 V DC output is a maximum of 0.1 A and the maximum number of cycles is 60/h.
Ambient temperature during storage/transportation • Storage, min. • Storage, max.	 -40 °C 85 °C	
Air pressure acc. to IEC 60068-2-13 • Installation altitude above sea level, max.	 2 000 m	
Relative humidity • No condensation, min. • No condensation, max.	 10 % 93 %	
Mechanics/material		
Service life • Mean time between failures (MTBF)	 13 y	
Dimensions		
Width	320 mm	
Height	60 mm	
Depth	80 mm	

Selection and ordering data

Version	Article No.
SIDOOR ATE530S COATED	
SIDOOR ATE530S COATED, version with protective coating	**6FB1231-3BM12-7AT0**
SIDOOR ATE531S	
SIDOOR ATE531S, version with protectivecoating and extended temperature range	**6FB1231-3BM11-7AT0**

*** You can order this quantity or a multiple thereof.**

Overview

The SIDOOR ATE530G drive control is designed for controlling gap fillers between external train doors and the platform edge. The gap filler facilitates easy access for passengers. The innovative SIDOOR ATE530G drive solution enables operation of a gap filler with adjustable speed, acceleration and motor currents. Depending on the application, a project-specific motor is used. In this case the firmware of the controller might be adapted to the specific project.

The SIDOOR ATE530G is activated by digital signals from a higher-level door control, and reports information about its current state via digital signals back to the door control.

The following drive functions are supported:

- System start-up after power failure
- "Extend", "Retract" command
- Gap filler is moved by a travel curve profile
- Obstruction detection
- Ice-breaker function
  Icing can be shifted broken by repeated extension and retraction of the gap filler with increased force.
- Reversing at the platform edge

The SIDOOR ATE530G control unit fulfills Basic Integrity in accordance with EN 50657:2017

Technical specifications

Article No.	**6FB1221-5SM10-7BP0** SIDOOR ATE530G COATED
General information	
Product brand name	SIDOOR
Product category	Controller
Type of product	ATE530G with protective coating
Area of application	For gap filling in railway vehicles
Installation type/mounting • Installation and mounting note	 Do not expose to direct sunlight
Supply voltage	
Rated value (DC)	36 V
Permissible range, lower limit (DC)	19.2 V
Permissible range, upper limit (DC)	37.1 V
DC supply protection	Use of a miniature circuit breaker in the supply branch
Digital inputs	
Control inputs isolated	Yes
Control inputs p-switching	Yes
DC supply protection	Use of a miniature circuit breaker in the supply branch 230/400 V 10 kA, 1-pin, C, 8A for railway applications, 5SY5108-7KK11
Input voltage	
Per DC input, min.	10 V; ensure correct polarity!
Per DC input, max.	28 V; ensure correct polarity!
Digital outputs	
Short-circuit proof	Yes
Overload-proof	Yes
Note	Ensure correct polarity! CAUTION: Do not supply with external voltage!
Output voltage • Output voltage (DC)	 24 V
Output current • For output (24 V DC), max.	 400 mA
Relay outputs	
Switching capacity of contacts • At 30 V DC, min. • At 30 V DC, max.	 0.01 A 0.5 A
Isolation	
Overvoltage category	2
Degree of protection and protection class	
IP degree of protection	IP20
Standards, approvals, certificates	
CE mark	Yes
UL approval	No
China RoHS compliance	Yes
Standard for EMC	EN 61000-6-2 / EN 61000-6-4 / EN 61326-3-1 / EN 50121- 3-2

Controller > Control unit for gap filler

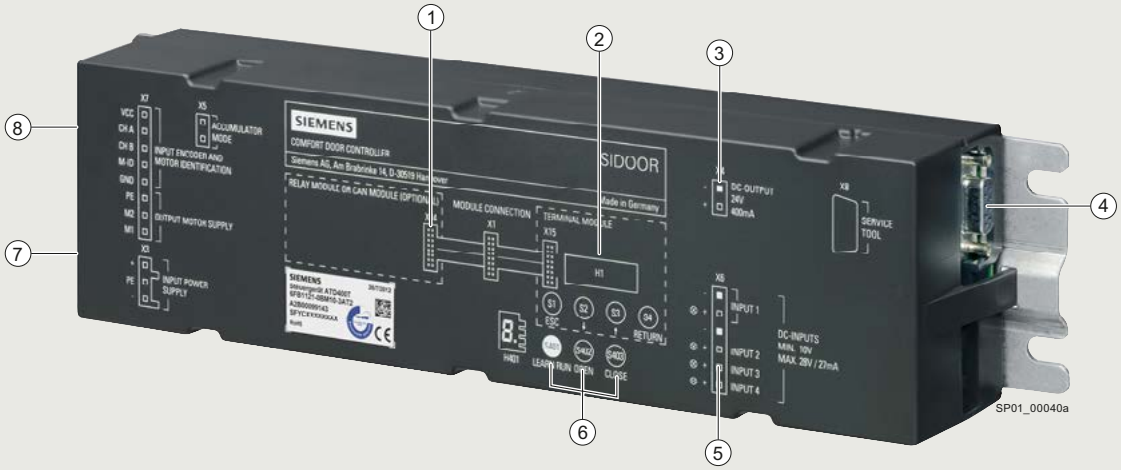
Article No.	**6FB1221-5SM10-7BP0** SIDOOR ATE530G COATED
Ambient conditions	
Ambient temperature during operation	
• Min.	-25 °C
• Max.	50 °C
• Note	Screw the control unit thermally conductive to a metal mounting surface or use standard rail mounting, otherwise maximum operating temperature is only 40 °C
Ambient temperature during storage/transport	
• Storage, min.	-40 °C
• Storage, max.	85 °C
Air pressure acc. to IEC 60068-2-13	
• Installation altitude above sea level, max.	2 000 m
Relative humidity	
• No condensation, min.	10%
• No condensation, max.	93%
Mechanics/material	
Dimensions	
• Width	320 mm
• Height	60 mm
• Depth	80 mm

Selection and ordering data

Version	Article No.
SIDOOR ATE530G COATED SIDOOR ATE530G coated,controlling gap fillers between external train doors and the platform edge	**6FB1221-5SM10-7BP0**

* You can order this quantity or a multiple thereof.

Overview



1. Emergency RELAY module connection
2. Terminal module
3. Output voltage 24 V DC/400 mA connection
4. Connection
   - service tool or
   - software kit
5. Input signal connection
6. Control panel
7. 16.8 to 36 V DC input voltage connection
8. Motor connection

SIDOOR ATD400T interior railway door drive

The SIDOOR ATD400T interior railway door drive is an "intelligent" door drive which enables gangway doors to be opened and closed at adjustable speeds and accelerations.

- Relay module design
- For dynamic door weights up to 180 kg
- Automatic door weight detection
- Operating temperature -20 to +70 °C [1)]
- Flexible motor management (two different motor types), automatic detection
- Opening width 0.25 to 4 m
- Door can be operated with and without closing springs (60 to 80 N)
- With two identical door leaves, can be used up to a train inclination of 0 to 10%
- Forces and energies are limited in accordance with EN 14752
- EMC according to EN 50121-3-2
- Fulfills HL3 according to fire protection standard EN 45545-2 (Railway applications – Fire protection on rail vehicles)
- Vandal-proof

Note:

- Maximum output current at 24 V DC:
  - 0.4 A at ≤ 55 °C ambient temperature during operation
  - 0.1 A from 55 °C to 70 °C ambient temperature during operation, with restrictions at operating temperatures > 55 °C
- Maximum ambient temperature during operation:
  - 55 °C
  - 70 °C with restrictions at operating temperatures > 55 °C
- Restrictions at operating temperatures > 55 °C:
  - Use the 24 V output voltage only for operating the control inputs (max. 0.1 A)
  - Use a sufficiently large (at least 350 x 350 mm), unpainted, metal mounting plate
  - The maximum drive parameters are restricted to the default values
  - If temperature class T3 according to EN 50155 is used, the maximum air temperature of 85 °C must not be exceeded near the printed-circuit board

Technical specifications

Article number	**6FB1121-0BM13-3AT2** SIDOOR ATD400T RELAY
General information	
Product brand name	SIDOOR
Product version	With relay outputs
Manufacturer's article no. of the usable motor	6FB1103-0AT10-4MB0, 6FB1103-0AT11-4MB0, 6FB1103-0AT15-4MB0, 6FB1103-0AT16-4MB0
Installation type/mounting	
Installation and mounting instructions	At operating temperatures > 55 °C a sufficiently large (at least 350 mm x 350 mm), unpainted, metal mounting plate must be used
Supply voltage	
Rated value (DC)	24 V
Input current	
Current consumption, max.	15 A
Digital inputs	
Control inputs isolated	Yes
Control inputs p-switching	Yes
Input voltage • per DC input, min. • per DC input, max.	 10 V; Observe polarity ! 28 V; Observe polarity !
Input current • per DC input, min. • per DC input, max.	 9 mA 27 mA
Digital outputs	
short-circuit proof	Yes
Overload-proof	Yes
Remark	Ensure correct polarity! CAUTION: Do not supply with external voltage!
Output voltage • Output voltage (DC)	 24 V
Output current • For output (24 V DC), max. • For output (24 V DC) at 55 to 70 °C, max.	 400 mA 100 mA
Relay outputs	
Switching capacity of contacts • at 50 V DC, min. • at 50 V DC, max. • at 230 V AC, min. • at 230 V AC, max.	 0.01 A; 50 V DC switching voltage not released for NFPA-relevant countries 1 A; 50 V DC switching voltage not released for NFPA-relevant countries 0.01 A 1 A
Mechanical data	
Opening width of door, min.	0.25 m
Opening width of door, max.	4 m
Weight of door, max.	180 kg
Operating cycle frequency of door, max.	180 1/h
Counterforce, max.	80 N
Counterweight • with SIDOOR M3 geared motor, max.	 6 kg
Interfaces	
Interfaces/bus type	without
Isolation	
Overvoltage category	2
Degree and class of protection	
IP degree of protection	IP20
Standards, approvals, certificates	
CE mark	Yes
UL approval	No
Standard for EMC	EN 50121-3-2

Article number	**6FB1121-0BM13-3AT2** SIDOOR ATD400T RELAY
Ambient conditions	
Ambient temperature class according to EN 50155	T3
Ambient temperature during operation • min. • max. • Remark	 -25 °C 70 °C; At operating temperatures > 55 °C the operating parameters are limited to default values At operating temperatures > 55 °C, the maximum air temperature of 85 °C must not be exceeded near the printed-circuit board if Temperature class T3 according to EN 50155 is used
Ambient temperature during storage/transportation • Storage, min. • Storage, max.	 -40 °C 50 °C
Air pressure acc. to IEC 60068-2-13 • Installation altitude above sea level, max.	 2 000 m
Relative humidity • No condensation, min. • No condensation, max.	 10 % 93 %
Fire resistance • Behavior in fire	 complies with EN 45545-2 Hazard Level HL3
Dimensions	
Width	320 mm
Height	60 mm
Depth	80 mm

Selection and ordering data

	Version	Article No.
	SIDOOR ATD400T SIDOOR ATD400T Controller for interior.railway doors, relay module design	 **6FB1121-0BM13-3AT2**

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*** You can order this quantity or a multiple thereof.**

Overview

SIDOOR Software Kit

SIDOOR Software Kit

The scope of delivery of the SIDOOR Software Kit includes an installation CD

which includes the following functionalities:

SIDOOR User Software	The component that enables the door control system to be configured, parameters to be assigned, and analyzed.
Siemens HCS12 Firmware Loader	This component is used to update the operating software of the door controller.
SIDOOR USB to UART Bridge Driver	This driver is essential for operation of the USB adapter.

Note:

Some firmware updates are offered as free downloads in the Siemens Industry Online Support (SIOS Service & Support Portal). For information on the availability and acquisition of more firmware, please contact Technical Support.

Selection and ordering data

Version	Article No.
SIDOOR Software Kit	**6FB1105-0AT01-6SW0**

Overview

SIDOOR Service Tool

The Service Tool can be used to input run commands, change run parameters and read out learned parameters, door states, input/output signals and service data.

The Service Tool is connected to the various controllers by the respective cable.

- SIDOOR ATD400T, SIDOOR ATE530S coated and SIDOOR ATE531S platform screen door drives

There is no need to dismount the cover for connecting the Service Tool to the controller.

Note:

If the Service Tool is in the "Quick adjustment" or "Total adjustment" menu, the run commands of the controller are blocked via the command inputs.

Selection and ordering data

Version	Article No.
SIDOOR Service Tool Hand-held terminal for parameter assignment of controllers	**6FB1105-0AT01-6ST0**

*** You can order this quantity or a multiple thereof.**

Overview

SIDOOR motors are speed controlled, taking set force and speed limits into account. The gear outlet direction is defined as left or right when viewing the gear unit from the front. Force transmission is via a toothed belt. The toothed belt passes over a deflector pulley and can be fitted with two door clutch holders. This enables it to drive both single-side and centrally opening doors.

SIDOOR geared motors are available in two technological versions.

- 1. DC technology in version
  (area of application: interior railway doors)
  - DC geared motor
    SIDOOR geared motors are a combination of gear unit, motor, and encoder. They are easy to connect to the controller via the interface provided and are automatically detected during commissioning. The variable speed drive unit comprises a speed-controlled DC motor with non-self-locking gearing.
- 2. EC technology in version
  (area of application: platform screen doors)
  - EC direct drive
    SIDOOR direct drives are a combination of motor and sensor. They are easy to connect to the controller via the interface provided and are automatically detected during commissioning. The maintenance-free drive unit consists of a gearless, speed-controlled, electronically commutated motor. The EC direct drive can be fitted in various mounting orientations, facilitating reduced inventory management and minimizing assets.
  - EC geared motors
    EC geared motors are electronically commutated DC motors with non-self-locking gearing and are speed-controlled. They are easy to connect to the controller via the interface provided and are automatically detected during commissioning. Due to the brushless drive technology, EC geared motors are subject to less abrasion compared with DC geared motors and thus have a longer service life. On account of the brushless drive technology, no commutation noises come from this motor, so it generates less noise than the DC geared motors.

Motors for interior railway door drives (for controllers ATD400T)

The following DC geared motors **are available for interior railway door drives**. They should be selected according to the dynamic door weight.

- SIDOOR MDG180 geared motors, compliance with fire protection standard EN 45545-2 (max. door weight 180 kg)
  - SIDOOR MDG180 L EN 45545-2 (pinion left)
    6FB1103-0AT16-4MB0
  - SIDOOR MDG180 R EN 45545-2 (pinion right)
    6FB1103-0AT15-4MB0
- SIDOOR M3 geared motors (max. door weight 180 kg)
  - SIDOOR M3 L (pinion left) 6FB1103-0AT10-4MB0
  - SIDOOR M3 R (pinion right) 6FB1103-0AT11-4MB0

Motors for platform screen door drives (for controllers ATE530S, ATE531S)

EC technology:

- SIDOOR MEG251 geared motors (max. door weight 250 kg)
  - SIDOOR MEG251 L (pinion left), 6FB1203-5AT00-7MP0
  - SIDOOR MEG251 R (pinion right), 6FB1203-5AT01-7MP0

Photo: DC geared motor SIDOOR M3 L, 6FB1103-0AT10-4MB0 or SIDOOR MDG180 L, 6FB1103-0AT16-4MB0. (version with pinion left)

Photo: EC geared motor SIDOOR MEG251 L, 6FB1203-5AT00-7MP0. (version with pinion left)

Geared motors

Technical specifications

Article number	**6FB1103-0AT16-4MB0** SIDOOR MDG180 L DIN EN 45545-2	**6FB1103-0AT15-4MB0** SIDOOR MDG180 R DIN EN 45545-2	**6FB1103-0AT10-4MB0** SIDOOR M3 L	**6FB1103-0AT11-4MB0** SIDOOR M3 R	**6FB1203-5AT00-7MP0** SIDOOR MEG251 L	**6FB1203-5AT01-7MP0** SIDOOR MEG251 R
General information						
Product brand name	SIDOOR					
Product version	With driven gear on the left	With driven gear on the right	With driven gear on the left	With driven gear on the right	With driven gear on the left	With driven gear on the right
Input current						
Operational current (rated value)	4 A				6.8 A	
Mechanical data						
Torque of the rotary operating mechanism (rated value)	3 Nm				4.1 N·m	
Speed, max.	0.65 m/s					
Gear ratio	15					
Number of pulses per revolution, max.	100					
Weight of door, max.	180 kg				250 kg	
Degree and class of protection						
IP degree of protection • of the motor • of the gear unit	 IP54 IP40				 IP40	
Ambient conditions						
Ambient temperature during operation • min. • max.	 -20 °C 50 °C				 70 °C	
Ambient temperature during storage/transportation • Storage, min. • Storage, max.	 -40 °C 85 °C					
Fire resistance • Behavior in fire	 complies with EN 45545-2 Hazard Level HL3					
Dimensions						
Height of motor	98 mm				100 mm	
Length of motor	236 mm				249 mm	
Diameter of motor	63 mm				62 mm	
Width of gear unit, including drive pinion	85 mm				86 mm	

Selection and ordering data

Version	Article No.
Motors for interior railway door drives	
SIDOOR MDG180 geared motors	
MDG180 L, EN 45545-2	**6FB1103-0AT16-4MB0**
MDG180 R, EN 45545-2	**6FB1103-0AT15-4MB0**
SIDOOR M3 geared motors	
M3 L	**6FB1103-0AT10-4MB0**
M3 R	**6FB1103-0AT11-4MB0**
Motors for platform screen doors	
SIDOOR MEG251 EC technology geared motor	
MEG251 L	**6FB1203-5AT00-7MP0**
MEG251 R	**6FB1203-5AT01-7MP0**

* You can order this quantity or a multiple thereof.

Overview

SIDOOR MED280 direct drive

SIDOOR direct drives are a combination of motor and sensor. They are easy to connect to the controller via the interface provided and are automatically detected during commissioning.

The maintenance-free drive unit consists of a gearless, speed-controlled, electronically commutated motor with non-self-locking gearing.

Direct drives are designed for certain maximum dynamic door weights and can control both drive directions.

- SIDOOR MED280 direct drive for dynamic door weights up to 280 kg (6FB1203-0AT12-7DA0)

Technical specifications

Article number	**6FB1203-0AT12-7DA0** SIDOOR MED280
General information	
Product brand name	SIDOOR
Product designation	Motor for door control
Product version	MED280
Input current	
Operational current (rated value)	9.7 A
Mechanical data	
Torque of the rotary operating mechanism (rated value)	4.7 N·m
Speed, max.	0.8 m/s
Number of pulses per revolution, max.	1 024
Weight of door, max.	280 kg
Degree and class of protection	
IP degree of protection • of the motor	 IP54
Ambient conditions	
Ambient temperature during operation • min. • max.	 -25 °C 70 °C
Ambient temperature during storage/transportation • Storage, min. • Storage, max.	 -40 °C 85 °C
Dimensions	
Width of motor	160 mm
Height of motor	140 mm
Length of motor • including drive pinion	56 mm 91 mm

Selection and ordering data

	Version	Article No.
	SIDOOR MED280 direct drive Motor for door control	**6FB1203-0AT12-7DA0**

*** You can order this quantity or a multiple thereof.**

Overview

A comprehensive range of accessories is available for the SIDOOR systems. This is necessary to ensure low-noise operation of the door by the controller.

Accessories for SIDOOR DC and EC geared motors

Rubber-metal anti-vibration mount

To ensure low-noise door operation, the SIDOOR geared motors are integrated in the door system using rubber-metal anti-vibration mounts.

- Rubber-metal anti-vibration mount 6FB1104-0AT02-0AD0 for SIDOOR M3 and SIDOOR MDG180 DC geared motors (also for EN 45545-2) and SIDOOR MEG251 EC geared motors (door weights up to 250 kg)

Rubber-metal anti-vibration mount 6FB1104-0AT02-0AD0

Mounting bracket

Two different mounting brackets are available with elongated holes:

- Mounting bracket 6FB1104-0AT01-0AS0 for SIDOOR M3 and SIDOOR MDG180 DC geared motors (also for EN 45545-2) and SIDOOR MEG251 EC geared motors for flexible accommodation of the rubber-bonded metal.
- Mounting bracket 6FB1104-0AT02-0AS0 for the deflector unit, this enables the toothed belt to be set to the required belt tension.

Mounting bracket 6FB1104-0AT01-0AS0 for mounting the geared motor

Mounting bracket 6FB1104-0AT02-0AS0 for the deflector unit

Door clutch holder

The door clutch holder 6FB1104-0AT01-0CP0 serves to connect the respective door leaf by means of a toothed belt while also functioning as a toothed-belt lock. One door clutch holder per door leaf is required. The toothed-belt lock can accommodate both open ends of the toothed belt.

Door clutch holder 6FB1104-0AT01-0CP0 (packaging size = 1 unit)

Deflector unit

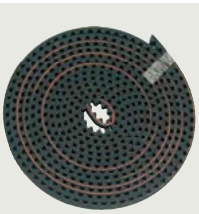
The deflector unit 6FB1104-0AT03-0AS0 contains an embedded belt pulley which can be mounted on the door system.

The STS toothed belt is redirected via this deflector unit.

Deflector unit 6FB1104-0AT03-0AS0

STS toothed belt

The door system is moved between the end positions of the door using the STS toothed belt 6FB1104-0AT0.-0AB0. Two different toothed belt lengths are available.



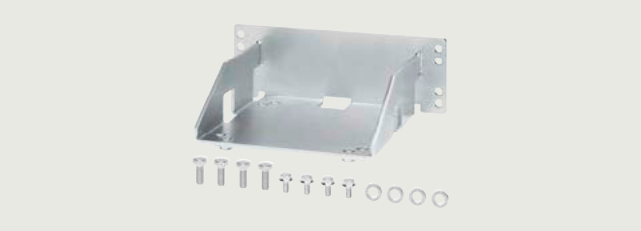
Toothed belt 6FB1104-0AT01-0AB0, length 4 m

Toothed belt 6FB1104-0AT02-0AB0, length 45 m

Accessories for the SIDOOR MED280 EC direct drive, for the controller for the SIDOOR ATE530S coated/ATE531S platform screen door drive

Motor holder

- Motor holder 6FB1104-0AT03-0AD0 for accommodation of the SIDOOR MED280 direct drive.



SIDOOR motor holder

Mounting bracket

- For mounting the SIDOOR motor holder 6FB1104-0AT01-0AS0 Identical to the mounting bracket 6FB1104-0AT01-0AS0 for DC geared motors.

Mounting bracket for geared motor

- With tensioning device for mounting the deflector unit and setting the toothed belt to the required tension (large) 6FB1104-0AT05-0AS4

SIDOOR mounting bracket, large

- With tensioning device for mounting the deflector unit and setting the toothed belt to the required tension (small) 6FB1104-0AT05-0AS5

SIDOOR mounting bracket, small

Door clutch holder

- For attaching both ends of the toothed belt and connecting the respective door panel to the toothed belt, width 20 mm, 6FB1104-0AT05-0AS1

SIDOOR door clutch holder

Deflector unit

- For attaching the SIDOOR toothed belt and fixing to the door 6FB1104-0AT07-0AS0

SIDOOR deflector unit

STD toothed belt

- As a connection between the door system and the end positions of the door, toothed belt width 20 mm. Length 4 m, 6FB1104-0AT05-0AB0

SIDOOR toothed belt, small

- Toothed belt width 20 mm. Length 45 m 6FB1104-0AT06-0AB1

SIDOOR toothed belt, large

Selection and ordering data

Version	Article No.
Accessories for SIDOOR DC and EC geared motors	
Rubber-metal anti-vibration mounts for geared motors	
• SIDOOR rubber-metal anti-vibration mount for geared motors for door weights up to 250 kg	**6FB1104-0AT02-0AD0**
Mounting bracket	
• SIDOOR mounting bracket for geared motor	**6FB1104-0AT01-0AS0**
• SIDOOR mounting bracket with tensioning device for deflector pulley	**6FB1104-0AT02-0AS0**
SIDOOR door clutch holder	
• For toothed belt, width 12 mm	**6FB1104-0AT01-0CP0**
SIDOOR deflector unit	**6FB1104-0AT03-0AS0**
SIDOOR toothed belt STS	
Width 12 mm	
• 4 m	**6FB1104-0AT01-0AB0**
• 45 m	**6FB1104-0AT02-0AB0**
Accessories for the SIDOOR MED280 EC direct drive, for the controller for the SIDOOR ATE530S coated/ATE531S platform screen door drive	
Motor holder for SIDOOR MED280 direct drive	**6FB1104-0AT03-0AD0**
Mounting bracket for mounting the motor holder	**6FB1104-0AT01-0AS0**
Mounting bracket with tensioning device for mounting the deflector unit	
• Large	**6FB1104-0AT05-0AS4**
• Small	**6FB1104-0AT05-0AS5**
SIDOOR door clutch holder	
• For toothed belt, width 20 mm	**6FB1104-0AT05-0AS1**
SIDOOR deflector unit	**6FB1104-0AT07-0AS0**
SIDOOR toothed belt STD	
Width 20 mm	
• 4 m	**6FB1104-0AT05-0AB0**
• 45 m	**6FB1104-0AT06-0AB1**

* You can order this quantity or a multiple thereof.

SCALANCE X005EEC

Overview

The unmanaged Industrial Ethernet switch SCALANCE X005 is ideally suited for economical setup of small Industrial Ethernet networks with data transfer rates of 10/100 Mbps in line and star structures.

- Five electrical station or network connections
- Rugged metal housing for space-saving control cabinet installation on a standard mounting rail or S7-300 mounting rail or for wall mounting
- Rugged, industry-compatible station connections with RJ45 plug connectors that are locked into place on the housing to provide additional strain relief and bending relief
- Diagnostics on the device by means of LEDs (power, link status, data communication)

SCALANCE X005EEC

- For setting up electrical star and line structures with five electrical ports for use in rail and road transport with extended temperature range

Benefits

- Ideal solution for setup of small Industrial Ethernet line and star structures
- Space-saving installation in the control cabinet thanks to its compact size in S7-300 format
- Reliable plug-in connection thanks to rugged, industry-compatible device connection in combination with FastConnect connectors
- Installation without patch field is possible using IE FC RJ45 plug 180 and IE FC standard cable
- Integrated autocrossover function enables use of uncrossed connection cables

Application

- For economical setup of small, electrical Industrial Ethernet star and line structures with switching functionality, e.g. machine or plant islands
- For use in the control cabinet
- The SCALANCE X005EEC is suitable for use in rail and road transport due to its specification according to EN 50155 and e1/E1

Design

The SCALANCE Industrial Ethernet switches with a rugged metal housing (IP30) are optimized for mounting on a standard mounting rail and an S7-300 mounting rail. Direct wall mounting in different mounting positions is also possible.
Due to the housing dimensions, which correspond to those of the SIMATIC S7-300, the devices are very well suited for integration into an automation solution with S7-300 components.

The SCALANCE X005 switch is equipped with:

- Supply voltage 1 x 24 V DC
- A row of LEDs for displaying status information (power, link status, data communication)
- 5 x 10/100BaseTX, RJ45 ports: automatic detection of the data rate (10 or 100 Mbps), with autosensing and autocrossover function for connecting IE FC cables via IE FC RJ45 Plug 180 up to 100 m

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Technical specifications

Article number	**6GK5005-0BA10-1CA3**
Product type designation	SCALANCE X005EEC
Transmission rate	
Transmission rate	10/100 Mbps
Integrated interfaces for communication	
Number of electrical connections	
• for network components or data terminal equipment	5; RJ45 with securing collar
Number of 100 Mbps SC ports	
• for multimode	0
Number of 1000 Mbps LC ports	
• for multimode	0
• for single-mode (LD)	0
Other interfaces	
Number of electrical connections	
• for power supply	1
Type of electrical connection	
• for power supply	2-pin terminal block

Article number	**6GK5005-0BA10-1CA3**
Product type designation	SCALANCE X005EEC
Supply voltage, current consumption, power loss	
Type of supply voltage	DC
Supply voltage	
• External	24 V
• External	18 ... 32 V
Product component: fusing at power supply input	Yes
Type of fusing at input for supply voltage	0.5 A / 60 V
Current consumption, maximum	0.08 A
Power loss [W]	
• with 24 V DC	2 Watts
Permissible ambient conditions	
Ambient temperature	
• during operation	-40 ... +75°C
• during storage	-40 ... +80°C
• during transport	-40 ... +80°C
Relative humidity	
• Relative humidity at 25 °C, without condensation during operation, maximum	95%
IP degree of protection	IP30
Design, dimensions and weights	
Model	Compact
Width	40 mm
Height	125 mm
Depth	124 mm
Net weight	0.55 kg
Product property: conformal coating	No
Mounting type	
• 35 mm DIN rail mounting	Yes
• Wall mounting	Yes
• S7-300 rail mounting	Yes
• S7-1500 rail mounting	No
Product functions - Management, configuration, engineering	
Product function	
• Multiport mirroring	No
• CoS	Yes
• Switch-managed	No
Product functions - Redundancy	
Product function	
• Parallel Redundancy Protocol (PRP)/use in PRP network	Yes
• Parallel Redundancy Protocol (PRP)/Redundant Network Access (RNA)	No
Standards, specifications, approvals	
Standard	
• for safety, from CSA and UL	UL 60950-1, CSA C22.2 No. 60950-1
• for emitted interference	EN 61000-6-4 (Class A)
• for noise immunity	EN 61000-6-2
Standards, specifications, approvals - CE	
Proof of suitability, CE mark	Yes
Standards, specifications, approvals - Other	
Proof of suitability	EN 61000-6-2, EN 61000-6-4
• C-Tick	Yes
• E1 approval	Yes
• e1 approval	Yes
• Railway application in accordance with EN 50155	Yes
• KC approval	Yes
Standards, specifications, approvals - Marine classification	
Marine classification association	
• American Bureau of Shipping Europe Ltd. (ABS)	Yes
• Bureau Veritas (BV)	Yes
• Det Norske Veritas (DNV)	Yes
• Germanischer Lloyd (GL)	No
• Lloyds Register of Shipping (LRS)	Yes
• Nippon Kaiji Kyokai (NK)	Yes
• Polski Rejestr Statkow (PRS)	Yes
• Royal Institution of Naval Architects (RINA)	Yes
Standards, specifications, approvals - Product conformity	
MTBF at 40 °C	167.1 y

SCALANCE X005EEC

Selection and ordering data

Version	Article No.
SCALANCE X005EEC Industrial Ethernet switch for 10/100 Mbps; with five 10/100 Mbps RJ45 ports for setup of small star and line structures with extended temperature range and approvals for use in rail and road transport	**6GK5005-0BA10-1CA3**
Accessories	
IE FC Stripping Tool Preset insulation stripping tool for fast stripping of Industrial Ethernet FC cables	**6GK1901-1GA00**
IE FC RJ45 Plug 180 2 x 2 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1901-1BB10-2AA0**
IE TP Train Cable GP 2x2 (Type C) 4-core, shielded TP installation cable for connection to IE FC outlet RJ45/IE FC RJ45 plug 180/90 for train applications: PROFINET-compliant; sold by the meter; maximum delivery unit 1000 m, minimum order quantity 20 m	**6XV1871-2T**
IE Connecting Cable IE FC RJ45 Plug-180/IE FC RJ45 Plug-180 Preassembled IE FC TP trailing cable GP 2 x 2 (PROFINET type C) with two IE FC RJ45 Plug-180, IP20 degree of protection; length:	
• 1.0 m	**6XV1871-5BH10**
• 5.0 m	**6XV1871-5BH50**
• 10.0 m	**6XV1871-5BN10**
2-pole screw-terminal block for power supply (24 V DC) for SCALANCE X/W/S 1 pack = 5 units	**6GK5980-0BB00-0AA5**

More information

Selection tools:

To assist in selecting the right Industrial Ethernet switches as well as configuration of modular variants, the TIA Selection Tool is available at:

TIA Selection Tool:
http://www.siemens.com/tia-selection-tool

Overview

The managed Industrial Ethernet switches of the SCALANCE XC-200 product line are optimized for setting up Industrial Ethernet networks with data transfer rates of 10/100/1000 Mbps as well as 2 x 10 Gbps (e.g. SCALANCE XC206-2G PoE).

- Electrical or optical connection to stations or networks according to port characteristics of the devices
- Versions with transmission rates up to 10 Gbps optical or 1 Gbps electrical
- Rugged station connections with industry-standard RJ45 connectors that offer additional strain and bending strain relief thanks to latching on the enclosure
- Redundant power supply
- Console port for direct access to device
- Display of comprehensive operating mode and status information via LEDs and selection pushbuttons
- Signaling contact for connecting to an error signaling system
- Slot for optional C-PLUG removable data storage medium for easy device replacement without additional equipment such as a field PG
- Grounding screw for external ground connection
- Virtual LANs (VLAN) for easy structuring of large networks into smaller, logical subnetworks. Reasons for the subdivision into logical subnetworks are, for example, separation of the Ethernet networks to reduce the broadcast load, separation of sensitive areas from the main network, and subdivision of the network into logical working groups
- By learning the multicast sources and destinations (Internet Group Management Protocol (IGMP) Snooping), SCALANCE XC-200 switches can also filter multicast data traffic and thus limit the load on the network
- Integrated security functions offer protection against unauthorized network access and configuration (e.g. authentication via IEEE 802.1X)

Product versions

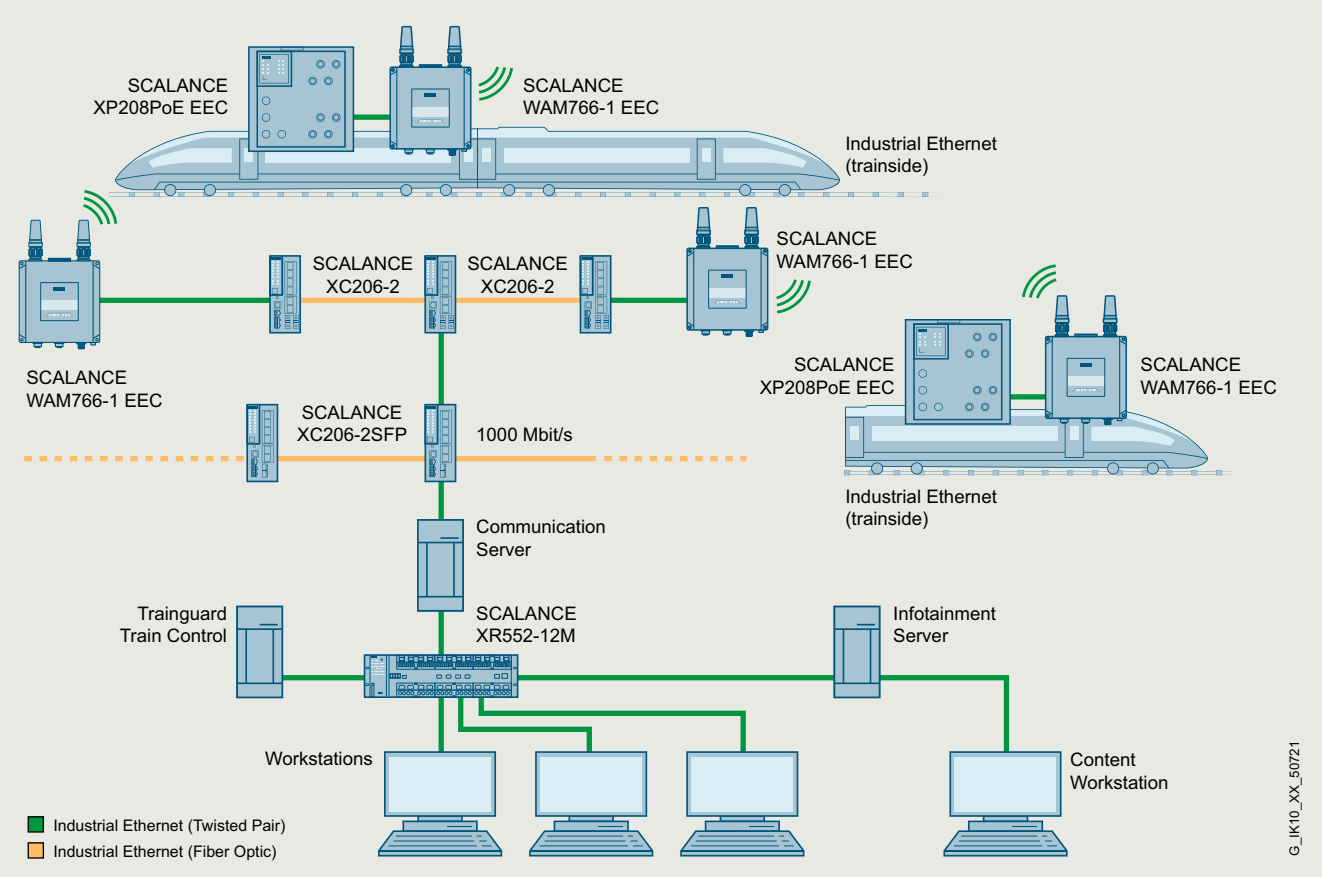
- Switches with electrical ports:
  - SCALANCE XC208G
    with 8x RJ45 ports 10/100/1000 Mbit/s
  - SCALANCE XC208;
    with 8x RJ45 ports 10/100 Mbps for mounting in the control cabinet
  - SCALANCE XC216
    with 16x RJ45 ports 10/100 Mbps for mounting in the control cabinet
  - SCALANCE XC224;
    with 24x RJ45 ports 10/100 Mbps for mounting in the control cabinet
- Switches with Power over Ethernet:
  - SCALANCE XC206-2G PoE
    with 6x RJ45 PoE ports 10/100/1000 Mbps and 2x SFP+ 1000/10000 Mbps
  - SCALANCE XC206-2G PoE (DC 54 V)
    with 6x RJ45 PoE ports 10/100/1000 Mbps and 2x SFP+ 1000/10000 Mbps, PoE support for 54 V DC Infeed
  - SCALANCE XC206-2G PoE EEC
    with 6x RJ45 PoE ports 10/100/1000 Mbps and 2x SFP+ 1000/10000 Mbps, PoE support for 54 V DC Infeed
  - SCALANCE XC208G PoE
    with 6x RJ45 PoE ports 10/100/1000 Mbps and 2x RJ45 ports 10/100/1000 Mbps
  - SCALANCE XC208G PoE (DC 54 V)
    with 6x RJ45 PoE ports 10/100/1000 Mbps and 2x RJ45 ports 10/100/1000 Mbps, PoE support for 54 V DC Infeed
- Switches with electrical and optical ports
  - SCALANCE XC206-2;
    with 6x RJ45 ports 10/100 Mbps and 2x ST/BFOC ports 100 Mbps
  - SCALANCE XC206-2;
    with 6x RJ45 ports 10/100 Mbps and 2x SC ports 100 Mbps
  - SCALANCE XC206-2SFP;
    with 6x RJ45 ports 10/100 Mbps and 2x SFP plug-in transceivers with 100 or 1000 Mbps

Benefits

- Operational reliability in industrial environments, e.g. due to rugged enclosure, redundancy, temperature range from -40 °C to +70 °C
- Fast mobile diagnostics by smartphone or tablet in existing WLAN using NFC (near field communication)
- Integration of SCALANCE XC-200 switches into existing network management infrastructure (e.g. SINEC NMS) through SNMP accesction thanks to rugged, industry-standard device connecs
- Reliable plug-in connetion in conjunction with industry-standard FastConnect connectors

SCALANCE XC-200 managed

Function



Set-up of distributed access points along track segments with SCALANCE XC206-2SFP

Technical specifications

Article number	6GK5206-2BB00-2AC2	6GK5206-2BD00-2AC2	6GK5206-2BS00-2AC2
Product type designation	SCALANCE XC206-2 (ST/BFOC)	SCALANCE XC206-2 (SC)	SCALANCE XC206-2SFP
Transmission rate			
Transfer rate	10/100 Mbit/s	10/100 Mbit/s	10/100/1000 Mbit/s
Interfaces for communication integrated			
Number of electrical connections			
• for network components or terminal equipment	6; RJ45	6; RJ45	6; RJ45
Number of 10/100 Mbit/s RJ45 ports Integrated			
• with securing collar	6	6	6
Number of 100 Mbit/s ST(BFOC) ports			
• for multimode	2		
Number of 100 Mbit/s SC ports			
• for multimode		2	
Interfaces for communication pluggable maximum			
Number of electrical connections			
• for SFP			2; 100 Mbit/s or 1000 Mbit/s SFP plug-in transceiver
Interfaces others			
Number of electrical connections			
• for operator console	1	1	1
• for signaling contact	1	1	1
• for power supply	1	1	1
• for redundant voltage supply	1	1	1
Type of electrical connection			
• for operator console	RJ11	RJ11	RJ11
• for signaling contact	2-pole terminal block	2-pole terminal block	2-pole terminal block
• for power supply	4-pole terminal block	4-pole terminal block	4-pole terminal block
design of the removable storage			
• C-PLUG	Yes	Yes	Yes

Article number	**6GK5206-2BB00-2AC2**	**6GK5206-2BD00-2AC2**	**6GK5206-2BS00-2AC2**
Product type designation	SCALANCE XC206-2 (ST/BFOC)	SCALANCE XC206-2 (SC)	SCALANCE XC206-2SFP
Signal-Inputs/outputs			
Operating voltage of the signaling contacts			
• at DC Rated value	24 V	24 V	24 V
Operating current of the signaling contacts			
• at DC maximum	0.1 A	0.1 A	0.1 A
Supply voltage, current consumption, power loss			
Type of voltage of the supply voltage	DC	DC	DC
Supply voltage			
• external	24 V	24 V	24 V
• external minimum	9.6 V	9.6 V	9.6 V
• external maximum	31.2 V	31.2 V	31.2 V
Supply voltage 4 Rated value			
• Consumed current 4 at rated supply voltage maximum	0.25 A	0.25 A	0.25 A
Product component fusing at power supply input	Yes	Yes	Yes
Fuse protection type at input for supply voltage	2.5 A / 125 V	2.5 A / 125 V	2.5 A / 125 V
Consumed current maximum	0.5 A	0.5 A	0.5 A
Power loss [W]			
• at DC at 24 V	6 W	6 W	6 W
Permitted ambient conditions			
Ambient temperature			
• during operation	-40 ... +70 °C	-40 ... +70 °C	-40 ... +70 °C
• during storage	-40 ... +85 °C	-40 ... +85 °C	-40 ... +85 °C
• during transport	-40 ... +85 °C	-40 ... +85 °C	-40 ... +85 °C
Relative humidity			
• at 25 °C without condensation during operation maximum	95 %	95 %	95 %
Protection class IP	IP20	IP20	IP20
Design, dimensions and weight			
Design	compact	compact	compact
Width	60 mm	60 mm	60 mm
Height	147 mm	147 mm	147 mm
Depth	125 mm	125 mm	125 mm
Net weight	0.54 kg	0.54 kg	0.52 kg
Material of the enclosure	Polycarbonate (PC-GF10) / pressure die cast aluminum	Polycarbonate (PC-GF10) / pressure die cast aluminum	Polycarbonate (PC-GF10) / pressure die cast aluminum
Mounting type			
• 35 mm DIN rail mounting	Yes	Yes	Yes
• wall mounting	Yes	Yes	Yes
• S7-300 rail mounting	Yes	Yes	Yes
• S7-1500 rail mounting	Yes	Yes	Yes
Product properties, functions, components general			
Cascading in the case of a redundant ring at reconfiguration time of <\~0.3\~s	50	50	50
Cascading in cases of star topology	any (depending only on signal propagation time)	any (depending only on signal propagation time)	any (depending only on signal propagation time)
Product function QoS according to DSCP	Yes	Yes	Yes
Product feature			
• Cut Through switching method	No	No	No
• Store & Forward switching method	Yes	Yes	Yes
Product functions management, configuration			
Product function			
• CLI	Yes	Yes	Yes
• web-based management	Yes	Yes	Yes
• MIB support	Yes	Yes	Yes
• TRAPs via email	Yes	Yes	Yes
• Configuration with STEP 7	Yes	Yes	Yes
• RMON	Yes	Yes	Yes
• SMTP server	No	No	No
• Port mirroring	Yes	Yes	Yes
• multiport mirroring	Yes	Yes	Yes
• CoS	Yes	Yes	Yes
• PROFINET IO diagnosis	Yes	Yes	Yes
• switch-managed	Yes	Yes	Yes
Telegram length for Ethernet maximum	1 632 byte	1 632 byte	1 632 byte

SCALANCE XC-200 managed

Article number	6GK5206-2BB00-2AC2	6GK5206-2BD00-2AC2	6GK5206-2BS00-2AC2
Product type designation	SCALANCE XC206-2 (ST/BFOC)	SCALANCE XC206-2 (SC)	SCALANCE XC206-2SFP
Protocol is supported			
• Telnet	Yes	Yes	Yes
• HTTP	Yes	Yes	Yes
• HTTPS	Yes	Yes	Yes
• TFTP	Yes	Yes	Yes
• BOOTP	No	No	No
• GMRP	Yes	Yes	Yes
• DCP	Yes	Yes	Yes
• LLDP	Yes	Yes	Yes
• EtherNet/IP	Yes	Yes	Yes
• SNMP v1	Yes	Yes	Yes
• SNMP v2	Yes	Yes	Yes
• SNMP v3	Yes	Yes	Yes
• IGMP (snooping/querier)	Yes	Yes	Yes
Identification & maintenance function			
• I&M0 - device-specific information	Yes	Yes	Yes
• I&M1 – higher-level designation/location designation	Yes	Yes	Yes
Product functions Diagnosis			
Product function			
• Port diagnostics	Yes	Yes	Yes
• Statistics Packet Size	Yes	Yes	Yes
• Statistics packet type	Yes	Yes	Yes
• Error statistics	Yes	Yes	Yes
• SysLog	Yes	Yes	Yes
Product functions VLAN			
Product function			
• VLAN - port based	Yes	Yes	Yes
• VLAN - protocol-based	No	No	No
• VLAN - IP-based	No	No	No
• VLAN dynamic	Yes	Yes	Yes
Number of VLANs maximum	257	257	257
Number of VLANs - dynamic maximum	257	257	257
Protocol is supported GVRP	Yes	Yes	Yes
Product functions DHCP			
Product function			
• DHCP server	Yes	Yes	Yes
• DHCP client	Yes	Yes	Yes
• DHCP Option 82	Yes	Yes	Yes
• DHCP Option 66	Yes	Yes	Yes
• DHCP Option 67	Yes	Yes	Yes
Product functions Redundancy			
Product function			
• Ring redundancy	Yes	Yes	Yes
• High Speed Redundancy Protocol (HRP)	Yes	Yes	Yes
• high speed redundancy protocol (HRP) with redundancy manager	Yes	Yes	Yes
• high speed redundancy protocol (HRP) with standby redundancy	Yes	Yes	Yes
Protocol is supported Media Redundancy Protocol (MRP)	Yes	Yes	Yes
Product function			
• media redundancy protocol (MRP) with redundancy manager	Yes	Yes	Yes
• redundancy procedure STP	Yes	Yes	Yes
• redundancy procedure RSTP	Yes	Yes	Yes
• redundancy procedure MSTP	Yes	Yes	Yes
• Passive listening	Yes	Yes	Yes
Protocol is supported			
• LACP	Yes	Yes	Yes
Product functions Security			
Product function			
• IEEE 802.1x (radius)	Yes	Yes	Yes
• Broadcast/Multicast/Unicast Limiter	Yes	Yes	Yes
• broadcast blocking	Yes	Yes	Yes
Protocol is supported			
• SSH	Yes	Yes	Yes
• SSL	Yes	Yes	Yes
Product functions Time			
Product function			
• SICLOCK support	Yes	Yes	Yes
• NTP-client	Yes	Yes	Yes
• SNTP client	Yes	Yes	Yes
Protocol is supported			
• NTP	Yes	Yes	Yes
• SNTP	Yes	Yes	Yes

Article number	6GK5206-2BB00-2AC2	6GK5206-2BD00-2AC2	6GK5206-2BS00-2AC2
Product type designation	SCALANCE XC206-2 (ST/BFOC)	SCALANCE XC206-2 (SC)	SCALANCE XC206-2SFP
Standards, specifications, approvals CE			
Certificate of suitability CE marking	Yes	Yes	Yes
Product conformity according to EMC-guideline	2014/30/EU	2014/30/EU	2014/30/EU
Standard			
• for EMC interference emission	EN 61000-6-4, EN 50121-4	EN 61000-6-4, EN 50121-4	EN 61000-6-4, EN 50121-4
• for immunity to EMI	EN 61000-6-2, EN 50121-4	EN 61000-6-2, EN 50121-4	EN 61000-6-2, EN 50121-4
Certificate of suitability RoHS conformity	Yes; 2011/65/EU	Yes; 2011/65/EU	Yes; 2011/65/EU
Standards, specifications, approvals hazardous environments			
Certificate of suitability			
• ATEX	Yes	Yes	Yes
• IECEx	Yes	Yes	Yes
• FM registration	Yes	Yes	Yes
Standards, specifications, approvals miscellaneous			
Certificate of suitability			
• Railway application in accordance with EN 50121-4	Yes	Yes	Yes
• Regulatory Compliance Mark (RCM)	Yes	Yes	Yes
• EAC approval	Yes	Yes	Yes
Standards, specifications, approvals ship classification			
Marine classification association			
• American Bureau of Shipping Europe Ltd. (ABS)	Yes	Yes	Yes
• DNV GL	Yes	Yes	Yes
• Polski Rejestr Statkow (PRS)	Yes	Yes	Yes
Standards, specifications, approvals product conformity			
MTBF at 40 °C	46.43 y	46.43 y	47.06 y
Accessories			
Product extension optional C-PLUG	Yes	Yes	Yes

Article number	6GK5208-0BA00-2AC2	6GK5216-0BA00-2AC2	6GK5224-0BA00-2AC2
Product type designation	SCALANCE XC208	SCALANCE XC216	SCALANCE XC224
Transmission rate			
Transfer rate	10/100 Mbit/s	10 /100 Mbit/s	10/100 Mbit/s
Interfaces for communication integrated			
Number of electrical connections			
• for network components or terminal equipment	8; RJ45	16; RJ45	24; RJ45
Number of 10/100 Mbit/s RJ45 ports Integrated			
• with securing collar	8	16	24
Interfaces others			
Number of electrical connections			
• for operator console	1	1	1
• for signaling contact	1	1	1
• for power supply	1	1	1
• for redundant voltage supply	1	1	1
• Type of electrical connection			
• for operator console	RJ11	RJ11	RJ11
• for signaling contact	2-pole terminal block	2-pole terminal block	2-pole terminal block
• for power supply	4-pole terminal block	4-pole terminal block	4-pole terminal block
Design of the removable storage			
• C-PLUG	Yes	Yes	Yes
Signal-Inputs/outputs			
Operating voltage of the signaling contacts			
• at DC Rated value	24 V	24 V	24 V
Operating current of the signaling contacts			
• at DC maximum	0.1 A	0.1 A	0.1 A
Supply voltage, current consumption, power loss			
Type of voltage of the supply voltage	DC	DC	DC
Supply voltage			
• external	24 V	24 V	24 V
• external minimum	9.6 V	9.6 V	9.6 V
• external maximum	31.2 V	31.2 V	31.2 V
Supply voltage 4 Rated value			
• Consumed current 4 at rated supply voltage maximum	0.175 A	0.275 A	0.375 A
Product component fusing at power supply input	Yes	Yes	Yes
Fuse protection type at input for supply voltage	2.5 A / 125 V	2.5 A / 125 V	2.5 A / 125 V
Consumed current maximum	0.35 A	0.55 A	0.75 A
Power loss [W]			
• at DC at 24 V	4.2 W	6.6 W	9 W

SCALANCE XC-200 managed

Article number	6GK5208-0BA00-2AC2	6GK5216-0BA00-2AC2	6GK5224-0BA00-2AC2
Product type designation	SCALANCE XC208	SCALANCE XC216	SCALANCE XC224
Permitted ambient conditions			
Ambient temperature			
• during operation	-40 ... +70 °C	-40 ... +70 °C	-40 ... +70 °C
• during storage	-40 ... +85 °C	-40 ... +85 °C	-40 ... +85 °C
• during transport	-40 ... +85 °C	-40 ... +85 °C	-40 ... +85 °C
Relative humidity			
• at 25 °C without condensation during operation maximum	95 %	95 %	95 %
Protection class IP	IP20	IP20	IP20
Design, dimensions and weight			
Design	compact	compact	compact
Width	60 mm	120 mm	120 mm
Height	147 mm	147 mm	147 mm
Depth	125 mm	125 mm	125 mm
Net weight	0.52 kg	0.8 kg	0.88 kg
Material of the enclosure	Polycarbonate (PC-GF10) / pressure die cast aluminum	Polycarbonate (PC-GF10) / pressure die cast aluminum	Polycarbonate (PC-GF10) / pressure die cast aluminum
Mounting type			
• 35 mm DIN rail mounting	Yes	Yes	Yes
• wall mounting	Yes	Yes	Yes
• S7-300 rail mounting	Yes	Yes	Yes
• S7-1500 rail mounting	Yes	Yes	Yes
Product properties, functions, components general			
Cascading in the case of a redundant ring at reconfiguration time of <\~0.3\~s	50	50	50
Cascading in cases of star topology	any (depending only on signal propagation time)	any (depending only on signal propagation time)	any (depending only on signal propagation time)
Product function QoS according to DSCP		Yes	Yes
Product feature			
• Cut Through switching method	No	No	No
• Store & Forward switching method	Yes	Yes	Yes
Product functions management, configuration			
Product function			
• CLI	Yes	Yes	Yes
• web-based management	Yes	Yes	Yes
• MIB support	Yes	Yes	Yes
• TRAPs via email	Yes	Yes	Yes
• Configuration with STEP 7	Yes	Yes	Yes
• RMON	Yes	Yes	Yes
• SMTP server	No	No	No
• Port mirroring	Yes	Yes	Yes
• multiport mirroring	Yes	Yes	Yes
• CoS	Yes	Yes	Yes
• PROFINET IO diagnosis	Yes	Yes	Yes
• switch-managed	Yes	Yes	Yes
Telegram length for Ethernet maximum	1 632 byte	1 632 byte	1 632 byte
Protocol is supported			
• Telnet	Yes	Yes	Yes
• HTTP	Yes	Yes	Yes
• HTTPS	Yes	Yes	Yes
• TFTP	Yes	Yes	Yes
• BOOTP	No	No	No
• GMRP	Yes	Yes	Yes
• DCP	Yes	Yes	Yes
• LLDP	Yes	Yes	Yes
• EtherNet/IP	Yes	Yes	Yes
• SNMP v1	Yes	Yes	Yes
• SNMP v2	Yes	Yes	Yes
• SNMP v3	Yes	Yes	Yes
• IGMP (snooping/querier)	Yes	Yes	Yes
Identification & maintenance function			
• I&M0 - device-specific information	Yes	Yes	Yes
• I&M1 – higher-level designation/location designation	Yes	Yes	Yes
Product functions Diagnosis			
Product function			
• Port diagnostics	Yes	Yes	Yes
• Statistics Packet Size	Yes	Yes	Yes
• Statistics packet type	Yes	Yes	Yes
• Error statistics	Yes	Yes	Yes
• SysLog	Yes	Yes	Yes

Article number	6GK5208-0BA00-2AC2	6GK5216-0BA00-2AC2	6GK5224-0BA00-2AC2
Product type designation	SCALANCE XC208	SCALANCE XC216	SCALANCE XC224
Product functions VLAN			
Product function			
• VLAN - port based	Yes	Yes	Yes
• VLAN - protocol-based	No	No	No
• VLAN - IP-based	No	No	No
• VLAN dynamic	Yes	Yes	Yes
Number of VLANs maximum	257	257	257
Number of VLANs - dynamic maximum	257	257	257
Protocol is supported GVRP	Yes	Yes	Yes
Product functions DHCP			
Product function			
• DHCP server	Yes	Yes	Yes
• DHCP client	Yes	Yes	Yes
• DHCP Option 82	Yes	Yes	Yes
• DHCP Option 66	Yes	Yes	Yes
• DHCP Option 67	Yes	Yes	Yes
Product functions Redundancy			
Product function			
• Ring redundancy	Yes	Yes	Yes
• High Speed Redundancy Protocol (HRP)	Yes	Yes	Yes
• high speed redundancy protocol (HRP) with redundancy manager	Yes	Yes	Yes
• high speed redundancy protocol (HRP) with standby redundancy	Yes	Yes	Yes
Protocol is supported Media Redundancy Protocol (MRP)	Yes	Yes	Yes
Product function			
• media redundancy protocol (MRP) with redundancy manager	Yes	Yes	Yes
• redundancy procedure STP	Yes	Yes	Yes
• redundancy procedure RSTP	Yes	Yes	Yes
• redundancy procedure MSTP	Yes	Yes	Yes
• Parallel Redundancy Protocol (PRP)/operation in the PRP-network	No	No	No
• Parallel Redundancy Protocol (PRP)/Redundant Network Access (RNA)	No	No	No
• Passive listening	Yes	Yes	Yes
Protocol is supported			
• LACP	Yes	Yes	Yes
Product functions Security			
Product function			
• IEEE 802.1x (radius)	Yes	Yes	Yes
• Broadcast/Multicast/Unicast Limiter	Yes	Yes	Yes
• broadcast blocking	Yes	Yes	Yes
Protocol is supported			
• SSH	Yes	Yes	Yes
• SSL	Yes	Yes	Yes
Product functions Time			
Product function			
• SICLOCK support	Yes	Yes	Yes
• NTP-client	Yes	Yes	Yes
• SNTP client	Yes	Yes	Yes
Protocol is supported			
• NTP	Yes	Yes	Yes
• SNTP	Yes	Yes	Yes
Standards, specifications, approvals CE			
Certificate of suitability CE marking	Yes	Yes	Yes
Product conformity according to EMC-guideline	2014/30/EU	2014/30/EU	2014/30/EU
Standard			
• for EMC interference emission	EN 61000-6-4, EN 50121-4	EN 61000-6-4, EN 50121-4	EN 61000-6-4, EN 50121-4
• for immunity to EMI	EN 61000-6-2, EN 50121-4	EN 61000-6-2, EN 50121-4	EN 61000-6-2, EN 50121-4
Certificate of suitability RoHS conformity	Yes; 2011/65/EU	Yes; 2011/65/EU	Yes; 2011/65/EU
Standards, specifications, approvals miscellaneous			
Certificate of suitability			
• Railway application in accordance with EN 50121-4	Yes	Yes	Yes
• Regulatory Compliance Mark (RCM)	Yes	Yes	Yes
• EAC approval	Yes	Yes	Yes
Standards, specifications, approvals product conformity			
MTBF at 40 °C	57.15 y	48.09 y	41.36 y
Accessories			
Product extension optional C-PLUG	Yes	Yes	Yes

SCALANCE XC-200 managed

Article number	6GK5208-0GA00-2AC2	6GK5206-2RS00-2AC2	6GK5206-2RS00-5AC2
Product type designation	SCALANCE XC208G	SCALANCE XC206-2G PoE	SCALANCE XC206-2G PoE (DC 54 V)
Transfer rate			
Transfer rate	10/100/1000 Mbit/s	10/100/1000 Mbit/s, 10 Gbit/s	10/100/1000 Mbit/s, 10 Gbit/s
Interfaces for communication integrated			
Number of electrical connections			
• for network components or terminal equipment	8; RJ45	6; RJ45	6; RJ45
Number of 10/100 Mbit/s RJ45 ports Integrated			
• with securing collar	8	4 PoE ports according to IEEE 802.3at (30 W), 2 PoE ports according to IEEE 802.3bt (60 W)	4 PoE ports according to IEEE 802.3at (30 W), 2 PoE ports according to IEEE 802.3bt (60 W)
• with securing collar with PoE	--	6	6
number of electrical connections			
• for SFP	--	2	2
Interfaces for communication plug-in			
Number of electrical connections			
• for SFP+	--	2; SFPs with 1000 Mbps or 10,000 Mbps possible; 100 Mbps with SFP991-1(LD) A possible	2; SFPs with 1000 Mbps or 10,000 Mbps possible; 100 Mbps with SFP991-1(LD) A possible
Interfaces others			
Number of electrical connections			
• for operator console	1	1	1
• for signaling contact	1	1	1
• for power supply	1	--	--
Type of electrical connection			
• for operator console	RJ11	RJ11	RJ11
• for signaling contact	2-pole terminal block	2-pole terminal block	2-pole terminal block
• for power supply	4-pole terminal block	4-pole terminal block	4-pole terminal block
design of the removable storage			
• C-PLUG	Yes	Yes	Yes
Signal-inputs/outputs			
Operating voltage of the signaling contacts			
• at DC rated value	24 V	24 V	54 V
Operating current of the signaling contacts			
• at DC maximum	0.1 A	0.1 A	0.1 A
Supply voltage, current consumption, power loss			
product component connection for redundant voltage supply	Yes	Yes	Yes
supplied active power of PSE with PoE			
• total maximum		144 W	260 W
Type of voltage 1 of the supply voltage	DC	DC	DC
• Supply voltage 1 rated value	24 V	24 V	54 V
• power loss (W) 1 rated value	4.3 W	18 W	10 W
• consumed current 1 at rated supply voltage maximum	0.26 A	--	--
• supply voltage 1 rated value	9.6 ... 31.2 V	19.2 ... 31.2 V	52 ... 57 V
• consumed current 1 maximum	0.36 A	6 A	5 A
• type of electrical connection 1 for power supply	4-pole terminal block	--	--
• product component 1 fusing at power supply input	Yes	Yes	Yes
• fuse protection type 1 at input for supply voltage	2.5 A / 125 V	15 A / 125 V	15 A / 125 V
ambient conditions			
ambient temperature			
• during operation	-40 ... +70 °C	-40 ... +60 °C	-40 ... +60 °C
• during storage	-40 ... +85 °C	-40 ... +85 °C	-40 ... +85 °C
• during transport	-40 ... +85 °C	-40 ... +85 °C	-40 ... +85 °C
• Note	--	installation position and SFPs used during the operation have to be considered (see manual)	installation position and SFPs used during the operation have to be considered (see manual)
relative humidity			
• at 25 °C without condensation during operation maximum	95 %	95 %	95 %
protection class IP	IP20	IP20	IP20
Design, dimensions and weight			
Design	compact	compact	compact
Width	60 mm	100 mm	60 mm
Height	147 mm	147 mm	147 mm
Depth	125 mm	125 mm	125 mm
Net weight	0.52 kg	0.955 kg	0.54 kg
product feature conformal coating	No	No	No
Material of the enclosure	Polycarbonate (PC-GF10) pressure die cast aluminum	Polycarbonate (PC-GF10) pressure die cast aluminum	Polycarbonate (PC-GF10) pressure die cast aluminum

Article number	**6GK5208-0GA00-2AC2**	**6GK5206-2RS00-2AC2**	**6GK5206-2RS00-5AC2**
Product type designation	SCALANCE XC208G	SCALANCE XC206-2G PoE	SCALANCE XC206-2G PoE (DC 54 V)
Fastening method			
• 35 mm top hat DIN rail mounting	Yes	Yes	Yes
• wall mounting	Yes	Yes	Yes
• S7-300 rail mounting	Yes	Yes	Yes
• S7-1500 rail mounting	Yes	Yes	Yes
Product properties, functions, components general			
Cascading in the case of a redundant ring at reconfiguration time of <\~0.3\~s	50	50	50
Cascading in cases of star topology	any (depending only on signal propagation time)	any (depending only on signal propagation time)	any (depending only on signal propagation time)
Product function QoS according to DSCP	Yes	Yes	Yes
Product feature			
• Cut Through switching method	No	No	No
• Store & Forward switching method	Yes	Yes	Yes
Product functions management, configuration, engineering			
Product function			
• CLI	Yes	Yes	Yes
• web-based management	Yes	Yes	Yes
• MIB support	Yes	Yes	Yes
• TRAPs via email	Yes	Yes	Yes
• Configuration with STEP 7	Yes	Yes	Yes
• RMON	Yes	Yes	Yes
• SMTP server	No	No	No
• Port mirroring	Yes	Yes	Yes
• multiport mirroring	Yes	Yes	Yes
• CoS	Yes	Yes	Yes
• PROFINET IO diagnosis	Yes	Yes	Yes
PROFINET conformity class	B	B	B
Network load class according to PROFINET	3	3	3
Product function switch-managed	Yes	Yes	Yes
Telegram length for Ethernet maximum	10240 byte	10240 byte	10240 byte
Protocol is supported			
• Telnet	Yes	Yes	Yes
• HTTP	Yes	Yes	Yes
• HTTPS	Yes	Yes	Yes
• TFTP	Yes	Yes	Yes
• BOOTP	No	No	No
• GMRP	Yes	Yes	Yes
• DCP	Yes	Yes	Yes
• LLDP	Yes	Yes	Yes
• EtherNet/IP	Yes	Yes	Yes
• SNMP v1	Yes	Yes	Yes
• SNMP v2	Yes	Yes	Yes
• SNMP v3	Yes	Yes	Yes
• IGMP (snooping/querier)	Yes	Yes	Yes
Identification & maintenance function			
• I&M0 - device-specific information	Yes	Yes	Yes
• I&M1 – higher-level designation/location designation	Yes	Yes	Yes
Product functions Diagnosis			
Product function			
• Port diagnostics	Yes	Yes	Yes
• Statistics packet size	Yes	Yes	Yes
• Statistics packet type	Yes	Yes	Yes
• Error statistics	Yes	Yes	Yes
• SysLog	Yes	Yes	Yes
Product functions VLAN			
Product function			
• VLAN - port based	Yes	Yes	Yes
• VLAN - protocol-based	No	No	No
• VLAN - IP-based	No	No	No
Number of VLANs maximum	257	257	257
Number of VLANs - dynamic maximum	257	257	257
number of VLANs / at ring redundancy (HRP; MRP; standby link)	35	35	35
Protocol is supported GVRP	Yes	Yes	Yes
Product functions DHCP			
Product function			
• DHCP server	Yes	Yes	Yes
• DHCP client	Yes	Yes	Yes
• DHCP Option 82	Yes	Yes	Yes
• DHCP Option 66	Yes	Yes	Yes
• DHCP Option 67	Yes	Yes	Yes

SCALANCE XC-200 managed

Article number	6GK5208-0GA00-2AC2	6GK5206-2RS00-2AC2	6GK5206-2RS00-5AC2
Product type designation	SCALANCE XC208G	SCALANCE XC206-2G PoE	SCALANCE XC206-2G PoE (DC 54 V)
Product functions redundancy			
Product function			
• of the PROFINET IO device is supported PROFINET system redundancy	Yes	Yes	Yes
• Ring redundancy	Yes	Yes	Yes
• High Speed Redundancy Protocol (HRP)	Yes	Yes	Yes
• high speed redundancy protocol (HRP) with redundancy manager	Yes	Yes	Yes
• high speed redundancy protocol (HRP) with standby redundancy	Yes	Yes	Yes
Protocol is supported Media Redundancy Protocol (MRP)	Yes	Yes	Yes
Product function			
• media redundancy protocol (MRP) with redundancy manager	Yes	Yes	Yes
• Media Redundancy Protocol Interconnection (MRPI)	Yes	Yes	Yes
• of the PROFINET IO device / is supported / H-Sync forwarding	Yes	Yes	Yes
• redundancy procedure STP	Yes	Yes	Yes
• redundancy procedure RSTP	Yes	Yes	Yes
• redundancy procedure RSTP+	Yes	Yes	Yes
• redundancy procedure MSTP	Yes	Yes	Yes
• Parallel Redundancy Protocol (PRP)/operation in the PRP-network	Yes	Yes	Yes
• Parallel Redundancy Protocol (PRP)/Redundant Network Access (RNA)	No	No	No
• Passive listening	Yes	Yes	Yes
Protocol is supported			
• LACP	Yes	Yes	Yes
Product functions Security			
Product function			
• IEEE 802.1x (radius)	Yes	Yes	Yes
• Broadcast/Multicast/Unicast Limiter	Yes	Yes	Yes
• broadcast blocking	Yes	Yes	Yes
Protocol is supported			
• SSH	Yes	Yes	Yes
• SSL	Yes	Yes	Yes
Product functions Time			
Product function			
• SICLOCK support	Yes	Yes	Yes
• NTP-client	Yes	Yes	Yes
• SNTP client	Yes	Yes	Yes
Protocol is supported			
• NTP	Yes	Yes	Yes
• SNTP	Yes	Yes	Yes
system modification during operation			
product function configuration in RUN via CiR/H-CiR	Yes	Yes	Yes
standards, specifications, approvals			
Standard			
• for emitted interference	--	EN 61000-6-4:2001 (Class A)	EN 61000-6-4:2001 (Class A)
• for interference immunity	--	EN 61000-6-2:2001	EN 61000-6-2:2001
IT security for industrial automation systems / according to IEC 62443-4-2:2019	Yes	Yes	Yes
MTBF	54 y	42 y	37 y
Reference code			
• according to IEC 81346-2	KF	KF	KF
• according to IEC 81346-2:2019	KFE	KFE	KFE
Standards, specifications, approvals CE			
Certificate of suitability CE marking	Yes	Yes	Yes
Product conformity according to EMC-guideline	2014/30/EU	2014/30/EU	2014/30/EU
Standard			
• for EMC interference emission	EN 61000-6-4, EN 50121-9	EN 61000-6-4, EN 50121-15	EN 61000-6-4, EN 50121-15
• for immunity to EMI	EN 61000-6-2, EN 50121-4	EN 61000-6-2, EN 50121-4	EN 61000-6-2, EN 50121-4
Certificate of suitability RoHS conformity	Yes; 2011/65/EU	Yes; 2011/65/EU	Yes; 2011/65/EU

Article number	6GK5208-0GA00-2AC2	6GK5206-2RS00-2AC2	6GK5206-2RS00-5AC2
Product type designation	SCALANCE XC208G	SCALANCE XC206-2G PoE	SCALANCE XC206-2G PoE (DC 54 V)
Standards, specifications, approvals / hazardous environments			
Certificate of suitability			
• ATEX	Yes; EN 60079-0, EN 60079-15	Yes	Yes
• for ATEX as marking	II 3 G Ex nA II T4 Gc	--	--
• for ATEX as certificate	KEMA 07ATEX0145 X	--	--
• IECEx	Yes; IEC 60079-0, IEC 60079-15	Yes	Yes
• for IECEx as marking	Ex nA II T4 Gc	--	--
• for IECEx as certificate	IECEx DEK 14.0025X	--	--
• CCC for hazardous zone according to GB standard	Yes	--	Yes
• for cULus HazLoc as marking	CL1, DIV2, Group A,B,C,D T4, CL1, Zone 2, Group IIC, T4	CL1, DIV2, Group A,B,C,D T4, CL1, Zone 2, Group IIC, T4	CL1, DIV2, Group A,B,C,D T4, CL1, Zone 2, Group IIC, T4
• for cULus HazLoc as File Nr.	E240480 (NWHP, NWHP7)	--	Yes
• FM registration	Yes; FM class 3600:2011, FM class 3611:2004, FM class 3810:2005, ANSI/ISA-61010-1:2004	Yes	--
• for FM as marking	CL1, DIV2, group A,B,C,D T4, CL1, Zone 2, group IIC, T4 Ta: -40 °C +70 °C	CL1, DIV2, group A,B,C,D T4, CL1, Zone 2, group IIC, T4 Ta: -40 °C +70 °C	CL1, DIV2, group A,B,C,D T4, CL1, Zone 2, group IIC, T4 Ta: -40 °C +70 °C
• for FM as certificate	FM16US0205X	--	--
standards, specifications, approvals other			
Certificate of suitability			
• KC approval	--	Yes	Yes
• Railway application in accordance with EN 50121-4	Yes	Yes	Yes
• Regulatory Compliance Mark (RCM)	Yes	Yes	Yes
• for UL 61010-2-201 as File Nr.	E85972 (NRAQ, NRAQ7)	E85972 (NRAQ, NRAQ7)	E85972 (NRAQ, NRAQ7)
• for UL 60950-1 as File Nr.	E115352 (NWGQ, NWGQ7)	--	--
• EAC approval	Yes	Yes	Yes
Accessories			
Product extension optional C-PLUG	Yes	Yes	

Article number	6GK5206-2RS00-5FC2	6GK5208-0RA00-2AC2	6GK5208-0RA00-5AC2
Product type designation	SCALANCE XC206-2G PoE EEC (DC 54 V)	SCALANCE XC208G PoE	SCALANCE XC208G PoE (DC 54 V)
Transfer rate			
Transfer rate	10/100/1000 Mbit/s, 10 Gbit/s	10/100/1000 Mbit/s, 10 Gbit/s	10/100/1000 Mbit/s, 10 Gbit/s
Interfaces for communication integrated			
Number of electrical connections			
• for network components or terminal equipment	6; RJ45	8; RJ45	8; RJ45
Number of 10/100 Mbit/s RJ45 ports Integrated			
• with securing collar	4 PoE ports according to IEEE 802.3at (30 W), 2 PoE ports according to IEEE 802.3bt (60 W)	2; 4 PoE ports according to IEEE 802.3at (30 W), 2 PoE ports according to IEEE 802.3bt (60 W)	2; 4 PoE ports according to IEEE 802.3at (30 W), 2 PoE ports according to IEEE 802.3bt (60 W)
• with securing collar with PoE	6	6	6
number of electrical connections			
• for SFP	2	--	--
Interfaces for communication plug-in			
Number of electrical connections			
• for SFP+	2; SFPs with 1000 Mbps or 10,000 Mbps possible; 100 Mbps with SFP991-1(LD) A possible	--	--
Interfaces others			
Number of electrical connections			
• for operator console	1	1	1
• for signaling contact	1	1	1
Type of electrical connection			
• for operator console	RJ11	RJ11	RJ11
• for signaling contact	2-pole terminal block	2-pole terminal block	2-pole terminal block
• for power supply	4-pole terminal block	4-pole terminal block	4-pole terminal block
design of the removable storage			
• C-PLUG	Yes	Yes	Yes
Signal-inputs/outputs			
Operating voltage of the signaling contacts			
• at DC rated value	54 V	24 V	54 V
Operating current of the signaling contacts			
• at DC maximum	0.1 A	0.1 A	0.1 A

SCALANCE XC-200 managed

Article number	6GK5206-2RS00-5FC2	6GK5208-0RA00-2AC2	6GK5208-0RA00-5AC2
Product type designation	SCALANCE XC206-2G PoE EEC (DC 54 V)	SCALANCE XC208G PoE	SCALANCE XC208G PoE (DC 54 V)
Supply voltage, current consumption, power loss			
product component connection for redundant voltage supply	Yes	Yes	Yes
supplied active power of PSE with PoE			
• total maximum	260 W	144 W	260 W
Type of voltage 1 of the supply voltage	DC	DC	DC
• Supply voltage 1 rated value	54 V	24 V	54 V
• power loss (W) 1 rated value	10 W	--	--
• consumed current 1 at rated supply voltage maximum	--	6 A	5 A
• supply voltage 1 rated value	52 ... 57 V	19.2 ... 31.2 V	52 ... 57 V
• consumed current 1 maximum	5 A	7.5 A	5 A
• product component 1 fusing at power supply input	Yes	--	--
• fuse protection type 1 at input for supply voltage	15 A / 125 V	15 A / 125 V	15 A / 125 V
Ambient conditions			
ambient temperature			
• during operation	-40 ... +60 °C	-40 ... +60 °C	-40 ... +60 °C
• during storage	-40 ... +85 °C	-40 ... +85 °C	-40 ... +85 °C
• during transport	-40 ... +85 °C	-40 ... +85 °C	-40 ... +85 °C
• Note	installation position and SFPs used during the operation have to be considered (see manual)	installation position and SFPs used during the operation have to be considered (see manual)	installation position and SFPs used during the operation have to be considered (see manual)
Installation altitude / at height above sea level / maximum	4000 m	--	
relative humidity			
• at 25 °C without condensation during operation maximum	95 %	95 %	95 %
protection class IP	IP20	IP20	IP20
Design, dimensions and weight			
Design	compact	compact	compact
Width	60 mm	100 mm	60 mm
Height	147 mm	147 mm	147 mm
Depth	125 mm	125 mm	125 mm
Net weight	0.54 kg	0.955 kg	0.54 kg
product feature conformal coating	Yes	No	No
Material of the enclosure	Polycarbonate (PC-GF10) pressure die cast aluminum	Polycarbonate (PC-GF10) pressure die cast aluminum	Polycarbonate (PC-GF10) pressure die cast aluminum
Fastening method			
• 35 mm top hat DIN rail mounting	Yes	Yes	Yes
• wall mounting	Yes	Yes	Yes
• S7-300 rail mounting	Yes	Yes	Yes
• S7-1500 rail mounting	Yes	Yes	Yes
Product properties, functions, components general			
Cascading in the case of a redundant ring at reconfiguration time of <\~0.3\~s	50	50	50
Cascading in cases of star topology	any (depending only on signal propagation time)	any (depending only on signal propagation time)	any (depending only on signal propagation time)
Product function QoS according to DSCP	Yes	Yes	Yes
Product feature			
• Cut Through switching method	No	No	No
• Store & Forward switching method	Yes	Yes	Yes
Product functions management, configuration, engineering			
Product function			
• CLI	Yes	Yes	Yes
• web-based management	Yes	Yes	Yes
• MIB support	Yes	Yes	Yes
• TRAPs via email	Yes	Yes	Yes
• Configuration with STEP 7	Yes	Yes	Yes
• RMON	Yes	Yes	Yes
• SMTP server	No	No	No
• Port mirroring	Yes	Yes	Yes
• multiport mirroring	Yes	Yes	Yes
• CoS	Yes	Yes	Yes
• PROFINET IO diagnosis	Yes	Yes	Yes
PROFINET conformity class	B	B	B
Network load class according to PROFINET	3	3	3
Product function switch-managed	Yes	Yes	Yes
Telegram length for Ethernet maximum	10240 byte	10240 byte	10240 byte

Article number	**6GK5206-2RS00-5FC2**	**6GK5208-0RA00-2AC2**	**6GK5208-0RA00-5AC2**
Product type designation	SCALANCE XC206-2G PoE EEC (DC 54 V)	SCALANCE XC208G PoE	SCALANCE XC208G PoE (DC 54 V)
Protocol is supported			
• Telnet	Yes	Yes	Yes
• HTTP	Yes	Yes	Yes
• HTTPS	Yes	Yes	Yes
• TFTP	Yes	Yes	Yes
• BOOTP	No	No	No
• GMRP	Yes	Yes	Yes
• DCP	Yes	Yes	Yes
• LLDP	Yes	Yes	Yes
• EtherNet/IP	Yes	Yes	Yes
• SNMP v1	Yes	Yes	Yes
• SNMP v2	Yes	Yes	Yes
• SNMP v3	Yes	Yes	Yes
• IGMP (snooping/querier)	Yes	Yes	Yes
Identification & maintenance function			
• I&M0 - device-specific information	Yes	Yes	Yes
• I&M1 – higher-level designation/location designation	Yes	Yes	Yes
Product functions Diagnosis			
Product function			
• Port diagnostics	Yes	Yes	Yes
• Statistics packet size	Yes	Yes	Yes
• Statistics packet type	Yes	Yes	Yes
• Error statistics	Yes	Yes	Yes
• SysLog	Yes	Yes	Yes
Product functions VLAN			
Product function			
• VLAN - port based	Yes	Yes	Yes
• VLAN - protocol-based	No	No	No
• VLAN - IP-based	No	No	No
Number of VLANs maximum	257	257	257
Number of VLANs - dynamic maximum	257	257	257
number of VLANs / at ring redundancy (HRP; MRP; standby link)	35	35	35
Protocol is supported GVRP	Yes	Yes	Yes
Product functions DHCP			
Product function			
• DHCP server	Yes	Yes	Yes
• DHCP client	Yes	Yes	Yes
• DHCP Option 82	Yes	Yes	Yes
• DHCP Option 66	Yes	Yes	Yes
• DHCP Option 67	Yes	Yes	Yes
Product functions redundancy			
Product function			
• of the PROFINET IO device is supported PROFINET system redundancy	Yes	Yes	Yes
• Ring redundancy	Yes	Yes	Yes
• High Speed Redundancy Protocol (HRP)	Yes	Yes	Yes
• high speed redundancy protocol (HRP) with redundancy manager	Yes	Yes	Yes
• high speed redundancy protocol (HRP) with standby redundancy	Yes	Yes	Yes
Protocol is supported Media Redundancy Protocol (MRP)	Yes	Yes	Yes
Product function			
• media redundancy protocol (MRP) with redundancy manager	Yes	Yes	Yes
• Media Redundancy Protocol Interconnection (MRPI)	Yes	Yes	Yes
• of the PROFINET IO device / is supported / H-Sync forwarding	Yes	Yes	Yes
• redundancy procedure STP	Yes	Yes	Yes
• redundancy procedure RSTP	Yes	Yes	Yes
• redundancy procedure RSTP+	Yes	Yes	Yes
• redundancy procedure MSTP	Yes	Yes	Yes
• Parallel Redundancy Protocol (PRP)/operation in the PRP-network	Yes	Yes	Yes
• Parallel Redundancy Protocol (PRP)/Redundant Network Access (RNA)	No	No	No
• Passive listening	Yes	Yes	Yes
Protocol is supported			
• LACP	Yes	Yes	Yes
Product functions Security			
Product function			
• IEEE 802.1x (radius)	Yes	Yes	Yes
• Broadcast/Multicast/Unicast Limiter	Yes	Yes	Yes
• broadcast blocking	Yes	Yes	Yes
Protocol is supported			
• SSH	Yes	Yes	Yes
• SSL	Yes	Yes	Yes

SCALANCE XC-200 managed

Article number	6GK5206-2RS00-5FC2	6GK5208-0RA00-2AC2	6GK5208-0RA00-5AC2
Product type designation	SCALANCE XC206-2G PoE EEC (DC 54 V)	SCALANCE XC208G PoE	SCALANCE XC208G PoE (DC 54 V)
Product functions time			
Product function			
• SICLOCK support	Yes	Yes	Yes
• NTP-client	Yes	Yes	Yes
• SNTP client	Yes	Yes	Yes
Protocol is supported			
• NTP	Yes	Yes	Yes
• SNTP	Yes	Yes	Yes
system modification during operation			
product function configuration in RUN via CiR/H-CiR	Yes	Yes	Yes
standards, specifications, approvals			
standard			
• for emitted interference	EN 61000-6-4:2001 (Class A)s	EN 61000-6-4:2001 (Class A)	--
• for interference immunity	EN 61000-6-2:2001	EN 61000-6-2:2001	--
IT security for industrial automation systems / according to IEC 62443-4-2:2019	Yes	Yes	Yes
MTBF	37 y	42 y	37 y
reference code			
• according to IEC 81346-2	KF	KF	KF
• according to IEC 81346-2:2019	KFE	KFE	KFE
Standards, specifications, approvals CE			
Certificate of suitability CE marking	Yes	Yes	Yes
Product conformity according to EMC-guideline	2014/30/EU	2014/30/EU	2014/30/EU
Standard			
• for EMC interference emission	EN 61000-6-4, EN 50121-15	EN 61000-6-4, EN 50121-15	EN 61000-6-4, EN 50121-15
• for immunity to EMI	EN 61000-6-2, EN 50121-4	EN 61000-6-2, EN 50121-4	EN 61000-6-2, EN 50121-4
Certificate of suitability RoHS conformity	Yes; 2011/65/EU	Yes; 2011/65/EU	Yes; 2011/65/EU
Standards, specifications, approvals / hazardous environments			
Certificate of suitability			
• ATEX	Yes	Yes	Yes
• IECEx	Yes; IEC 60079-0, IEC 60079-15	Yes	Yes
• for IECEx as marking	Ex nA II T4 Gc	--	--
• for IECEx as certificate	IECEx DEK 14.0025X	--	--
• CCC for hazardous zone according to GB standard	Yes	Yes	Yes
• for cULus HazLoc as marking	CL1, DIV2, Group A,B,C,D T4, CL1, Zone 2, Group IIC, T4	CL1, DIV2, Group A,B,C,D T4, CL1, Zone 2, Group IIC, T4	CL1, DIV2, Group A,B,C,D T4, CL1, Zone 2, Group IIC, T4
• FM registration	Yes; FM class 3600:2011, FM class 3611:2004, FM class 3810:2005, ANSI/ISA-61010-1:2004	Yes	--
• for FM as marking	CL1, DIV2, group A,B,C,D T4, CL1, Zone 2, group IIC, T4 Ta: -40 °C +70 °C	CL1, DIV2, group A,B,C,D T4, CL1, Zone 2, group IIC, T4 Ta: -40 °C +70 °C	CL1, DIV2, group A,B,C,D T4, CL1, Zone 2, group IIC, T4 Ta: -40 °C +70 °C
standards, specifications, approvals other			
Certificate of suitability			
• KC approval	Yes	Yes	Yes
• Railway application in accordance with EN 50121-4	Yes	Yes	Yes
• Regulatory Compliance Mark (RCM)	Yes	Yes	Yes
• for UL 61010-2-201 as File Nr.	E85972 (NRAQ, NRAQ7)	E85972 (NRAQ, NRAQ7)	E85972 (NRAQ, NRAQ7)
• EAC approval	Yes	Yes	Yes
Accessories			
Product extension optional C-PLUG	Yes	Yes	Yes

Selection and ordering data

Version	Article No.
SCALANCE XC-200 Industrial Ethernet switches	
Industrial Ethernet switches with integrated SNMP access, online diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; with integrated redundancy manager; incl. operating instructions, Industrial Ethernet network manual and configuration software on CD-ROM	
• **SCALANCE XC208G** with 8x RJ45 ports 10/100/1000 Mbit/s	**6GK5208-0GA00-2AC2**
• **SCALANCE XC206-2G PoE** with 6x RJ45 PoE ports 10/100/1000 Mbps and 2x SFP+ 1000/10000 Mbps	**6GK5206-2RS00-2AC2**
• **SCALANCE XC206-2G PoE (DC 54 V)** with 6x RJ45 PoE ports 10/100/1000 Mbps and 2x SFP+ 1000/10000 Mbps, PoE support for 54 V DC Infeed	**6GK5206-2RS00-5AC2**
• **SCALANCE XC206-2G PoE EEC (DC 54 V)** with 6x RJ45 PoE ports 10/100/1000 Mbps and 2x SFP+ 1000/10000 Mbps, PoE support for 54 V DC Infeed	**6GK5206-2RS00-5FC2**
• **SCALANCE XC208G PoE** with 6x RJ45 PoE ports 10/100/1000 Mbps and 2x RJ45 ports 10/100/1000 Mbps	**6GK5208-0RA00-2AC2**
• **SCALANCE XC208G PoE (DC 54 V)** with 6x RJ45 PoE ports 10/100/1000 Mbps and 2x RJ45 ports 10/100/1000 Mbps, PoE support for 54 V DC Infeed	**6GK5208-0RA00-5AC2**
• **SCALANCE XC206-2 (ST/BFOC)** with six RJ45 ports 10/100 Mbps and two ST/BFOC ports 100 Mbps	**6GK5206-2BB00-2AC2**
• **SCALANCE XC206-2 (SC)** with six RJ45 ports 10/100 Mbps and two SC ports 100 Mbps	**6GK5206-2BD00-2AC2**
• **SCALANCE XC206-2SFP** with six RJ45 ports 10/100 Mbps and two SFP slots for SFPs with 100 or 1 000 Mbps	**6GK5206-2BS00-2AC2**
• **SCALANCE XC208** with eight RJ45 ports 10/100 Mbps	**6GK5208-0BA00-2AC2**
• **SCALANCE XC216** with sixteen RJ45 ports 10/100 Mbps	**6GK5216-0BA00-2AC2**
• **SCALANCE XC224** with twenty-four RJ45 ports 10/100 Mbps	**6GK5224-0BA00-2AC2**
Accessories	
FC RJ 45 port lock Mechanical locking of unused RJ45 ports at network components and end devices. For use on devices with and without retaining collar[2)]	**6GK1901-1BB50-0AA0**
C-PLUG Removable data storage medium for simple replacement of devices in the event of a fault; for storing configuration or engineering and application data; can be used for SIMATIC NET products with C-PLUG slot	
• 1 pack = 1 unit	**6GK1900-0AB10**
Push-in terminal block For Scalance X//S	
• 2-pin for signaling contact (24 V DC) 1 pack = 5 units	**6GK5980-0BB10-0AA5**
• 4-pin for power supply (24 V DC) 1 pack = 5 units	**6GK5980-1DB10-0AA5**
Screw-type terminal block For Scalance X/W/S	
• 2-pin for signaling contact (24 V DC) 1 pack = 5 units	**6GK5980-0BB00-0AA5**
• 4-pin for power supply (24 V DC) 1 pack = 5 units	**6GK5980-1DB00-0AA5**
Fixing screw for SCALANCE X/W Screw for mounting on an S7-1500 and S7-300 mounting rail 1 pack = 5 units	**6GK5980-4AA00-0AA5**
SFP plug-in transceiver See "Plug-in transceivers for SCALANCE XR-500" / "Media modules for modular SCALANCE X-500"	
IE FC RJ45 plug 180 2x2 Industrial Ethernet FastConnect RJ45 plug 180 2x2, RJ45 connector (10/100 Mbps) with rugged metal enclosure and FC connection technology, for IE FC cable 2x2 180° cable outlet 1 pack = 1 unit	**6GK1901-1BB10-2AA0**
IE FC RJ45 plug 4x2 RJ45 plug-in data connector (10/100/1000 Mbps), for connection to IE FC TP cables 4x2, with rugged metal enclosure and FastConnect connection technology	**6GK1901-1BB11-2AA0**

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Version	Article No.
IE FC TP standard cable GP 2 x 2 (Type A) 4-core, shielded TP installation cable for connection to IE FC outlet RJ45/IE FC RJ45 plug; PROFINET-compliant; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1840-2AH10**
IE FC TP standard cable GP 4X2 TP installation cable Cat 6 for connection to IE FC RJ45 plug 4x2, AWG24, sold by the meter; max. length 1 000 m, minimum order quantity 20 m	**6XV1878-2A**
IE FC TP standard cable GP 4x2 Shielded TP installation cable capable of 1 000 Mbps, for connection to FC RJ45 modular outlet, 8-wire, AWG22, with rigid cores for final assembly	**6XV1870-2E**
IE connecting cable IE FC RJ45 plug 180/IE FC RJ45 plug 180 IE FC trailing cable GP, preassembled with 2x IE FC RJ45 plugs 180; length:	
• 1.0 m	**6XV1871-5BH10**
• 5.0 m	**6XV1871-5BH50**
• 10.0 m	**6XV1871-5BN10**
FastConnect stripping tool Industrial Ethernet FastConnect stripping tool, for fast stripping of the Industrial Ethernet FastConnect cable	**6GK1901-1GA00**
FC FO standard cable GP 62.5/200/230 [1) 2)] FC FO standard cable (62.5/200/230) for field assembly, cULus approval, standard cable divisible	**6XV1847-2A**
FO standard cable GP 50/125/1400 [1) 2)] Multimode cable, sold by the meter; max. length 1 000 m; minimum order 20 m	**6XV1873-2A**
MM FO cord LC/LC 50/125; preassembled with 2x2 LC duplex connectors; length 1.0 m	**6XV1843-5EH10-0AA0**
MM FO cord SC/LC 50/125; preassembled with 1x SC duplex connector and 1x LC duplex connector; length 1.0 m	**6XV1843-5EH10-0CA0**
MM FO cord SC/BFOC 50/125; preassembled with 1x SC duplex connector and 1x BFOC connector; length 1.0 m	**6XV1843-5EH10-0CB0**
MM FO cord SC/SC 50/125; preassembled with 2x SC duplex connectors; length 1.0 m	**6XV1843-5EH10-0CC0**
MM FO cord LC/LC 9/125; preassembled with 2x2 LC duplex connectors; length 1.0 m	**6XV1843-5FH10-0AA0**
MM FO cord SC/LC 9/125; preassembled with 1x SC duplex connector and 1x LC duplex connector; length 1.0 m	**6XV1843-5FH10-0CA0**
MM FO cord SC/BFOC 9/125; preassembled with 1x SC duplex connector and 1x BFOC connector; length 1.0 m	**6XV1843-5FH10-0CB0**
MM FO cord SC/SC 9/125; preassembled with 2x2 SC duplex connectors; length 1.0 m	**6XV1843-5FH10-0CC0**
MM FO robust cable GP FO robust cable GP 50/125, preassembled with 2 x LC duplex connectors Length:	
• 1.0 m	**6XV1873-5RH10**
• 2.0 m	**6XV1873-5RH20**
• 3.0 m	**6XV1873-5RH30**
• 10.0 m	**6XV1873-5RN10**
• 30.0 m	**6XV1873-5RN30**
• 50.0 m	**6XV1873-5RN50**
• 100.0 m	**6XV1873-5RT10**
• 150.0 m	**6XV1873-5RT15**
5 x FC SC duplex plugs FC FO SC plugs for on-site mounting on FC FO cables (62.5/200/230)	**6GK1900-1LB00-0AC0**

	Version	Article No.
	MM FO SC connector set 10 duplex connectors for FO cable; standard, trailing, indoor and marine cable; Note: special tools and skilled personnel are required for assembly; adhesive bonding and polishing technology	**6GK1901-0LB10-2AA0**
	MM FO LC duplex plug 10 units for MM FO robust cable GP (2G50/125); Note: special tools and skilled personnel are required for assembly; adhesive bonding and polishing technology	**6GK1901-0RB10-2AB0**
	FC FO Termination Kit Termination Kit for local assembly of FC SC and FC BFOC connectors to FC FO standard cable; comprising a stripping tool, Kevlar cutters, fiber breaking tool and microscope	**6GK1900-1GL00-0AA0**
	FC ST/ BFOC plug Screw connector for on-site assembly on FC fiber-optic cable; (1 pack = 10 units + cleaning cloths)	**6GK1900-1GB00-0AC0**
	Serial cable RJ11/RS232 Preassembled serial cable with RJ11 and RS232 connectors; length: 3 m; 1 pack = 1 unit	**6GK5980-3BB00-0AA5**
	SCALANCE TAP104 Test access port for the reaction-free extraction of Ethernet data frames (10/100 Mbps) from both transmission directions; extracts entire data traffic (including incomplete diagrams) for further diagnostics.	**6GK5104-0BA00-1SA2**

[1] Special fiber-optic cables; lengths and accessories available on request

[2] Special tools and trained personnel are required for pre-assembling glass fiber-optic cables

More information

Selection tool:

To assist in selecting the right Industrial Ethernet switches as well as configuration of modular variants, the TIA Selection Tool is available at:

TIA Selection Tool:
http://www.siemens.com/tia-selection-tool

Overview

SCALANCE XP216EEC

SCALANCE XP208EEC

The managed Industrial Ethernet switches of the SCALANCE XP-200 product line with 8 or 16 Ethernet ports are optimally suited for setup of cabinet-free automation concepts of Industrial Ethernet networks with transmission rates of 10/100/1000 Mbps in a line, star or ring structure.

- Integrated redundancy manager for setup of high availability networks in a ring structure
- Electrical station or network connection
- Rugged metal housing for mounting on SIMATIC ET 200pro rack, ITEM rail mounting or direct wall mounting
- Rugged industry-compatible station connections with industrial-compatible M12 plug connectors, (M12 D-coded for FastEthernet (10/100 Mbps) interfaces, M12 X-coded for 1000 Mbps interfaces)
- Redundant power supply (M12, A-coded)
- Console port (M12, D-coded)
- Diagnostics on the device by means of prominent LED display with integrated SELECT/SET button (power, link status, data communication, display mode)
- Error signaling contact with easy setting using SELECT/SET button
- Configuration storage using C-PLUG removable data storage medium
- Grounding screw for external ground connection

Product versions

SCALANCE XP208EEC

- with 8 electrical ports (10/100 Mbps, M12 D-coded)

SCALANCE XP208PoE EEC

- with 4 electrical ports (10/100 Mbps, M12 D-coded) and 4 electrical PoE ports (10/100 Mbps M12 D-coded)

SCALANCE XP216EEC

- with 12 electrical ports (10/100 Mbps, M12 D-coded) and 4 electrical ports (10/100/1000 Mbps, M12 X-coded)

SCALANCE XP216PoE EEC

- with 12 electrical ports (10/100 Mbps, M12 D-coded) and 4 electrical ports (10/100/1000 Mbps, M12 X-coded) A total of 8 ports with PoE can be used.

The switch is suitable for mounting outside a control cabinet especially in railway applications (EN 50155/45545), extended range (-40 to +70 °C).

Benefits

- Ideal solution for setup of Industrial Ethernet line, star and ring structures
- Industry-compatible plug-in connection (10/100 Mbps M12 D-coded and 10/100/1000 Mbps, X-coded)
- High network availability through setup of redundant ring structures (redundancy manager integrated)
- Integration of the SCALANCE XP-200 Industrial Ethernet switches in the existing network management infrastructure through SNMP access
- Easy integration in the process diagnostics and system diagnostics
- Fast device replacement under fault conditions through the use of C-PLUG
- Use under extreme ambient conditions (-40 to +70 °C)
- Use outside the control cabinet also possible (IP65/67 degree of protection)

Technical specifications

Article number	**6GK5 208-0HA00-2ES6** **6GK5 208-0UA00-5ES6**	**6GK5 216-0HA00-2ES6** **6GK5 216-0UA00-5ES6**
Product type designation	SCALANCE XP208EEC, SCALANCE XP208PoE EEC	SCALANCE XP216EEC, SCALANCE XP216PoE EEC
Transmission rate		
Port speed	8 x 10/100 Mbps (D-coded)	12 x 10/100 Mbps (D-coded), 4 x 1000 Mbps (X-coded)
Supply voltage		
Supply voltage	2 x M12 A-coded (24 V DC) XP208PoE EEC: 2 x M12 A-coded (54 V DC)	2 x M12 A-coded (24 V DC) XP216PoE EEC: 2 x M12 A-coded (54 V DC)
Dimensions and weights		
Width	200 mm	200 mm
Height	200 mm	280 mm
Depth	49 mm	49 mm
Weight	1.8 kg	2.5 kg
Product properties, functions, components - General		
Coated printed circuit boards (conformal coating)	Yes	Yes
Port type	M12 D-coded	M12 D-coded and X-coded
Power-over-Ethernet (PoE)	XP208PoE EEC: 4 ports IEEE 802.3at Type 2 (max. 120 W)	XP216PoE EEC: 8 ports IEEE 802.3at Type 2 (max. 120 W)
Permissible ambient conditions		
IP degree of protection	IP65/IP67	IP65/IP67
Standards, specifications, approvals - Other		
• e1/E1 motor vehicle approval	Yes	Yes
• Railway application in accordance with EN 50155	Yes	Yes
• Railway application in accordance with EN 45545	Yes	Yes

Selection and ordering data

Version	Article No.
Industrial Ethernet switches SCALANCE XP-200	
Industrial Ethernet switches with integrated SNMP access, web diagnostics, copper cable diagnostics and PROFINET diagnostics, for setup of line, star and ring structures; with integrated redundancy manager; incl. operating instructions, Industrial Ethernet network manual and configuration software on CD-ROM	
• **SCALANCE XP208EEC** with eight 10/100 Mbps M12 ports (D-coded)	**6GK5 208-0HA00-2ES6**
• **SCALANCE XP208PoE EEC** with four 10/100 Mbps M12 ports (D-coded) and four 10/100 Mbps M12 PoE ports (D-coded)	**6GK5 208-0UA00-5ES6**
• **SCALANCE XP216EEC** with twelve 10/100 Mbps M12 ports (D-coded) and four 10/100/1000 Mbps M12 ports (X-coded)	**6GK5 216-0HA00-2ES6**
• **SCALANCE XP216PoE EEC** with twelve 10/100 Mbps, M12 ports (D-coded) and four 10/100/1000 Mbps M12 ports (X-coded), A total of eight PoE ports are possible.	**6GK5 216-0UA00-5ES6**
Accessories	
C-PLUG Removable data storage medium (conformal coating) for easy replacement of devices under fault conditions; for recording configuration data or engineering and application data; can be used in SIMATIC NET products with C-PLUG slot	**6GK1900-0AQ00**
IE FC Stripping Tool Preset insulation stripping tool for fast stripping of Industrial Ethernet FC cables	**6GK1901-1GA00**
IE TP Train Cable GP 2x2 (Type C) 4-core, shielded TP installation cable for connection to IE FC outlet RJ45/IE FC RJ45 plug 180/90 for train applications: PROFINET-compliant; sold by the meter; maximum delivery unit 1000 m, minimum order quantity 20 m	**6XV1871-2T**
IE Train Cable GP 4x2 8-core, shielded TP installation cable for connection to IE FC M12 Plug PRO 4x2 for use in railway applications; with railway approval; sold by the meter; maximum delivery unit 1000 m, minimum order quantity 20 m	**6XV1878-2T**

Version	Article No.
IE Connecting Cable M12-180/M12-180	
Flexible plug-in cable (4-core), pre-assembled with 4-pin M12 connectors (D-coded), for connection of IE devices, IP65/67	
Length:	
• 0.3 m	**6XV1870-8AE30**
• 0.5 m	**6XV1870-8AE50**
• 1 m	**6XV1870-8AH10**
• 1.5 m	**6XV1870-8AH15**
• 2 m	**6XV1870-8AH20**
• 3 m	**6XV1870-8AH30**
• 5 m	**6XV1870-8AH50**
• 10 m	**6XV1870-8AN10**
• 15 m	**6XV1870-8AN15**
M12 Robust Connecting Cable M12-180/M12-180	
Flexible plug-in cable (4-core), pre-assembled with 4-pin M12 connectors (D-coded), for connection of IE devices such as SCALANCE XP-200 and ET 200, IP69	
Length:	
• 1 m	**6XV1881-5AH10**
• 2 m	**6XV1881-5AH20**
• 3 m	**6XV1881-5AH30**
• 5 m	**6XV1881-5AH50**
M12 Power Connecting Cable M12-180/M12-180	
Flexible plug-in cable (4-core), pre-assembled with one 4-pin M12 male connector/female connector each (A-coded), for connection of 24 V voltage supply to SCALANCE XP-200 and ET 200, IP 65/67	
Length:	
• 0.3 m	**6XV1801-5DE30**
• 0.5 m	**6XV1801-5DE50**
• 1 m	**6XV1801-5DH10**
• 1.5 m	**6XV1801-5DH15**
• 2 m	**6XV1801-5DH20**
• 3 m	**6XV1801-5DH30**
• 5 m	**6XV1801-5DH50**
• 10 m	**6XV1801-5DN10**
• 15 m	**6XV1801-5DN15**
Robust Power Connecting Cable M12-180/M12-180	
Preassembled cable with M12 male connector and M12 female connector for power supply of SCALANCE XP-200 and ET 200, A-coded, 4-pin, IP69	
Length:	
• 1 m	**6XV1801-5AH10**
• 2 m	**6XV1801-5AH20**
• 3 m	**6XV1801-5AH30**
• 5 m	**6XV1801-5AH50**
IE FC M12 Plug PRO 2 x 2	
M12 plug-in connector with rugged metal housing and FC connection technology, with axial cable outlet, D-coded, for SCALANCE XP-200 and ET 200	
• 1 pack = 1 unit	**6GK1901-0DB20-6AA0**
• 1 pack = 8 units	**6GK1901-0DB20-6AA8**
IE FC M12 Plug PRO 4 x 2	
M12 plug-in connector with rugged metal housing and FC connection technology, with axial cable outlet, X-coded, for SCALANCE W and XP-200	
• 1 pack = 1 unit	**6GK1901-0DB30-6AA0**
• 1 pack = 8 units	**6GK1901-0DB30-6AA8**
IE FC M12 Cable Connector PRO 4 x 2	
Field-assembled M12 plug-in connector with metal housing and FC connection technology, female contact insert, X-coded, 8-pin	
• 1 pack = 1 unit	**6GK1901-0DB40-6AA0**
• 1 pack = 8 units	**6GK1901-0DB40-6AA8**
IE M12 Panel Feedthrough	**6GK1901-0DM20-2AA5**
Control cabinet bushing for transition from M12 (D-coded) connection technology (IP65) to RJ45 connection technology (IP20), 5 units	
IE M12 Panel Feedthrough PRO	**6GK1901-0DM30-2AA5**
Control cabinet bushing for transition from M12 (D-coded) connection technology (IP65) to M12 (D-coded) connection technology (IP65), 5 units	

Version	Article No.
IE M12 Panel Feedthrough 4 x 2 M12 control cabinet bushing for transition from M12 connection technology (X-coded, IP65/67) to RJ45 connection technology (X-coded, IP20), 5 units	**6GK1901-0DM40-2AA5**
M12 Power T-Tap T-function for looping through the energy supply if redundant supply is not needed (24 V DC), 5 units	**6GK1907-0DC00-6AA5**
Serial Cable M12/RS232 Serial connection cable (M12 / Sub-D) for direct configuration of switch using laptop	**6GK5980-3BC00-0AA5**
IE Power M12 Plug PRO Plug-in connector for connection to PS791-1PRO power supply for 24 V DC supply voltage with installation instructions, 4-pin, A-coded, 3 units	**6GK1907-0DB10-6AA3**
Signaling Contact M12 Cable Connector PRO Connection socket for connection of SCALANCE X208PRO for signaling contact with installation instructions, 5-pin, B-coded, 3 items	**6GK1908-0DC10-6AA3**

More information

Selection tools:

To assist in selecting the right Industrial Ethernet switches as well as configuration of modular variants, the TIA Selection Tool is available at:

TIA Selection Tool:
http://www.siemens.com/tia-selection-tool

SCALANCE X308-2M TS

Overview

The SCALANCE X-300 product line comprises compact Industrial Ethernet switches for setup of electrical and/or optical line, star and ring structures with transmission rates of 10/100/1000 Mbps.

- Fast media redundancy through integral redundancy manager for Gigabit Ethernet (SCALANCE X-300, X-400) and Fast Ethernet (e.g. in combination with SCALANCE X-200 switches)
- Seamless integration of automation networks into existing corporate networks thanks to support of a large number of IT standards: Setup of virtual networks (VLANs)
- Redundant integration into higher-level networks thanks to support of standardized redundancy procedures (Rapid Spanning Tree Protocol)
- PROFINET diagnostics, SNMP access, integrated web server and automatic e-mail transmission function for remote diagnostics and signaling via the network

Benefits

- High availability of the network thanks to
  - Redundant power supply
  - Redundant network structures based on fiber-optic or twisted pair cable (redundancy manager, standby function and RSTP are integrated)
  - Easy device replacement by means of plug-in C-PLUG removable data storage medium
  - Very fast reconfiguration of the network in event of a fault
- Lower susceptibility to failure and higher availability of the plant networking due to locking of the RJ45 FastConnect plug connectors in place in the securing collar of the RJ45 ports
- Protection of investment through integration in existing network management systems by means of standardized SNMP access
- Easy adaptation to different network structures, and reduction in stock keeping costs through flexibility of the partially modular versions

Application

SCALANCE X-300 products enable the setup of switched networks in the field level area and the control level area where high transmission speed is required in addition to high network availability and extensive diagnostic capabilities.

The main area of application is found in high-performance plant networks with connection to the corporate network.

The X308-2M TS is suitable for use in railway applications due to its specification according to EN 50155.

SCALANCE X308-2M TS

- For setup of optical line, ring or star structures
- Hub in the plant bus (redundant connection possible)
- SCALANCE X308-2M TS (TS = Transportation Systems); 4 x 10/100/1000 Mbps RJ45 ports, electrical 2 x free module slots for 4 x 10/100/1000 Mbps media modules (electrical or optical)

Technical specifications

Article number	**6GK5308-2GG10-2CA2**
Product type designation	SCALANCE X308-2M TS
Transmission rate	
Transmission rate	10/100/1000 Mbps
Integrated interfaces for communication	
Number of electrical connections • for network components or data terminal equipment	 4
Number of 100 Mbps ST(BFOC) ports • for multimode	 4
Number of 100 Mbps SC ports • for multimode	 4
Number of 1000 Mbps LC ports • for multimode • for single-mode (LD)	 4 4
Other interfaces	
Number of electrical connections • for signaling contact • for media module • for power supply • for redundant power supply	 1 2 1 1
Type of electrical connection • for signaling contact • for power supply	 2-pin terminal block 4-pin terminal block
Type of removable data storage medium • C-PLUG	 Yes
Signal inputs/outputs	
Operating current of the signaling contacts • with DC, nominal value	 24 V
Operating current of the signaling contacts • with DC, maximum	 0.1 A
Supply voltage, current consumption, power loss	
Type of power supply: redundant power supply	No
Type of supply voltage	DC
Supply voltage • External • External	 12 V 20 ... 30 V
Supply voltage with DC • Rated value	24 V 20 ... 30 V
Product component: fusing at power supply input	Yes
Type of fusing at input for supply voltage	F 3 A / 32 V
Current consumption, maximum	0.7 A
Power loss [W] • with 24 V DC	 16.6 W
Permissible ambient conditions	
Ambient temperature • during operation • during storage • during transport • Remark	 -40 ... +70 °C -40 ... +70 °C -40 ... +70 °C Reduced operating temperature through use of media modules (-40 to +70 °C) or SFP plug-in transceivers (-40 to +60 °C). In the case of vertical mounting position, the maximum operating temperature is reduced to +50 °C.
Relative humidity • Relative humidity at 25 °C, without condensation during operation, maximum	 95%
IP degree of protection	IP20
Design, dimensions and weights	
Model	Compact
Width	120 mm
Height	125 mm
Depth	124 mm
Net weight	1.4 kg
Product property: conformal coating	Yes
Mounting type • 19-inch installation • 35 mm DIN rail mounting • Wall mounting • S7-300 rail mounting • S7-1500 rail mounting	In marine applications, mounting on the 35 mm DIN rail is not permissible. No Yes Yes Yes No

SCALANCE X308-2M TS

Article number	**6GK5308-2GG10-2CA2**
Product type designation	SCALANCE X308-2M TS
Product properties, functions, components - General	
Cascading with redundant ring and reconfiguration time of < 0.3 s	100
Cascading with star structure	Any (only dependent on signal propagation time)
Product functions - Management, configuration, engineering	
Product function	
• CLI	Yes
• Web-based management	Yes
• MIB support	Yes
• TRAPs via e-mail	Yes
• Configuration with STEP 7	Yes
• RMON	Yes
• Port mirroring	Yes
• Multiport mirroring	Yes
• CoS	Yes
• PROFINET IO diagnostics	Yes
• Switch-managed	Yes
Protocol is supported	
• Telnet	Yes
• HTTP	Yes
• HTTPS	Yes
• TFTP	Yes
• FTP	Yes
• BOOTP	Yes
• GMRP	Yes
• DCP	Yes
• LLDP	Yes
• IGMP (snooping/querier)	Yes
Product functions - Management, configuration, engineering (continued)	
Identification & Maintenance function	
• I&M0 - Device-specific information	Yes
• I&M1 - Higher level designation/location designation	Yes
Protocol is supported	
• SNMP v1	Yes
• SNMP v2	Yes
• SNMP v3	Yes
Product functions - Diagnostics	
Product function	
• Port diagnostics	Yes
• Packet size statistics	Yes
• Packet type statistics	Yes
• Error statistics	Yes
• SysLog	Yes
Product functions - VLAN	
Product function	
• VLAN - port-based	Yes
• VLAN - protocol-based	No
• VLAN - IP-based	No
• VLAN - dynamic	Yes
Number of VLANs, maximum	255
Number of dynamic VLANs, maximum	255
GVRP protocol is supported	Yes
Product functions - DHCP	
Product function	
• DHCP client	Yes
• DHCP option 82	Yes
• DHCP option 66	Yes
• DHCP option 67	Yes
Product functions - Redundancy	
Product function	
• Ring redundancy	Yes
• High Speed Redundancy Protocol (HRP)	Yes
• High Speed Redundancy Protocol (HRP) with redundancy manager	Yes
• High Speed Redundancy Protocol (HRP) with standby redundancy	Yes
Media Redundancy Protocol (MRP) is supported	Yes
Product function	
• Media Redundancy Protocol (MRP) with redundancy manager	Yes
• Redundancy procedure STP	Yes
• Redundancy procedure RSTP	Yes
• Redundancy procedure MSTP	Yes
• Parallel Redundancy Protocol (PRP)/use in PRP network	Yes
• Parallel Redundancy Protocol (PRP)/Redundant Network Access (RNA)	No
• Passive listening	Yes

Article number	**6GK5308-2GG10-2CA2**
Product type designation	SCALANCE X308-2M TS
Protocol is supported	
• STP/RSTP	Yes
• STP	Yes
• RSTP	Yes
• MSTP	No
• RSTP Big Network Support	Yes
• LACP	Yes
Product functions - Security	
Product function	
• ACL - MAC-based	Yes
• ACL - Port/MAC-based	Yes
• IEEE 802.1X (RADIUS)	Yes
• Broadcast/Multicast/Unicast Limiter	Yes
• Broadcast blocking	Yes
Protocol is supported	
• SSH	Yes
Product functions - Time of day	
Product function	
• SICLOCK support	Yes
Protocol is supported	
• NTP	Yes
• SNTP	Yes
• IEEE 1588 profile default	Yes
Standards, specifications, approvals	
Standard	
• for FM	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4
• for hazardous zone	EN 60079-0: 2006, EN60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X
• for safety, from CSA and UL	UL 60950-1, CSA C22.2 No. 60950-1
• for hazardous zone,from CSA and UL	UL 1604 and UL 2279-15 (Hazardous Location), CSA C22.2 No. 213-M1987, Class 1 / Division 2 / Group A, B, C, D / T4, Class 1 / Zone 2 / Group IIC / T4
• for emitted interference	EN 61000-6-4
• for noise immunity	EN 61000-6-2
Standards, specifications, approvals - CE	
Proof of suitability, CE mark	Yes
Standards, specifications, approvals - Other	
Proof of suitability	EN 61000-6-2, EN 61000-6-4
• C-Tick	Yes
• Railway application in accordance with EN 50155	Yes
• Railway application in accordance with EN 50121-4	Yes
• Fire protection in accordance with EN 45545-2	Yes
• KC approval	Yes
Standards, specifications, approvals - Product conformity	
MTBF at 40 °C	40 y

Selection and ordering data

Version	Article No.
Industrial Ethernet switches SCALANCE X-300	
Industrial Ethernet switches for setting up electrical and/or optical Industrial Ethernet networks; integrated redundancy manager, IT functions (RSTP, VLAN, etc.), network management via SNMP and web server; incl. operating instructions, Industrial Ethernet network manual and configuration software on CD-ROM; C-PLUG included in scope of delivery	
Full Gigabit Ethernet switches	
• **SCALANCE X308-2M TS**; 4 x 10/100/1000 Mbps RJ45 ports, electrical 2 x 10/100/1000 Mbps slots for 2-port media modules, electrical or optical, with extended temperature range and EN 50155 approval for railway applications	**6GK5308-2GG10-2CA2**
Media modules	
Electrical Media Modules	
With 2 x 10/100/1000 Mbps RJ45 ports, electrical	
• MM992-2CUC with securing collar and coated PCBs (conformal coating)	**6GK5992-2GA00-8FA0**
With 2 x 10/100/1000 Mbps M12 ports, electrical	
• MM992-2 M12 interface (x-coded) and coated PCBs (conformal coating)	**6GK5992-2HA00-0AA0**
Optical Media Modules	
with 2 x 1000 Mbps SC ports, optical	
• MM992-2 multimode, glass, up to 750 m, coated PCBs (conformal coating)	**6GK5992-2AL00-8FA0**
Accessories	
S7-1500 Mounting Kit Mounting bracket for installation of SCALANCE X-300 on S7-1500 mounting rail	**6GK5980-2EA00-0AA1**
IE FC Stripping Tool Preset insulation stripping tool for fast stripping of Industrial Ethernet FC cables	**6GK1901-1GA00**
IE FC RJ45 Plug 180 2 x 2 RJ45 plug connector for Industrial Ethernet with rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1901-1BB10-2AA0**
IE TP Train Cable GP 2x2 (Type C) 4-core, shielded TP installation cable for connection to IE FC outlet RJ45/IE FC RJ45 plug 180/90 for train applications: PROFINET-compliant; sold by the meter; maximum delivery unit 1000 m, minimum order quantity 20 m	**6XV1871-2T**
IE FC RJ45 Plug 4 x 2 RJ45 plug connector for Industrial Ethernet (10/100/1000 Mbps) with rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1901-1BB12-2AA0**
IE FC M12 Plug PRO 4x2 M12 plug connector (X-coded, IP65/IP67) that can be assembled in the field, metal enclosure, insulation displacement fast connection method, for SCALANCE W	
• 1 unit	**6GK1901-0DB30-6AA0**
IE M12 Panel Feedthrough 4x2 Control cabinet feedthrough for transition from M12 connection method (X-coded, IP65/IP67) to RJ45 connection method (IP20)	
• 1 pack = 5 units	**6GK1901-0DM40-2AA5**
IE FC M12 Cable Connector PRO 4x2 M12 plug-in connector (X-coded, IP65/IP67, female contact insert) that can be assembled in the field, metal housing, insulation displacement fast connection method	
• 1 unit	**6GK1901-0DB40-6AA0**

Version	Article No.
IE Train Cable GP 4x2 8-core, shielded TP installation cable for connection to IE FC M12 Plug PRO 4x2 for use in railway applications; with railway approval; sold by the meter; maximum delivery unit 1000 m, minimum order quantity 20 m	**6XV1878-2T**
IE Connecting Cable **IE FC RJ45 Plug-180/IE FC RJ45 Plug-180** Preassembled IE FC TP trailing cable GP 2 x 2 (PROFINET type C) with two IE FC RJ45 Plug-180, IP20 degree of protection; Length:	
• 1.0 m	**6XV1871-5BH10**
• 5.0 m	**6XV1871-5BH50**
• 10.0 m	**6XV1871-5BN10**
IE SC RJ POF Plug Screw connector for local assembly on POF FOC (1 pack = 20 units)	**6GK1900-0MB00-0AC0**
POF Standard Cable GP 980/1000 POF standard cable for fixed installation indoors with PVC sheath; sold by the meter; maximum delivery unit 1000 m, minimum order quantity 20 m.	**6XV1874-2A**
IE SC RJ PCF Plug Screw connector for local assembly on PCF FOC (1 pack = 10 units)	**6GK1900-0NB00-0AC0**
PCF Standard Cable GP 200/230 Standard cable, fan-out, sold by the meter; Maximum delivery unit 2000 m; minimum order quantity 20 m	**6XV1861-2A**
FC FO Termination Kit Termination kit for local assembly of FC SC and FC BFOC connectors on FC FO standard cable; contains a stripping tool, Kevlar cutters, fiber breaking tool and microscope.	**6GK1900-1GL00-0AA0**
FC BFOC Plug Screw connector for local assembly on FC FOC; (1 pack = 20 units + cleaning cloths)	**6GK1900-1GB00-0AC0**
FC SC Plug Screw connector for local assembly on FC FOC; (1 pack = 10 units duplex plugs + cleaning cloths)	**6GK1900-1LB00-0AC0**
FC FO Standard Cable GP 62.5/200/230 FC FO standard cable for fixed installation indoors with PVC sheath; sold by the meter; maximum delivery unit 1000 m, minimum order quantity 20 m	**6XV1847-2A**
Multimode FO BFOC Connector Set For FO standard cable (50/125/1400), FO ground cable (50/125/1400), flexible FO trailing cable, INDOOR FO cable (62.5/125/900), 20 units	**6GK1901-0DA20-0AA0**
Multi-mode FO SC Duplex Connector Set For FO standard cable (50/125/1400), FO ground cable (50/125/1400), flexible FO trailing cable, INDOOR FO cable (62.5/125/900), 10 units	**6GK1901-0LB10-2AA0**
LC Plug MM[2]	**6GK1901-0RB10-2AB0**
FO Standard Cable GP 50/125/1400 [1) 2)] Multimode cable sold by the meter; maximum delivery unit 1000 m, minimum order quantity 20 m	**6XV1873-2A**
Pre-Assembled FO Patch Cables Multimode	
MM FO Cord SC/LC With one SC duplex connector and one LC duplex connector, 1 m	**6XV1843-5EH10-0CA0**
MM FO Cord SC/BFOC With one SC duplex connector and two BFOC connectors, 1 m	**6XV1843-5EH10-0CB0**
MM FO Cord SC/SC With two SC duplex connectors, 1 m	**6XV1843-5EH10-0CC0**

Version	Article No.
Single-mode	
SM FO Cord SC/LC With one SC duplex connector and one LC duplex connector, 1 m	**6XV1843-5FH10-0CA0**
SM FO Cord SC/BFOC With one SC duplex connector and two BFOC connectors, 1 m	**6XV1843-5FH10-0CB0**
SM FO Cord SC/SC With two SC duplex connectors, 1 m	**6XV1843-5FH10-0CC0**
IE TP Cord RJ45/RJ45 TP cable 4 x 2 with two RJ45 connectors	
• 1 m	**6XV1870-3QH10**
• 6 m	**6XV1870-3QH60**
• 10 m	**6XV1870-3QN10**
Screw-Type Terminal Block For SCALANCE X/W/S	
• 2-pole for signaling contact (24 V DC) 1 pack = 5 units	**6GK5980-0BB00-0AA5**
• 4-pole for power supply (24 V DC) 1 pack = 5 units	**6GK5980-1DB00-0AA5**
C-PLUG Removable data storage medium (conformal coating) for easy replacement of devices under fault conditions; for recording configuration data or engineering and application data; can be used in SIMATIC NET products with C-PLUG slot	**6GK1900-0AQ00**

1) Special fiber-optic cables, lengths and accessories available on request

2) Special tools and specially trained personnel are required for assembling glass FOC

More information

Selection Tool:

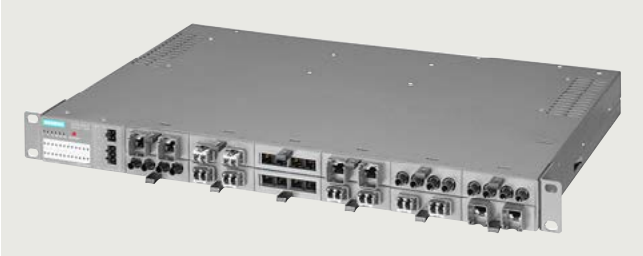
To assist in selecting the right Industrial Ethernet switches as well as configuration of modular variants, the TIA Selection Tool is available at:

TIA Selection Tool:
http://www.siemens.com/tia-selection-tool

Overview

SCALANCE XR324-4M PoE TS

SCALANCE XR324-4M EEC



SCALANCE XR324-12M TS

- Fast media redundancy through integrated redundancy manager both for Gigabit Ethernet (with SCALANCE X-300, X-400) and Fast Ethernet (e.g. in combination with SCALANCE X-200 switches)
- Seamless integration of automation networks in existing corporate networks thanks to support of a large number of IT standard functions (VLANs, IGMP-Snooping/Querier, STP/RSTP, Link Aggregation, Quality of Service)
- Redundant integration in higher-level networks thanks to support of standardized redundancy procedures (Spanning Tree Protocol/Rapid Reconfiguration Spanning Tree Protocol/MRP)
- Remote diagnostics by means of PROFINET diagnostics, web browser, CLI or SNMP

SCALANCE XR324-4M PoE TS

The SCALANCE XR-300PoE Industrial Ethernet switches are partly modular, high-performance, industry-standard switches for setup of electrical and/or optical line, ring and star structures with transmission rates of 10/100/1000 Mbps, designed for installation in 19" control cabinets

- Up to 24 electrical and/or optical interfaces (10/100/1000 Mbps), of which 16 are integrated RJ45 ports, eight of which are PoE-capable;
  up to four electrical and/or optical 2-port media modules can also be inserted in the media module slots of the basic device.

SCALANCE XR324-4M EEC

The SCALANCE XR-300EEC (Enhanced Environmental Conditions) industrial Ethernet switches are partly modular, high-performance, industry-standard switches for the construction of electrical and/or optical line, ring and star topologies at data transfer rates of 10/100/1000 Mbps, designed for installation in 19" control cabinets.

- Up to 24 electrical and/or optical interfaces (10/100/1000 Mbps), of which 16 are integral RJ45 ports; up to four electrical and/or optical 2-port media modules can also be inserted in the media module slots of the basic device

SCALANCE XR324-12M TS

The SCALANCE XR-300 Industrial Ethernet switches are fully modular, high-performance, industry-standard switches for setup of electrical and optical line, ring and star structures with transmission rates of 10/100/1000 Mbps, designed for installation in 19" control cabinets.

- Up to 24 electrical and/or optical interfaces (10/100/1000 Mbps);
  up to 12 electrical and/or optical 2-port media modules can be inserted at any position in the basic device

Benefits

- Unlimited flexibility for network expansions (e.g. more terminals) or upgrade (e.g. switching from copper to fiber-optic cable) and reduction of stock keeping costs due to the modular configuration with port modules
- High availability of the network thanks to
  - Redundant power supply
  - Redundant network structures based on fiber-optic or twisted pair cable (redundancy manager, standby function and STP/RSTP integrated)
  - Easy device replacement by means of plug-in C-PLUG removable data storage medium
  - Very fast reconfiguration of the network in event of a fault
- Lower susceptibility to failure and higher availability of the plant networking due to locking of the RJ45 FastConnect plug connectors in place in the securing collar of the RJ45 port modules
- Protection of investment through integration in existing network management systems by means of standardized SNMP access
- Space savings in control cabinet due to flexible cable outlet on the front or rear of the device

SCALANCE XR324-4M PoE TS

- No need for additional power supply units and cabling for terminal devices due to PoE power supply

SCALANCE XR324-4M PoE TS / SCALANCE XR324-4M EEC / SCALANCE XR324-12M TS

Technical specifications

Article number	**6GK5324-4QG00-1CR2**
Product type designation	SCALANCE XR324-4M PoE TS
Transmission rate	
Transmission rate	10 /100/1000 Mbps
Integrated interfaces for communication	
Number of electrical connections • for network components or data terminal equipment • with Power-over-Ethernet for network components or terminal equipment	 16 8
Number of 100 Mbps ST(BFOC) ports • for multimode	 8
Number of 100 Mbps SC ports • for multimode	 8
Number of 1000 Mbps LC ports • for multimode • for single-mode (LD)	 8 8
Other interfaces	
Number of electrical connections • for operation panel • for signaling contact • for media module • for power supply • for redundant power supply	 1 1 4 1 0
Type of electrical connection • for operation panel • for signaling contact • for power supply	 RJ11 port 2-pin terminal block 4-pin terminal block
Type of removable data storage medium • C-PLUG	 Yes
Signal inputs/outputs	
Operating current of the signaling contacts • with DC, nominal value	 24 V
Operating current of the signaling contacts • with DC, maximum	 0.1 A
Supply voltage, current consumption, power loss	
Type of power supply: redundant power supply	No
Type of supply voltage	DC
Supply voltage • External • External	 24 V 19.2 ... 28.8 V
Product component: fusing at power supply input	Yes
Type of fusing at input for supply voltage	F 5 A / 250 V
Current consumption, maximum	4.2 A
Power loss [W] • with 24 V DC	 46 W
Permissible ambient conditions	
Ambient temperature • during operation • during storage • during transport • Remark	 -40 ... +70 °C -40 ... +85 °C -40 ... +85 °C In the case of vertical mounting position, the maximum operating temperature is reduced to 60 °C
Relative humidity • Relative humidity at 25 °C, without condensation during operation, maximum	 95%
IP degree of protection	IP20

Article number	**6GK5324-4QG00-1CR2**
Product type designation	SCALANCE XR324-4M PoE TS
Design, dimensions and weights	
Model	19-inch rack
Number of modular height units for 19-inch cabinet	1
Width	449 mm
Height	43.6 mm
Depth	305 mm
Net weight	6.8 kg
Product property: conformal coating	Yes
Mounting type	For 19-inch rack mounting, 4-point fixing is required for marine engineering applications
• 19-inch installation	Yes
• 35 mm DIN rail mounting	No
• Wall mounting	No
• S7-300 rail mounting	No
• S7-1500 rail mounting	No
Product properties, functions, components - General	
Cascading with redundant ring and reconfiguration time of < 0.3 s	100
Cascading with star structure	Any (only dependent on signal propagation time)
Product functions - Management, configuration, engineering	
Product function	
• CLI	Yes
• Web-based management	Yes
• MIB support	Yes
• TRAPs via e-mail	Yes
• Configuration with STEP 7	Yes
• RMON	Yes
• Port mirroring	Yes
• Multiport mirroring	Yes
• CoS	Yes
• PROFINET IO diagnostics	Yes
• Switch-managed	Yes
Protocol is supported	
• Telnet	Yes
• HTTP	Yes
• HTTPS	Yes
• TFTP	Yes
• FTP	Yes
• BOOTP	Yes
• GMRP	Yes
• DCP	Yes
• LLDP	Yes
• IGMP (snooping/querier)	Yes
Identification & Maintenance function	
• I&M0 - Device-specific information	Yes
• I&M1 - Higher level designation/location designation	Yes
Protocol is supported	
• SNMP v1	Yes
• SNMP v2	Yes
• SNMP v3	Yes
Product functions - Diagnostics	
Product function	
• Port diagnostics	Yes
• Packet size statistics	Yes
• Packet type statistics	Yes
• Error statistics	Yes
• SysLog	Yes
Product functions - VLAN	
Product function	
• VLAN - port-based	Yes
• VLAN - protocol-based	No
• VLAN - IP-based	No
• VLAN - dynamic	Yes
Number of VLANs, maximum	255
Number of dynamic VLANs, maximum	255
GVRP protocol is supported	Yes
Product functions - DHCP	
Product function	
• DHCP client	Yes
• DHCP option 82	Yes
• DHCP option 66	Yes
• DHCP option 67	Yes

SCALANCE XR324-4M PoE TS / SCALANCE XR324-4M EEC / SCALANCE XR324-12M TS

Article number	**6GK5324-4QG00-1CR2**
Product type designation	SCALANCE XR324-4M PoE TS
Product functions - Redundancy	
Product function	
• Ring redundancy	Yes
• High Speed Redundancy Protocol (HRP)	Yes
• High Speed Redundancy Protocol (HRP) with redundancy manager	Yes
• High Speed Redundancy Protocol (HRP) with standby redundancy	Yes
Media Redundancy Protocol (MRP) is supported	Yes
Product function	
• Media Redundancy Protocol (MRP) with redundancy manager	Yes
• Redundancy procedure STP	Yes
• Redundancy procedure RSTP	Yes
• Redundancy procedure MSTP	Yes
• Passive listening	Yes
Protocol is supported	
• STP/RSTP	Yes
• STP	Yes
• RSTP	Yes
• MSTP	No
• RSTP Big Network Support	Yes
• LACP	Yes
Product functions - Security	
Product function	
• ACL - MAC-based	Yes
• ACL - Port/MAC-based	Yes
• IEEE 802.1X (RADIUS)	Yes
• Broadcast/Multicast/Unicast Limiter	Yes
• Broadcast blocking	Yes
Protocol is supported	
• SSH	Yes
Product functions - Time of day	
Product function	
• SICLOCK support	Yes
Protocol is supported	
• NTP	Yes
• SNTP	Yes
• IEEE 1588 profile default	Yes
Standards, specifications, approvals	
Standard	
• for FM	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4
• for hazardous zone	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X
• for safety, from CSA and UL	UL 60950-1, CSA C22.2 No. 60950-1
• for hazardous zone, from CSA and UL	UL 1604 and UL 2279-15 (Hazardous Location), CSA C22.2 No. 213-M1987, Class 1 / Division 2 / Group A, B, C, D / T4, Class 1 / Zone 2 / Group IIC / T4
• for emitted interference	EN 61000-6-4: 2007 (Class A)
• for noise immunity	EN 61000-6-2:2006
Standards, specifications, approvals - CE	
Proof of suitability, CE mark	Yes
Standards, specifications, approvals - Other	
Proof of suitability	EN 61000-6-2:2006, EN 61000-6-4:2007
• C-Tick	Yes
• Railway application in accordance with EN 50155	Yes
• Railway application in accordance with EN 50121-4	Yes
• Fire protection in accordance with EN 45545-2	
• KC approval	No
Standards, specifications, approvals - Product conformity	
MTBF at 40 °C	

Article number	**6GK5324-4GG00-1ER2** SCALANCE XR324-4M EEC	**6GK5324-4GG00-1JR2** SCALANCE XR324-4M EEC	**6GK5324-4GG00-2ER2** SCALANCE XR324-4M EEC	**6GK5324-4GG00-2JR2** SCALANCE XR324-4M EEC
Transmission rate				
Transfer rate	10/100 /1000 Mbit/s	10/100 /1000 Mbit/s	10/100 /1000 Mbit/s	10/100 /1000 Mbit/s
Interfaces for communication integrated				
Number of electrical connections • for network components or terminal equipment	16; RJ45	16; RJ45	16; RJ45	16; RJ45
Number of 100 Mbit/s ST(BFOC) ports • for multimode	8	8	8	8
Number of 100 Mbit/s SC ports • for multimode	8	8	8	8
Number of 1000 Mbit/s LC ports • for multimode • for single mode (LD)	8 8	8 8	8 8	8 8
Interfaces others				
Number of electrical connections • for operator console • for signaling contact • for media module • for power supply • for redundant voltage supply	1 1 4 1 1	1 1 4 1 1	1 1 4 2 1	1 1 4 2 1
Type of electrical connection • for operator console • for signaling contact • for power supply	RJ11 2-pole terminal block 4-pole terminal block	RJ11 2-pole terminal block 4-pole terminal block	RJ11 2 x 2-pole terminal block 2 x 4-pole terminal block	RJ11 2 x 2-pole terminal block 2 x 4-pole terminal block
design of the removable storage • C-PLUG	Yes	Yes	Yes	Yes
Signal-Inputs/outputs				
Operating voltage of the signaling contacts • at DC Rated value	24 V	24 V	24 V	24 V
Operating current of the signaling contacts • at DC maximum	0.1 A	0.1 A	0.1 A	0.1 A
Supply voltage, current consumption, power loss				
Type of voltage supply redundant power supply unit	No	No	Yes	Yes
Type of voltage of the supply voltage	DC	DC	DC	DC
Supply voltage • external • external minimum • external maximum	24 V 19.2 V 57.6 V	24 V 19.2 V 57.6 V	24 V 19.2 V 57.6 V	24 V 19.2 V 57.6 V
Supply voltage 2 Rated value • Type of voltage 2 of the supply voltage	DC	DC	DC	DC
Supply voltage at DC • rated value	24 V 19.2 ... 57.6 V	24 V 19.2 ... 57.6 V	24 V 19.2 ... 57.6 V	24 V 19.2 ... 57.6 V
Product component fusing at power supply input	Yes	Yes	Yes	Yes
Fuse protection type at input for supply voltage	T2H / 250 V	T2H / 250 V	T2H / 250 V	T2H / 250 V
Consumed current maximum	1.6 A	1.6 A	1.6 A	1.6 A
Power loss [W] • at DC at 24 V	40 W	40 W	40 W	40 W
Permitted ambient conditions				
Ambient temperature • during operation • during storage • during transport • Note	-40 ... +70 °C -40 ... +85 °C -40 ... +85 °C Extended temperature upper limit of +85° C permitted for 16 hours. Reduced operating temperature through the use of media modules (-40 °C to +70 °C) or SFP plug-in transceivers (-40 °C to +60 °C)	-40 ... +70 °C -40 ... +85 °C -40 ... +85 °C Extended temperature upper limit of +85° C permitted for 16 hours. Reduced operating temperature through the use of media modules (-40 °C to +70 °C) or SFP plug-in transceivers (-40 °C to +60 °C)	-40 ... +70 °C -40 ... +85 °C -40 ... +85 °C Extended temperature upper limit of +85° C permitted for 16 hours. Reduced operating temperature through the use of media modules (-40 °C to +70 °C) or SFP plug-in transceivers (-40 °C to +60 °C)	-40 ... +70 °C -40 ... +85 °C -40 ... +85 °C Extended temperature upper limit of +85° C permitted for 16 hours. Reduced operating temperature through the use of media modules (-40 °C to +70 °C) or SFP plug-in transceivers (-40 °C to +60 °C)
Relative humidity • at 25 °C without condensation during operation maximum	95 %	95 %	95 %	95 %
Protection class IP	IP20	IP20	IP20	IP20

SCALANCE XR324-4M PoE TS / SCALANCE XR324-4M EEC / SCALANCE XR324-12M TS

Article number	**6GK5324-4GG00-1ER2** SCALANCE XR324-4M EEC	**6GK5324-4GG00-1JR2** SCALANCE XR324-4M EEC	**6GK5324-4GG00-2ER2** SCALANCE XR324-4M EEC	**6GK5324-4GG00-2JR2** SCALANCE XR324-4M EEC
Design, dimensions and weight				
Design	19" rack	19" rack	19" rack	19" rack
Number of modular height units relating to 19-inch cabinet	1	1	1	1
Width	483 mm	483 mm	483 mm	483 mm
Height	44 mm	44 mm	44 mm	44 mm
Depth	305 mm	305 mm	305 mm	305 mm
Net weight	6.5 kg	6.5 kg	6.8 kg	6.8 kg
Mounting type	When used in shipbuilding, the device must be secured in the 19" rack at four points	When used in shipbuilding, the device must be secured in the 19" rack at four points	When used in shipbuilding, the device must be secured in the 19" rack at four points	When used in shipbuilding, the device must be secured in the 19" rack at four points
• 19-inch installation	Yes	Yes	Yes	Yes
• 35 mm DIN rail mounting	No	No	No	No
• wall mounting	No	No	No	No
• S7-300 rail mounting	No	No	No	No
• S7-1500 rail mounting	No	No	No	No
Product properties, functions, components general				
Cascading in the case of a redundant ring at reconfiguration time of <\~0.3\~s	100	100	100	100
Cascading in cases of star topology	any (depending only on signal propagation time)	any (depending only on signal propagation time)	any (depending only on signal propagation time)	any (depending only on signal propagation time)
Product functions management, configuration				
Product function				
• CLI	Yes	Yes	Yes	Yes
• web-based management	Yes	Yes	Yes	Yes
• MIB support	Yes	Yes	Yes	Yes
• TRAPs via email	Yes	Yes	Yes	Yes
• Configuration with STEP 7	Yes	Yes	Yes	Yes
• RMON	Yes	Yes	Yes	Yes
• Port mirroring	Yes	Yes	Yes	Yes
• multiport mirroring	Yes	Yes	Yes	Yes
• CoS	Yes	Yes	Yes	Yes
• PROFINET IO diagnosis	Yes	Yes	Yes	Yes
• switch-managed	Yes	Yes	Yes	Yes
Protocol is supported				
• Telnet	Yes	Yes	Yes	Yes
• HTTP	Yes	Yes	Yes	Yes
• HTTPS	Yes	Yes	Yes	Yes
• TFTP	Yes	Yes	Yes	Yes
• FTP	Yes	Yes	Yes	Yes
• BOOTP	Yes	Yes	Yes	Yes
• GMRP	Yes	Yes	Yes	Yes
• DCP	Yes	Yes	Yes	Yes
• LLDP	Yes	Yes	Yes	Yes
• SNMP v1	Yes	Yes	Yes	Yes
• SNMP v2	Yes	Yes	Yes	Yes
• SNMP v3	Yes	Yes	Yes	Yes
• IGMP (snooping/querier)	Yes	Yes	Yes	Yes
Identification & maintenance function				
• I&M0 - device-specific information	Yes	Yes	Yes	Yes
• I&M1 – higher-level designation/location designation	Yes	Yes	Yes	Yes
Product functions Diagnosis				
Product function				
• Port diagnostics	Yes	Yes	Yes	Yes
• Statistics Packet Size	Yes	Yes	Yes	Yes
• Statistics packet type	Yes	Yes	Yes	Yes
• Error statistics	Yes	Yes	Yes	Yes
• SysLog	Yes	Yes	Yes	Yes
Product functions VLAN				
Product function				
• VLAN - port based	Yes	Yes	Yes	Yes
• VLAN - protocol-based	No	No	No	No
• VLAN - IP-based	No	No	No	No
• VLAN dynamic	Yes	Yes	Yes	Yes
Number of VLANs maximum	255	255	255	255
Number of VLANs - dynamic maximum	255	255	255	255
Protocol is supported GVRP	Yes	Yes	Yes	Yes

SCALANCE XR324-4M PoE TS / SCALANCE XR324-4M EEC / SCALANCE XR324-12M TS

Article number	**6GK5324-4GG00-1ER2**	**6GK5324-4GG00-1JR2**	**6GK5324-4GG00-2ER2**	**6GK5324-4GG00-2JR2**
	SCALANCE XR324-4M EEC	SCALANCE XR324-4M EEC	SCALANCE XR324-4M EEC	SCALANCE XR324-4M EEC
Product functions DHCP				
Product function				
• DHCP client	Yes	Yes	Yes	Yes
• DHCP Option 82	Yes	Yes	Yes	Yes
• DHCP Option 66	Yes	Yes	Yes	Yes
• DHCP Option 67	Yes	Yes	Yes	Yes
Product functions Redundancy				
Product function				
• Ring redundancy	Yes	Yes	Yes	Yes
• High Speed Redundancy Protocol (HRP)	Yes	Yes	Yes	Yes
• high speed redundancy protocol (HRP) with redundancy manager	Yes	Yes	Yes	Yes
• high speed redundancy protocol (HRP) with standby redundancy	Yes	Yes	Yes	Yes
Protocol is supported Media Redundancy Protocol (MRP)	Yes	Yes	Yes	Yes
Product function				
• media redundancy protocol (MRP) with redundancy manager	Yes	Yes	Yes	Yes
• redundancy procedure STP	Yes	Yes	Yes	Yes
• redundancy procedure RSTP	Yes	Yes	Yes	Yes
• redundancy procedure MSTP	Yes	Yes	Yes	Yes
• Parallel Redundancy Protocol (PRP)/operation in the PRP-network	Yes	Yes	Yes	Yes
• Parallel Redundancy Protocol (PRP)/Redundant Network Access (RNA)	No	No	No	No
• Passive listening	Yes	Yes	Yes	Yes
Protocol is supported				
• STP/RSTP	Yes	Yes	Yes	Yes
• STP	Yes	Yes	Yes	Yes
• RSTP	Yes	Yes	Yes	Yes
• MSTP	Yes	Yes	Yes	Yes
• RSTP big network support	Yes	Yes	Yes	Yes
• LACP	Yes	Yes	Yes	Yes
Product functions Security				
Product function				
• ACL - MAC-based	Yes	Yes	Yes	Yes
• ACL - port/MAC-based	Yes	Yes	Yes	Yes
• IEEE 802.1x (radius)	Yes	Yes	Yes	Yes
• Broadcast/Multicast/Unicast Limiter	Yes	Yes	Yes	Yes
• broadcast blocking	Yes	Yes	Yes	Yes
Protocol is supported				
• SSH	Yes	Yes	Yes	Yes
Product functions Time				
Product function				
• SICLOCK support	Yes	Yes	Yes	Yes
Protocol is supported				
• NTP	Yes	Yes	Yes	Yes
• SNTP	Yes	Yes	Yes	Yes
• IEEE 1588 profile default	Yes	Yes	Yes	Yes
Standards, specifications, approvals				
Standard				
• for FM	FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4
• for hazardous zone	EN 60079-0 : 2006, EN 60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X	EN 60079-0 : 2006, EN 60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X	EN 60079-0 : 2006, EN 60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X	EN 60079-0 : 2006, EN 60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X
• for safety from CSA and UL	UL 60950-1, CSA C22.2 No. 60950-1-03	UL 60950-1, CSA C22.2 No. 60950-1-03	UL 60950-1, CSA C22.2 No. 60950-1-03	UL 60950-1, CSA C22.2 No. 60950-1-03
• for hazardous zone from CSA and UL	ANSI / ISA 12.12.01, CSA C22.2 No. 142-M1987, CL. 1 / Div. 2 / GP. A, B, C, D T4, CL. 1 / Zone 2 / GP. IIC, T4	ANSI / ISA 12.12.01, CSA C22.2 No. 142-M1987, CL. 1 / Div. 2 / GP. A, B, C, D T4, CL. 1 / Zone 2 / GP. IIC, T4	ANSI / ISA 12.12.01, CSA C22.2 No. 142-M1987, CL. 1 / Div. 2 / GP. A, B, C, D T4, CL. 1 / Zone 2 / GP. IIC, T4	ANSI / ISA 12.12.01, CSA C22.2 No. 142-M1987, CL. 1 / Div. 2 / GP. A, B, C, D T4, CL. 1 / Zone 2 / GP. IIC, T4
• for emitted interference	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)
• for interference immunity	EN 61000-6-2:2005	EN 61000-6-2:2005	EN 61000-6-2:2005	EN 61000-6-2:2005
Standards, specifications, approvals CE				
Certificate of suitability CE marking	Yes	Yes	Yes	Yes
Standard				
• for EMC	IEC 61850, IEEE 1613	IEC 61850, IEEE 1613	IEC 61850, IEEE 1613	IEC 61850, IEEE 1613

SCALANCE XR324-4M PoE TS / SCALANCE XR324-4M EEC / SCALANCE XR324-12M TS

Article number	**6GK5324-4GG00-1ER2** SCALANCE XR324-4M EEC	**6GK5324-4GG00-1JR2** SCALANCE XR324-4M EEC	**6GK5324-4GG00-2ER2** SCALANCE XR324-4M EEC	**6GK5324-4GG00-2JR2** SCALANCE XR324-4M EEC
Standards, specifications, approvals miscellaneous				
Certificate of suitability	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007
• C-Tick	Yes	Yes	Yes	Yes
• IEC 61850-3	Yes	Yes	Yes	Yes
• KC approval	Yes	Yes	Yes	Yes
Standards, specifications, approvals ship classification				
Marine classification association				
• American Bureau of Shipping Europe Ltd. (ABS)	Yes	Yes	Yes	Yes
• Bureau Veritas (BV)	Yes	Yes	Yes	Yes
• Det Norske Veritas (DNV)	No	No	No	No
• Germanische Lloyd (GL)	No	No	No	No
• DNV GL	Yes	Yes	Yes	Yes
• Lloyds Register of Shipping (LRS)	Yes	Yes	Yes	Yes
• Nippon Kaiji Kyokai (NK)	Yes	Yes	Yes	Yes
• Polski Rejestr Statkow (PRS)	No	No	No	No
• Royal Institution of Naval Architects (RINA)	Yes	Yes	Yes	Yes
Standards, specifications, approvals product conformity				
MTBF	15 y	15 y	20 y	20 y

Article number	**6GK5324-4GG00-3ER2** SCALANCE XR324-4M EEC	**6GK5324-4GG00-3JR2** SCALANCE XR324-4M EEC	**6GK5324-4GG00-4ER2** SCALANCE XR324-4M EEC	**6GK5324-4GG00-4JR2** SCALANCE XR324-4M EEC
Transmission rate				
Transfer rate	10/100 /1000 Mbit/s	10/100 /1000 Mbit/s	10/100 /1000 Mbit/s	10/100 /1000 Mbit/s
Interfaces for communication integrated				
Number of electrical connections				
• for network components or terminal equipment	16; RJ45	16; RJ45	16; RJ45	16; RJ45
Number of 100 Mbit/s ST(BFOC) ports				
• for multimode	8	8	8	8
Number of 100 Mbit/s SC ports				
• for multimode	8	8	8	8
Number of 1000 Mbit/s LC ports				
• for multimode	8	8	8	8
• for single mode (LD)	8	8	8	8
Interfaces others				
Number of electrical connections				
• for operator console	1	1	1	1
• for signaling contact	1	1	1	1
• for media module	4	4	4	4
• for power supply	1	1	2	2
• for redundant voltage supply	0	0	0	0
Type of electrical connection				
• for operator console	RJ11	RJ11	RJ11	RJ11
• for signaling contact	3-pole terminal block	3-pole terminal block	2 x 3-pole terminal block	2 x 3-pole terminal block
• for power supply	3-pole terminal block	3-pole terminal block	2 x 3-pole terminal block	2 x 3-pole terminal block
design of the removable storage				
• C-PLUG	Yes	Yes	Yes	Yes
Signal-Inputs/outputs				
Operating voltage of the signaling contacts				
• at AC Rated value	276 V	276 V	276 V	276 V
• at DC Rated value	230 V	230 V	230 V	230 V
Operating current of the signaling contacts				
• at AC maximum	5 A	5 A	5 A	5 A
• at DC maximum	0.1 A	0.1 A	0.1 A	0.1 A
Supply voltage, current consumption, power loss				
Type of voltage supply redundant power supply unit	No	No	Yes	Yes
Type of voltage of the supply voltage	AC	AC	AC	AC
Supply voltage				
• at AC	230 V	230 V	230 V	230 V
• at AC rated value	80 ... 276 V	80 ... 276 V	80 ... 276 V	80 ... 276 V
Supply voltage 2 Rated value				
• Type of voltage 2 of the supply voltage	DC	DC	DC	DC
Supply voltage at DC	220 V	220 V	220 V	220 V
• rated value	48 ... 300 V	48 ... 300 V	48 ... 300 V	48 ... 300 V

SCALANCE XR324-4M PoE TS / SCALANCE XR324-4M EEC / SCALANCE XR324-12M TS

Article number	**6GK5324-4GG00-3ER2** SCALANCE XR324-4M EEC	**6GK5324-4GG00-3JR2** SCALANCE XR324-4M EEC	**6GK5324-4GG00-4ER2** SCALANCE XR324-4M EEC	**6GK5324-4GG00-4JR2** SCALANCE XR324-4M EEC
Product component fusing at power supply input	Yes	Yes	Yes	Yes
Fuse protection type at input for supply voltage	3.15 A / 250 V	3.15 A / 250 V	3.15 A / 250 V	3.15 A / 250 V
Consumed current maximum	0.7 A	0.7 A	0.7 A	0.7 A
Power loss [W] • at AC at 230 V • at DC at 250 V	 42 W 42 W	 42 W 42 W	 42 W 42 W	 42 W 42 W
Permitted ambient conditions				
Ambient temperature • during operation • during storage • during transport • Note	 -40 ... +70 °C -40 ... +85 °C -40 ... +85 °C Extended temperature upper limit of +85° C permitted for 16 hours. Reduced operating temperature through the use of media modules (-40 °C to +70 °C) or SFP plug-in transceivers (-40 °C to +60 °C)	 -40 ... +70 °C -40 ... +85 °C -40 ... +85 °C Extended temperature upper limit of +85° C permitted for 16 hours. Reduced operating temperature through the use of media modules (-40 °C to +70 °C) or SFP plug-in transceivers (-40 °C to +60 °C)	 -40 ... +70 °C -40 ... +85 °C -40 ... +85 °C Extended temperature upper limit of +85° C permitted for 16 hours. Reduced operating temperature through the use of media modules (-40 °C to +70 °C) or SFP plug-in transceivers (-40 °C to +60 °C)	 -40 ... +70 °C -40 ... +85 °C -40 ... +85 °C Extended temperature upper limit of +85° C permitted for 16 hours. Reduced operating temperature through the use of media modules (-40 °C to +70 °C) or SFP plug-in transceivers (-40 °C to +60 °C)
Relative humidity • at 25 °C without condensation during operation maximum	 95 %	 95 %	 95 %	 95 %
Protection class IP	IP20	IP20	IP20	IP20
Design, dimensions and weight				
Design	19" rack	19" rack	19" rack	19" rack
Number of modular height units relating to 19-inch cabinet	1	1	1	1
Width	483 mm	483 mm	483 mm	483 mm
Height	44 mm	44 mm	44 mm	44 mm
Depth	305 mm	305 mm	305 mm	305 mm
Net weight	6.6 kg	6.6 kg	7 kg	7 kg
Mounting type • 19-inch installation • 35 mm DIN rail mounting • wall mounting • S7-300 rail mounting • S7-1500 rail mounting	When used in shipbuilding, the device must be secured in the 19" rack at four points Yes No No No No	When used in shipbuilding, the device must be secured in the 19" rack at four points Yes No No No No	When used in shipbuilding, the device must be secured in the 19" rack at four points Yes No No No No	When used in shipbuilding, the device must be secured in the 19" rack at four points Yes No No No No
Product properties, functions, components general				
Cascading in the case of a redundant ring at reconfiguration time of <\~0.3\~s	100	100	100	100
Cascading in cases of star topology	any (depending only on signal propagation time)	any (depending only on signal propagation time)	any (depending only on signal propagation time)	any (depending only on signal propagation time)
Product functions management, configuration				
Product function • CLI • web-based management • MIB support • TRAPs via email • Configuration with STEP 7 • RMON • Port mirroring • multiport mirroring • CoS • PROFINET IO diagnosis • switch-managed	 Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes	 Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes	 Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes	 Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes
Protocol is supported • Telnet • HTTP • HTTPS • TFTP • FTP • BOOTP • GMRP • DCP • LLDP • SNMP v1 • SNMP v2 • SNMP v3 • IGMP (snooping/querier)	 Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes	 Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes	 Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes	 Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes

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SCALANCE XR324-4M PoE TS / SCALANCE XR324-4M EEC / SCALANCE XR324-12M TS

Article number	**6GK5324-4GG00-3ER2** SCALANCE XR324-4M EEC	**6GK5324-4GG00-3JR2** SCALANCE XR324-4M EEC	**6GK5324-4GG00-4ER2** SCALANCE XR324-4M EEC	**6GK5324-4GG00-4JR2** SCALANCE XR324-4M EEC
Identification & maintenance function				
• I&M0 - device-specific information	Yes	Yes	Yes	Yes
• I&M1 – higher-level designation/ location designation	Yes	Yes	Yes	Yes
Product functions Diagnosis				
Product function				
• Port diagnostics	Yes	Yes	Yes	Yes
• Statistics Packet Size	Yes	Yes	Yes	Yes
• Statistics packet type	Yes	Yes	Yes	Yes
• Error statistics	Yes	Yes	Yes	Yes
• SysLog	Yes	Yes	Yes	Yes
Product functions VLAN				
Product function				
• VLAN - port based	Yes	Yes	Yes	Yes
• VLAN - protocol-based	No	No	No	No
• VLAN - IP-based	No	No	No	No
• VLAN dynamic	Yes	Yes	Yes	Yes
Number of VLANs maximum	255	255	255	255
Number of VLANs - dynamic maximum	255	255	255	255
Protocol is supported GVRP	Yes	Yes	Yes	Yes
Product functions DHCP				
Product function				
• DHCP client	Yes	Yes	Yes	Yes
• DHCP Option 82	Yes	Yes	Yes	Yes
• DHCP Option 66	Yes	Yes	Yes	Yes
• DHCP Option 67	Yes	Yes	Yes	Yes
Product functions Redundancy				
Product function				
• Ring redundancy	Yes	Yes	Yes	Yes
• High Speed Redundancy Protocol (HRP)	Yes	Yes	Yes	Yes
• high speed redundancy protocol (HRP) with redundancy manager	Yes	Yes	Yes	Yes
• high speed redundancy protocol (HRP) with standby redundancy	Yes	Yes	Yes	Yes
Protocol is supported Media Redundancy Protocol (MRP)	Yes	Yes	Yes	Yes
Product function				
• media redundancy protocol (MRP) with redundancy manager	Yes	Yes	Yes	Yes
• redundancy procedure STP	Yes	Yes	Yes	Yes
• redundancy procedure RSTP	Yes	Yes	Yes	Yes
• redundancy procedure MSTP	Yes	Yes	Yes	Yes
• Passive listening	Yes	Yes	Yes	Yes
Protocol is supported				
• STP/RSTP	Yes	Yes	Yes	Yes
• STP	Yes	Yes	Yes	Yes
• RSTP	Yes	Yes	Yes	Yes
• MSTP	Yes	Yes	Yes	Yes
• RSTP big network support	Yes	Yes	Yes	Yes
• LACP	Yes	Yes	Yes	Yes
Product functions Security				
Product function				
• ACL - MAC-based	Yes	Yes	Yes	Yes
• ACL - port/MAC-based	Yes	Yes	Yes	Yes
• IEEE 802.1x (radius)	Yes	Yes	Yes	Yes
• Broadcast/Multicast/Unicast Limiter	Yes	Yes	Yes	Yes
• broadcast blocking	Yes	Yes	Yes	Yes
Protocol is supported				
• SSH	Yes	Yes	Yes	Yes
Product functions Time				
Product function				
• SICLOCK support	Yes	Yes	Yes	Yes
Protocol is supported				
• NTP	Yes	Yes	Yes	Yes
• SNTP	Yes	Yes	Yes	Yes
• IEEE 1588 profile default	Yes	Yes	Yes	Yes
Standards, specifications, approvals				
Standard				
• for hazardous zone	-	-	-	-
• for safety from CSA and UL	UL 508, CSA C22.2 No. 142-M1987	UL 508, CSA C22.2 No. 142-M1987	UL 508, CSA C22.2 No. 142-M1987	UL 508, CSA C22.2 No. 142-M1987
• for hazardous zone from CSA and UL	No	No	No	No
• for emitted interference	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)
• for interference immunity	EN 61000-6-2:2005	EN 61000-6-2:2005	EN 61000-6-2:2005	EN 61000-6-2:2005

SCALANCE XR324-4M PoE TS / SCALANCE XR324-4M EEC / SCALANCE XR324-12M TS

Article number	**6GK5324-4GG00-3ER2** SCALANCE XR324-4M EEC	**6GK5324-4GG00-3JR2** SCALANCE XR324-4M EEC	**6GK5324-4GG00-4ER2** SCALANCE XR324-4M EEC	**6GK5324-4GG00-4JR2** SCALANCE XR324-4M EEC
Standards, specifications, approvals CE				
Certificate of suitability CE marking	Yes	Yes	Yes	Yes
Standard				
• for EMC	IEC 61850, IEEE 1613	IEC 61850, IEEE 1613	IEC 61850, IEEE 1613	IEC 61850, IEEE 1613
Standards, specifications, approvals miscellaneous				
Certificate of suitability	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007
• C-Tick	Yes	Yes	Yes	Yes
• IEC 61850-3	Yes	Yes	Yes	Yes
• KC approval	Yes	Yes	Yes	Yes
Standards, specifications, approvals ship classification				
Marine classification association				
• American Bureau of Shipping Europe Ltd. (ABS)	Yes	Yes	Yes	Yes
• Bureau Veritas (BV)	Yes	Yes	Yes	Yes
• Det Norske Veritas (DNV)	No	No	No	No
• Germanische Lloyd (GL)	No	No	No	No
• DNV GL	Yes	Yes	Yes	Yes
• Lloyds Register of Shipping (LRS)	Yes	Yes	Yes	Yes
• Nippon Kaiji Kyokai (NK)	Yes	Yes	Yes	Yes
• Polski Rejestr Statkow (PRS)	No	No	No	No
• Royal Institution of Naval Architects (RINA)	Yes	Yes	Yes	Yes
Standards, specifications, approvals product conformity				
MTBF	15 y	15 y	20 y	20 y

Article number	**6GK5324-0GG00-1CR2**
Product type designation	SCALANCE XR324-12M TS
Transmission rate	
Transmission rate	10/100/1000 Mbps
Integrated interfaces for communication	
Number of electrical connections	
• for network components or data terminal equipment	
• with Power-over-Ethernet for network components or terminal equipment	
Number of 100 Mbps ST(BFOC) ports	
• for multimode	24
Number of 100 Mbps SC ports	
• for multimode	24
Number of 1000 Mbps LC ports	
• for multimode	24
• for single-mode (LD)	24
Other interfaces	
Number of electrical connections	
• for operation panel	1
• for signaling contact	1
• for media module	12
• for power supply	1
• for redundant power supply	1
Type of electrical connection	
• for operation panel	RJ11 port
• for signaling contact	2-pin terminal block
• for power supply	4-pin terminal block
Type of removable data storage medium	
• C-PLUG	Yes
Signal inputs/outputs	
Operating current of the signaling contacts	
• with DC, nominal value	24 V
Operating current of the signaling contacts	
• with DC, maximum	0.1 A
Supply voltage, current consumption, power loss	
Type of power supply: redundant power supply	No
Type of supply voltage	DC
Supply voltage	
• External	24 V
• External	19.2 ... 28.8 V
Product component: fusing at power supply input	Yes
Type of fusing at input for supply voltage	F 5 A / 125 V
Current consumption, maximum	1.8 A
Power loss [W]	

SCALANCE XR324-4M PoE TS / SCALANCE XR324-4M EEC / SCALANCE XR324-12M TS

Article number	**6GK5324-0GG00-1CR2**
Product type designation	SCALANCE XR324-12M TS
• with 24 V DC	44 W
Permissible ambient conditions	
Ambient temperature	
• during operation	-40 ... +70 °C
• during storage	-40 ... +85 °C
• during transport	-40 ... +85 °C
• Remark	Reduced operating temperature through use of media modules (-40 to +70 °C) or SFP plug-in transceivers (-40 to +60 °C). In the case of vertical mounting position, the maximum operating temperature is reduced to +50 °C.
Relative humidity	
• Relative humidity at 25 °C, without condensation during operation, maximum	95%
IP degree of protection	IP20
Design, dimensions and weights	
Model	19-inch rack
Number of modular height units for 19-inch cabinet	1
Width	483 mm
Height	44 mm
Depth	305 mm
Net weight	5.5 kg
Product property: conformal coating	Yes
Mounting type	For 19-inch rack mounting, 4-point fixing is required for marine engineering applications
• 19-inch installation	Yes
• 35 mm DIN rail mounting	No
• Wall mounting	No
• S7-300 rail mounting	No
• S7-1500 rail mounting	No
Product properties, functions, components - General	
Cascading with redundant ring and reconfiguration time of < 0.3 s	100
Cascading with star structure	Any (only dependent on signal propagation time)
Product functions - Management, configuration, engineering	
Product function	
• CLI	Yes
• Web-based management	Yes
• MIB support	Yes
• TRAPs via e-mail	Yes
• Configuration with STEP 7	Yes
• RMON	Yes
• Port mirroring	Yes
• Multiport mirroring	Yes
• CoS	Yes
• PROFINET IO diagnostics	Yes
• Switch-managed	Yes
Protocol is supported	
• Telnet	Yes
• HTTP	Yes
• HTTPS	Yes
• TFTP	Yes
• FTP	Yes
• BOOTP	Yes
• GMRP	Yes
• DCP	Yes
• LLDP	Yes
• IGMP (snooping/querier)	Yes
Identification & Maintenance function	
• I&M0 - Device-specific information	Yes
• I&M1 - Higher level designation/location designation	Yes
Protocol is supported	
• SNMP v1	Yes
• SNMP v2	Yes
• SNMP v3	Yes
Product functions - Diagnostics	
Product function	
• Port diagnostics	Yes
• Packet size statistics	Yes
• Packet type statistics	Yes
• Error statistics	Yes
• SysLog	Yes

Article number	**6GK5324-0GG00-1CR2**
Product type designation	SCALANCE XR324-12M TS
Product functions - VLAN	
Product function	
• VLAN - port-based	Yes
• VLAN - protocol-based	No
• VLAN - IP-based	No
• VLAN - dynamic	Yes
Number of VLANs, maximum	255
Number of dynamic VLANs, maximum	255
GVRP protocol is supported	Yes
Product functions - DHCP	
Product function	
• DHCP client	Yes
• DHCP option 82	Yes
• DHCP option 66	Yes
• DHCP option 67	Yes
Product functions - Redundancy	
Product function	
• Ring redundancy	Yes
• High Speed Redundancy Protocol (HRP)	Yes
• High Speed Redundancy Protocol (HRP) with redundancy manager	Yes
• High Speed Redundancy Protocol (HRP) with standby redundancy	Yes
Media Redundancy Protocol (MRP) is supported	Yes
Product function	
• Media Redundancy Protocol (MRP) with redundancy manager	Yes
• Redundancy procedure STP	Yes
• Redundancy procedure RSTP	Yes
• Redundancy procedure MSTP	Yes
• Passive listening	Yes
Protocol is supported	
• STP/RSTP	Yes
• STP	Yes
• RSTP	Yes
• MSTP	No
• RSTP Big Network Support	Yes
• LACP	Yes
Product functions - Security	
Product function	
• ACL - MAC-based	Yes
• ACL - Port/MAC-based	Yes
• IEEE 802.1X (RADIUS)	Yes
• Broadcast/Multicast/Unicast Limiter	Yes
• Broadcast blocking	Yes
Protocol is supported	
• SSH	Yes
Product functions - Time of day	
Product function	
• SICLOCK support	Yes
Protocol is supported	
• NTP	Yes
• SNTP	Yes
• IEEE 1588 profile default	Yes
Standards, specifications, approvals	
Standard	
• for FM	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4
• for hazardous zone	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X
• for safety, from CSA and UL	UL 60950-1, CSA C22.2 No. 60950-1-03
• for hazardous zone, from CSA and UL	UL 1604 and UL 2279-15 (Hazardous Location), CSA C22.2 No. 213-M1987, Class 1 / Division 2 / Group A, B, C, D / T4, Class 1 / Zone 2 / Group IIC / T4
• for emitted interference	EN 61000-6-4:2007 (Class A)
• for noise immunity	EN 61000-6-2:2005
Standards, specifications, approvals - CE	
Proof of suitability, CE mark	Yes
Standards, specifications, approvals - Other	
Proof of suitability	EN 61000-6-2:2005, EN 61000-6-4:2007
• C-Tick	Yes
• Railway application in accordance with EN 50155	Yes
• Railway application in accordance with EN 50121-4	Yes
• Fire protection in accordance with EN 45545-2	Yes
• KC approval	Yes
Standards, specifications, approvals - Product conformity	
MTBF at 40 °C	25 y

Selection and ordering data

Version	Article No.
Industrial Ethernet switches SCALANCE XR324-4M PoE	
Partially modular 19" Industrial Ethernet switches for setup of electrical and optical Industrial Ethernet networks; eight PoE-capable ports, can be optionally equipped with optical or electrical 2-port media modules; All ports support Gigabit Ethernet (blocking), integrated redundancy manager, RSTP, RMON, IGMP-Snooping/Querier, network management via SNMP, PROFINET, and web server 16 x 10/100/1000 Mbps RJ45 ports of which eight support PoE; 4 x 10/100/1000 Mbps slots for 2-port media modules, electrical or optical	
SCALANCE XR324-4M PoE TS For railway applications (EN 50155 approval); 24 V DC power supply	
• Data cable outlet at front	**6GK5324-4QG00-1CR2**
SCALANCE XR324-4M EEC Industrial Ethernet switches	
Partially modular 19" Industrial Ethernet switches for establishing electrical and optical Industrial Ethernet networks; all ports can be optionally equipped with optical or electrical 2-port media modules); All ports support Gigabit Ethernet (blocking), integrated redundancy manager, RSTP, RMON, IGMP snooping querier, network management via SNMP, PROFINET and Web server 16 x 10/100/1000 Mbps RJ45 ports, electrical 4 x 10/100/1000 Mbps slots for 2-port media modules, electrical or optical	
SCALANCE XR324-4M EEC	
Power supply 1 x 24 V DC	
• Front data cable outlet, rear power supply	**6GK5324-4GG00-1ER2**
• Rear data cable outlet, front power supply	**6GK5324-4GG00-1JR2**
Power supply 1 x 100-240 AC/60-250 V DC	
• Front data cable outlet, rear power supply	**6GK5324-4GG00-3ER2**
• Rear data cable outlet, front power supply	**6GK5324-4GG00-3JR2**
Power supply 2 x 24 V DC	
• Front data cable outlet, rear power supply	**6GK5324-4GG00-2ER2**
• Rear data cable outlet, front power supply	**6GK5324-4GG00-2JR2**
Power supply 2 x 100-240 AC/60-250 V DC	
• Front data cable outlet, rear power supply	**6GK5324-4GG00-4ER2**
• Rear data cable outlet, front power supply	**6GK5324-4GG00-4JR2**
Industrial Ethernet switches SCALANCE XR324-12M TS	
Fully modular 19" Industrial Ethernet switches for setup of electrical and/or optical Industrial Ethernet networks; all ports can optionally be equipped with optical or electrical 2-port media modules; All ports support Gigabit Ethernet (blocking), integrated redundancy manager, RSTP, RMON, IGMP-Snooping/Querier, network management via SNMP, PROFINET, and web server 12 x 10/100/1000 Mbps slots for 2-port media modules, electrical or optical	
SCALANCE XR324-12M TS For railway applications (EN 50155 approval) 24 V DC power supply	
• Data cable outlet at front	**6GK5324-0GG00-1CR2**
Media modules	
Electrical Media Modules With 2 x 10/100/1000 Mbps RJ45 ports, electrical	
• MM992-2CUC with securing collar and coated PCBs (conformal coating)	**6GK5992-2GA00-8FA0**
With 2 x 10/100/1000 Mbps M12 ports, electrical	
• MM992-2 M12 interface (x-coded) and coated PCBs (conformal coating)	**6GK5992-2HA00-0AA0**
Optical Media Modules With 2 x 1000 Mbps SC ports, optical	
• MM992-2 multi-mode, glass, up to 750 m, coated PCBs (conformal coating)	**6GK5992-2AL00-8FA0**
Accessories	
IE FC Stripping Tool Preset insulation stripping tool for fast stripping of Industrial Ethernet FC cables	**6GK1901-1GA00**
IE FC RJ45 Plug 180 2 x 2 RJ45 plug connector for Industrial Ethernet with rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1901-1BB10-2AA0**
IE TP Train Cable GP 2x2 (Type C) 4-core, shielded TP installation cable for connection to IE FC outlet RJ45/IE FC RJ45 plug 180/90 for train applications: PROFINET-compliant; sold by the meter; maximum delivery unit 1000 m, minimum order quantity 20 m	**6XV1871-2T**

Version	Article No.
IE FC RJ45 Plug 4 x 2 RJ45 plug connector for Industrial Ethernet (10/100/1000 Mbps) with rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1901-1BB12-2AA0**
IE FC M12 Plug PRO 4x2 M12 plug connector (X-coded, IP65/IP67) that can be assembled in the field, metal enclosure, insulation displacement fast connection method, for SCALANCE W	
• 1 unit	**6GK1901-0DB30-6AA0**
IE M12 Panel Feedthrough 4x2 Control cabinet feedthrough for transition from M12 connection method (X-coded, IP65/IP67) to RJ45 connection method (IP20)	
• 1 pack = 5 units	**6GK1901-0DM40-2AA5**
IE FC M12 Cable Connector PRO 4x2 M12 plug-in connector (X-coded, IP65/IP67, female contact insert) that can be assembled in the field, metal housing, insulation displacement fast connection method	
• 1 unit	**6GK1901-0DB40-6AA0**
IE Train Cable GP 4x2 8-core, shielded TP installation cable for connection to IE FC M12 Plug PRO 4x2 for use in railway applications; with railway approval; sold by the meter; maximum delivery unit 1000 m, minimum order quantity 20 m	**6XV1878-2T**
IE Connecting Cable **IE FC RJ45 Plug-180/IE FC RJ45 Plug-180** Preassembled IE FC TP trailing cable GP 2 x 2 (PROFINET type C) with two IE FC RJ45 Plug-180, IP20 degree of protection; Length:	
• 1.0 m	**6XV1871-5BH10**
• 5.0 m	**6XV1871-5BH50**
• 10.0 m	**6XV1871-5BN10**
IE TP Cord RJ45/RJ45 TP cable 4 x 2 with two RJ45 connectors	
• 1 m	**6XV1870-3QH10**
• 6 m	**6XV1870-3QH60**
• 10 m	**6XV1870-3QN10**
IE SC RJ POF Plug Screw connector for local assembly on POF FOC (1 pack = 20 units)	**6GK1900-0MB00-0AC0**
POF Standard Cable GP 980/1000 POF standard cable for fixed installation indoors with PVC sheath; sold by the meter; maximum delivery unit 1000 m, minimum order quantity 20 m	**6XV1874-2A**
IE SC RJ PCF Plug Screw connector for local assembly on PCF FOC (1 pack = 10 units)	**6GK1900-0NB00-0AC0**
PCF Standard Cable GP 200/230 Standard cable, fan-out, sold by the meter; maximum delivery unit 2000 m; minimum order quantity 20 m	**6XV1861-2A**
FC FO Termination Kit Termination kit for local assembly of FC SC and FC BFOC connectors on FC FO standard cable; contains a stripping tool, Kevlar cutters, fiber breaking tool and microscope.	**6GK1900-1GL00-0AA0**
FC BFOC Plug Screw connector for local assembly on FC FOC; (1 pack = 20 units + cleaning cloths)	**6GK1900-1GB00-0AC0**
FC SC Plug Screw connector for local assembly on FC FOC; (1 pack = 10 units duplex plugs + cleaning cloths)	**6GK1900-1LB00-0AC0**
FC FO Standard Cable GP 62.5/200/230 FC FO standard cable for fixed installation indoors with PVC sheath; sold by the meter; maximum delivery unit 1000 m, minimum order quantity 20 m	**6XV1847-2A**
Multimode FO BFOC Connector Set For FO standard cable (50/125/1400), FO ground cable (50/125/1400), flexible FO trailing cable, INDOOR FO cable (62.5/125/900), 20 units	**6GK1901-0DA20-0AA0**

Version	Article No.
Multi-mode FO SC Duplex Connector Set For FO standard cable (50/125/1400), FO ground cable (50/125/1400), flexible FO trailing cable, INDOOR FO cable (62.5/125/900), 10 units	**6GK1901-0LB10-2AA0**
LC Plug MM[2]	**6GK1901-0RB10-2AB0**
FO Standard Cable GP 50/125/1400 [1] [2] Multimode cable sold by the meter; maximum delivery unit 1000 m, minimum order quantity 20 m	**6XV1873-2A**
Pre-Assembled FO Patch Cables Multimode	
MM FO Cord SC/LC With one SC duplex connector and one LC duplex connector, 1 m	**6XV1843-5EH10-0CA0**
MM FO Cord SC/BFOC With one SC duplex connector and two BFOC connectors, 1 m	**6XV1843-5EH10-0CB0**
MM FO Cord SC/SC With two SC duplex connectors, 1 m Single-mode	**6XV1843-5EH10-0CC0**
SM FO Cord SC/LC With one SC duplex connector and one LC duplex connector, 1 m	**6XV1843-5FH10-0CA0**
SM FO Cord SC/BFOC With one SC duplex connector and two BFOC connectors, 1 m	**6XV1843-5FH10-0CB0**
SM FO Cord SC/SC With two SC duplex connectors, 1 m	**6XV1843-5FH10-0CC0**
Screw-Type Terminal Block For SCALANCE X/W/S/M	
• 2-pole for signaling contact (24 V DC) 1 pack = 5 units	**6GK5980-0BB00-0AA5**
• 2-pole for power supply (230 V AC) 1 pack = 5 units	**6GK5980-1BC00-0AA5**
• 4-pole for power supply (24 V DC) 1 pack = 5 units	**6GK5980-1DB00-0AA5**
C-PLUG Removable data storage medium (conformal coating) for easy replacement of devices under fault conditions; for recording configuration data or engineering and application data; can be used in SIMATIC NET products with C-PLUG slot	**6GK1900-0AQ00**

[1] Special fiber-optic cables; lengths and accessories available on request

[2] Special tools and specially trained personnel are required for assembling glass FOC

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More information

Selection Tool:

To assist in selecting the right Industrial Ethernet switches as well as configuration of modular variants, the TIA Selection Tool is available at:

TIA Selection Tool:
http://www.siemens.com/tia-selection-tool

Overview

The new SCALANCE XM-400 product range comprises modular Industrial Ethernet switches, expandable by various port extenders and plug-in transceivers for a maximum configuration with up to 24 ports. It supports 10/100/1000 Mbit technology for various transmission media (twisted pair, fiber optic) and increased port requirements. Thanks to the flexible, modular design, the XM-400 product line is also designed for future requirements and can be adapted to the relevant task.

- Combo ports for the flexible use of interfaces: A combo port consists of an electric port and an SFP slot. Only one of the two ports can ever be active. If an SFP plug-in transceiver is inserted, the electric port is deactivated
- Fast mobile diagnosis with smartphone/tablet thanks to WLAN and NFC: Fast access to the web-based management of the SCALANCE XM-400 via mobile websites. The function can be started using existing WLAN and NFC (Near Field Communication)
- High-speed media redundancy through integral redundancy manager even for large networks, for both Gigabit Ethernet and Fast Ethernet
- Seamless integration of automation networks into existing corporate networks thanks to support for a host of IT standards: Establishment of virtual networks (VLANs)
- Integration into higher-level enterprise networks thanks to support for standardized redundancy procedures (Rapid Spanning Tree Protocol, Link Aggregation)
- By learning the multicast sources and destinations (Internet Group Management Protocol (IGMP) Snooping), SCALANCE XM-400 switches can also filter multicast data traffic and thus limit the load on the network
- Optional activation of the Layer 3 functions for IPv4 and IPv6 in connection with the KEY-PLUG XM-400
- Creation of IP subnets and IP router communication by means of Layer 3 switching (IP routing)
  - Static routing
  - Dynamic routing OSPF (Open Shortest Path First) and RIPv2 (Routing Information Protocol)
  - Redundant routing VRRP (Virtual Router Redundancy Protocol)

Product versions - basic devices

XM408-8C

- 8 ports available in total, of which
  - up to 8 x 10/100/1000 Mbit/s are RJ45 ports with retaining collars
  - up to 8 x SFP slots (combo ports), 100 or 1000 Mbit/s
- Two port extenders with 8 ports each can be connected to implement a maximum of 24 ports in one switch

Technical specifications

Article number	**6GK5408-8GS00-2AM2**
Transmission rate	
Transfer rate	10/100/1000 Mbit/s
Number of ports maximum	24
Interfaces for communication maximum configuration for modular devices	
Number of electrical ports maximum	24
Number of electrical ports with PoE maximum	16
Number of optical ports maximum	24
Interfaces for communication integrated	
Number of electrical connections • for network components or terminal equipment	8; RJ45 with securing collar
Number of 10/100/1000 Mbit/s RJ45 ports Integrated • with securing collar	8
Number of electrical connections • for SFP	8; 100 Mbit/s or 1000 Mbit/s SFP plug-in transceiver
Number of combo ports with RJ45 interface for optical plug-in transceiver	8; 100 Mbit/s or 1000 Mbit/s SFP plug-in transceiver
Number of connectable extender modules	2
Interfaces for communication pluggable maximum	
Number of 10/100/1000 Mbit/s RJ45 ports • with securing collar • with securing collar with PoE	 16 16

SCALANCE XM-400 managed

Article number	**6GK5408-8GS00-2AM2**
Number of 100 Mbit/s LC ports	
• for multimode	24
• for single mode (LD)	24
• for single mode (LH+)	24
• for single mode (ELH200)	24
Number of 1000 Mbit/s LC ports	
• for multimode	24
• for single mode (LD)	24
• for single mode (LH)	24
• for single mode (LH+)	24
• for single mode (ELH)	24
Number of electrical connections	
• for SFP	24; 100 Mbit/s or 1000 Mbit/s SFP plug-in transceiver
Interfaces others	
Number of electrical connections	
• for operator console	1
• for management purposes	1
• for signaling contact	1
• for power supply	1
• for redundant voltage supply	1
• Type of electrical connection	
• for operator console	RJ11
• for management purposes	RJ45
• for signaling contact	2-pole terminal block
• for power supply	4-pole terminal block
Number of extender expansion interfaces	2
design of the removable storage	
• C-PLUG/KEY-PLUG	Yes
Product feature hot-swappable interface modules	Yes
Signal-Inputs/outputs	
Operating voltage of the signaling contacts	
• at DC Rated value	24 V
Operating current of the signaling contacts	
• at DC maximum	0.1 A
Supply voltage, current consumption, power loss	
Type of voltage supply redundant power supply unit	No
Type of voltage of the supply voltage	DC
Supply voltage	
• external	24 V
• external minimum	19.2 V
• external maximum	28.8 V
Product component fusing at power supply input	Yes
Fuse protection type at input for supply voltage	F 15 A / 125 V
Consumed current maximum	2 A
Power loss [W]	
• at DC at 24 V	48 W
Supplied active power of PSE with PoE	
• per port maximum	30 W
• total maximum	360 W
Permitted ambient conditions	
Ambient temperature	
• during operation	-40 ... +70 °C
• during storage	-40 ... +85 °C
• during transport	-40 ... +85 °C
Relative humidity	
• at 25 °C without condensation during operation maximum	95 %
Protection class IP	IP20
Design, dimensions and weight	
Design	modular
Width	140 mm
Height	147 mm
Depth	125 mm
Net weight	1.15 kg
Mounting type	
• 19-inch installation	No
• 35 mm DIN rail mounting	Yes
• wall mounting	No
• S7-300 rail mounting	Yes
• S7-1500 rail mounting	Yes

Article number	**6GK5408-8GS00-2AM2**
Product properties, functions, components general	
Cascading in cases of star topology	any (depending only on signal propagation time)
Product functions management, configuration	
Product function	
• CLI	Yes
• web-based management	Yes
• MIB support	Yes
• TRAPs via email	Yes
• Configuration with STEP 7	Yes
• RMON	Yes
• Port mirroring	Yes
• multiport mirroring	Yes
• CoS	Yes
• PROFINET IO diagnosis	Yes
• switch-managed	Yes
Telegram length for Ethernet maximum	9 216 byte
Protocol is supported	
• Telnet	Yes
• HTTP	Yes
• HTTPS	Yes
• TFTP	Yes
• FTP	Yes
• BOOTP	Yes
• GMRP	Yes
• DCP	Yes
• LLDP	Yes
• SNMP v1	Yes
• SNMP v2	Yes
• SNMP v3	Yes
• IGMP (snooping/querier)	Yes
Identification & maintenance function	
• I&M0 - device-specific information	Yes
• I&M1 – higher-level designation/location designation	Yes
Product functions Diagnosis	
Product function	
• Port diagnostics	Yes
• Statistics Packet Size	Yes
• Statistics packet type	Yes
• Error statistics	Yes
• SysLog	Yes
Product functions VLAN	
Product function	
• VLAN - port based	Yes
• VLAN - protocol-based	Yes
• VLAN - IP-based	Yes
• VLAN dynamic	Yes
Number of VLANs maximum	255
Number of VLANs - dynamic maximum	255
Protocol is supported GVRP	Yes
Product functions DHCP	
Product function	
• DHCP client	Yes
• DHCP Option 82	Yes
• DHCP Option 66	Yes
• DHCP Option 67	Yes
Product functions Routing	
Product function	
• Static IP routing	Yes
• Static IP routing IPv6	Yes
• dynamic IP routing	Yes
• dynamic IP routing IPv6	Yes
Protocol is supported	
• RIPv2	Yes
• RIPnG for IPv6	Yes
• OSPFv2	Yes
• OSPFv3 for IPv6	Yes
• VRRP	Yes
• VRRP for IPv6	Yes
Product functions Redundancy	
Product function	
• Ring redundancy	Yes
• High Speed Redundancy Protocol (HRP)	Yes
• high speed redundancy protocol (HRP) with redundancy manager	Yes
• high speed redundancy protocol (HRP) with standby redundancy	Yes

SCALANCE XM-400 managed

Article number	**6GK5408-8GS00-2AM2**
Protocol is supported Media Redundancy Protocol (MRP)	Yes
Product function	
• media redundancy protocol (MRP) with redundancy manager	Yes
• redundancy procedure STP	Yes
• redundancy procedure RSTP	Yes
• redundancy procedure MSTP	Yes
• Passive listening	Yes
Protocol is supported	
• LACP	Yes
Product functions Security	
Product function	
• ACL - MAC-based	Yes
• ACL - port/MAC-based	Yes
• IEEE 802.1x (radius)	Yes
• Broadcast/Multicast/Unicast Limiter	Yes
• broadcast blocking	Yes
Protocol is supported	
• SSH	Yes
Product functions Time	
Product function	
• SICLOCK support	Yes
Protocol is supported	
• NTP	Yes
• SNTP	Yes
Standards, specifications, approvals	
Standard	
• for FM	FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4
Standards, specifications, approvals CE	
Certificate of suitability CE marking	Yes
Standards, specifications, approvals miscellaneous	
Certificate of suitability	EN 61000-6-2, EN 61000-6-4
• C-Tick	Yes
• Railway application in accordance with EN 50121-4	Yes
• KC approval	Yes
Standards, specifications, approvals product conformity	
MTBF at 40 °C	28 y

Selection and ordering data

Version	Article No.
SCALANCE XM-400 Industrial Ethernet switches	
SCALANCE XM408-8C; 8 x 10/100/1000 Mbps, of which 8 x RJ45/SFP combo ports; 8 x 1000 Mbps maximum basic device configuration	
• IP routing in combination with KEY PLUG XM-400	**6GK5408-8GS00-2AM2**
• IP routing integrated	**6GK5408-8GR00-2AM2**
Accessories	
Power supplies	
SIMATIC PM 1507 24 V stabilized power supply for SIMATIC S7-1500	
• Power supply S7-1500 PM1507 SIMATIC PM 1507 24 V/3 A stabilized power supply for SIMATIC S7-1500 input: 120/230 V AC; output: 24 V DC/3 A	**6EP1332-4BA00**
• Power supply S7-1500 PM1507 SIMATIC PM 1507 24 V/8 A stabilized power supply for SIMATIC S7-1500 input: 120/230 V AC; output: 24 V DC/8 A	**6EP1333-4BA00**
KEY-PLUG XM-400 Swap medium for expansion of the device functions with IP routing (Layer 3), for integration of configuration data and easy replacement of SCALANCE XM-400 in the event of a fault	**6GK5904-0PA00**
IE FC Stripping Tool Pre-adjusted stripping tool for fast stripping of Industrial Ethernet FC cables	**6GK1901-1GA00**
IE FC RJ45 Plug 180 2 x 2 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1901-1BB10-2AA0**
IE FC TP Standard Cable GP 2 x 2 (Type A) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 Plug; PROFINET-compliant; with UL approval; sold by the meter; max. length 1000 m, minimum order 20 m	**6XV1840-2AH10**
IE FC RJ45 Plug 4 x 2 IE FC RJ45 plug 180 4 x 2; RJ45 connector; Cat6A; (10/100/1000/10000 Mbps) with rugged metal enclosure; FC connection method; for IE FC cable 4 x 2 (AWG24); 180° cable outlet	
• 1 pack = 1 unit	**6GK1901-1BB12-2AA0**
IE FC TP Standard Cable GP 4 x 2 8-core, shielded TP installation cable for universal applications; with UL approval; sold by the meter; max. length per delivery unit 1000 m, minimum order 20 m	
• AWG24, for connecting to IE FC RJ45 Plug 4 x 2, IE FC M12 Plug PRO 4 x 2	**6XV1878-2A**
IE Connecting Cable IE FC RJ45 Plug-180/IE FC RJ45 Plug-180 Preassembled IE FC TP Trailing Cable GP 2 x 2 (PROFINET type C) with two IE FC RJ45 Plug-180, IP20 degree of protection	
Length:	
• 1.0 m	**6XV1871-5BH10**
• 5.0 m	**6XV1871-5BH50**
• 10.0 m	**6XV1871-5BN10**
FC FO Termination Kit Termination Kit for local assembly of FC SC and FC BFOC connectors to FC FO Standard Cable, comprising a stripping tool, Kevlar cutters, fiber breaking tool and microscope	**6GK1900-1GL00-0AA0**
FC BFOC Plug Screw connector for on-site assembly on FC fiber-optic cable; (1 pack = 20 units + cleaning cloths)	**6GK1900-1GB00-0AC0**
FC SC Plug Screw connector for on-site assembly on FC fiber-optic cable; (1 pack = 10 duplex plugs + cleaning cloths)	**6GK1900-1LB00-0AC0**
FC FO Standard Cable GP 62.5/200/230 FC FO Standard Cable for fixed routing indoors with PVC sheath; sold by the meter; max. length 1000 m; minimum order 20 m	**6XV1847-2A**

Version	Article No.
Multi-mode FO BFOC connector set For FO Standard Cable (50/125/1400), FO Ground Cable (50/125/1400), flexible FO Trailing Cable, INDOOR FC Cable (62.5/125/900), 20 units	**6GK1901-0DA20-0AA0**
Multi-mode FO SC duplex connector set For FO Standard Cable (50/125/1400), FO Ground Cable (50/125/1400), flexible FO Trailing Cable, INDOOR FC Cable (62.5/125/900), 10 units	**6GK1901-0LB10-2AA0**
LC Plug MM[2]	**6GK1901-0RB10-2AB0**
FO Standard Cable GP 50/125/1400[1][2] Multimode cable, sold by the meter; max. length 1000 m; minimum order 20 m	**6XV1873-2A**
Pre-assembled FO patch cables Multimode	
MM FO Cord SC/LC With one SC duplex connector and one LC duplex connector, 1 m	**6XV1843-5EH10-0CA0**
MM FO Cord SC/BFOC With one SC duplex connector and two BFOC connectors, 1 m	**6XV1843-5EH10-0CB0**
MM FO Cord SC/SC With two SC duplex connectors, 1 m	**6XV1843-5EH10-0CC0**
Single-mode	
SM FO Cord SC/LC With one SC duplex connector and one LC duplex connector, 1 m	**6XV1843-5FH10-0CA0**
SM FO Cord SC/BFOC With one SC duplex connector and two BFOC connectors, 1 m	**6XV1843-5FH10-0CB0**
SM FO Cord SC/SC With two SC duplex connectors, 1 m	**6XV1843-5FH10-0CC0**
C-PLUG Swap medium for simple replacement of devices in the event of a fault; for storing configuration or application data; can be used for SIMATIC NET products with C-PLUG slot	**6GK1900-0AB00**
Other accessories	
Spring-loaded terminal block Spring-type terminal block for SCALANCE X/W/S/M; 1 pack = 5 units	
• 2-pole for signaling contact (24 V DC)	**6GK5980-0BB10-0AA5**
• 4-pole for power supply (24 V DC)	**6GK5980-1DB10-0AA5**
Connecting cable (RJ11/RS232) Preassembled serial cable with RJ11 and RS232 connectors; length: 5 m; 1 item per pack	**6GK5980-3BB00-0AA5**
Screw for fixing to S7-1500 and S7-300 rails Mounting screw for SCALANCE X/W/S/M; 1 pack = 5 items	**6GK5980-4AA00-0AA5**
SCALANCE TAP104 Test access port for the reaction-free extraction of Ethernet data frames (10/100 Mbps) from both transmission directions; extracts entire data traffic (including incomplete diagrams) for further diagnostics.	**6GK5104-0BA00-1SA2**

1) Special fiber-optic cables; lengths and accessories available on request

2) Special tools and trained personnel are required for pre-assembling glass fiber-optic cables

More information

Selection tools:

To assist in selecting the right Industrial Ethernet switches as well as configuration of modular variants, the TIA Selection Tool is available at:
www.siemens.com/tia-selection-tool-standalone

Overview

- Port extender for flexible expansion to up to 24 ports, can be connected to the SCALANCE XM-400 Industrial Ethernet switches
- Each port extender has eight ports
- There are three different versions, with different connections

Product versions

PE 408PoE

- 8 x 10/100/1000 Mbps RJ45 ports with retaining collar with PoE according to IEEE802.3 Type 1 and Type 2
- Extended operating temperature range from -40 °C to +60 °C
- A separate power supply is required for PoE power (SCALANCE PS924 PoE or SCALANCE PS9230 PoE are available)

Benefits

- Cost savings due to the modular system. The modular system allows the setup of electrical and optical Industrial Ethernet networks and the network topology and port type to easily be adapted to the plant structure and expanded at any time
- Integrated industrial network for data, speech, and video
- Mounting of a port extender on the basic device or another port extender without tools
- High performance due to Gigabit ports

Design

- Extender connection on the left for connection to a SCALANCE XM-400 basic device or a port extender
- Extender connection on the right for connecting another port extender
- 8 ports for Ethernet connection, different design depending on the version
- LEDs to display the port and device status
- 2 terminal blocks for Power-over-Ethernet supply with 54 V DC input (only PE408PoE)
- Operating temperature range from -40 °C to +70 °C
- IP20 degree of protection

Technical specifications

Article number	**6GK5408-0PA00-8AP2**
Product type designation	PE408PoE
Transmission rate	
Transfer rate	10/100/1000 Mbit/s
Interfaces for communication integrated	
Number of electrical connections	
• for network components or terminal equipment	8
• for Power-over-Ethernet for network components or terminal equipment	8
Number of 10/100/1000 Mbit/s RJ45 ports Integrated	
• with securing collar	
• with securing collar with PoE	8
Number of electrical connections	
• for SFP	
Interfaces for communication pluggable maximum	
Number of electrical connections	
• for SFP	0
Interfaces others	
Type of electrical connection	
• for power supply	2-pole terminal block
Number of extender expansion interfaces	2
Product feature hot-swappable interface modules	Yes
Supply voltage, current consumption, power loss	
Type of voltage of the supply voltage	DC
Supply voltage	
• external	54 V
• external minimum	51.3 V
• external maximum	56.7 V
Product component fusing at power supply input	Yes
Fuse protection type at input for supply voltage	F 4 A / 60 V

Port Extender for SCALANCE XM-400 managed

Article number	**6GK5408-0PA00-8AP2**
Product type designation	PE408PoE
Consumed current maximum	0.2 A
Power loss [W]	
• at DC at 24 V	4.8 W
Supplied active power of PSE with PoE	
• per port maximum	30 W
• total maximum	180 W
Permitted ambient conditions	
Ambient temperature	
• during operation	-40 ... +60 °C
• during storage	-40 ... +85 °C
• during transport	-40 ... +85 °C
Relative humidity	
• at 25 °C without condensation during operation maximum	95 %
Protection class IP	IP20
Design, dimensions and weight	
Design	SIMATIC S7-1500 device design
Number of modular height units relating to 19-inch cabinet	
Width	70 mm
Height	147 mm
Depth	125 mm
Net weight	0.7 kg
Mounting type	
• 19-inch installation	No
• 35 mm DIN rail mounting	Yes
• wall mounting	No
• S7-300 rail mounting	Yes
• S7-1500 rail mounting	Yes
Standards, specifications, approvals	
Standard	
• for FM	FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4
• for hazardous zone	EN 60079-0: 2009, EN60079-15: 2010, II 3 G Ex nA IIC T4 Gc, KEMA 07 ATEX 0145 X, IECEx DEK 14.0025X
• for safety from CSA and UL	UL 508, UL 60950-1, CSA C22.2 Nr. 60950-1-03
• for hazardous zone from CSA and UL	ISA 12.12.01-2012 (Hazardous Location), Class 1 / Division 2 / Group A, B, C, D / T4, Class 1 / Zone 2 / Group IIC / T4
• for emitted interference	EN 61000-6-4 (Class A)
• for interference immunity	EN 61000-6-2
Standards, specifications, approvals CE	
Certificate of suitability CE marking	Yes
Standards, specifications, approvals miscellaneous	
Certificate of suitability	EN 61000-6-2, EN 61000-6-4
• C-Tick	Yes
• Railway application in accordance with EN 50121-4	Yes
• KC approval	Yes
Standards, specifications, approvals ship classification	
Marine classification association	
• American Bureau of Shipping Europe Ltd. (ABS)	Yes
• Bureau Veritas (BV)	No
• Det Norske Veritas (DNV)	No
• Germanische Lloyd (GL)	No
• DNV GL	Yes
• Lloyds Register of Shipping (LRS)	Yes
• Nippon Kaiji Kyokai (NK)	Yes
• Polski Rejestr Statkow (PRS)	Yes
• Royal Institution of Naval Architects (RINA)	Yes
Standards, specifications, approvals product conformity	
MTBF at 40°C	58 y

Selection and ordering data

Version	Article No.
Port extender for SCALANCE XM-400	
• PE408PoE; with 8 x 10/100/1000 Mbps TP ports Power over Ethernet according to 802.3at Type 1/2	**6GK5408-0PA00-8AP2**
SCALANCE PS924 PoE or SCALANCE PS9230 PoE	
SCALANCE PS924 PoE power supply for Power-over-Ethernet, Input: 24 V DC Output: 54 V DC/1.6 A NEC Class 2	**6GK5924-0PS00-1AA2**
SCALANCE PS9230 PoE power supply for Power-over-Ethernet, Input: 120/230 V AC, Output: 54 V DC/1.6 A NEC Class	**6GK5923-0PS00-3AA2**
Accessories	
IE FC Stripping Tool Pre-adjusted stripping tool for fast stripping of Industrial Ethernet FC cables	**6GK1901-1GA00**
IE FC RJ45 Plug 180 2 x 2 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1901-1BB10-2AA0**
IE FC TP Standard Cable GP 2 x 2 (Type A) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 Plug; PROFINET-compliant; with UL approval; sold by the meter; max. length 1000 m, minimum order quantity 20 m	**6XV1840-2AH10**
IE FC RJ45 Plug 4 x 2 RJ45 plug-in connector for Industrial Ethernet (10/100/1000 Mbps) with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1901-1BB11-2AA0**
IE FC TP Standard Cable GP 4 x 2 8-core, shielded TP installation cable for universal applications; with UL approval; sold by the meter; max. length per delivery unit 1000 m, minimum order 20 m	
• AWG24, for connecting to IE FC RJ45 Plug 4 x 2, IE FC M12 Plug PRO 4 x 2	**6XV1878-2A**
IE Connecting Cable IE FC RJ45 Plug-180/IE FC RJ45 Plug-180 Preassembled IE FC TP Trailing Cable GP 2 x 2 (PROFINET type C) with two IE FC RJ45 Plug-180, IP20 degree of protection	
Length:	
• 1.0 m	**6XV1871-5BH10**
• 5.0 m	**6XV1871-5BH50**
• 10.0 m	**6XV1871-5BN10**
Other accessories	
Spring-loaded terminal block Spring-type terminal block for SCALANCE X/W/S/M; 1 pack = 5 units	
• 2-pole for signaling contact (24 V DC)	**6GK5980-0BB10-0AA5**
Screw for fixing to S7-1500 and S7-300 rails Mounting screw for SCALANCE X/W/S/M; 1 pack = 5 items	**6GK5980-4AA00-0AA5**

More information

Selection tools:

To assist in selecting the right Industrial Ethernet switches as well as configuration of modular variants, the TIA Selection Tool is available at:
www.siemens.com/tia-selection-tool-standalone

CP 1604

Overview

ISO	TCP/ UDP	PN	MRP	OPC	PG/OP	S7/S5	IT
	●	●	●				

- Integral 4-port real-time switch
- High performance through direct memory access
- Integration in network management systems through the support of SNMP
- Comprehensive diagnostics possibilities for installation, start-up and operation of the module
- Powerful configuration tools are part of the scope of delivery of the module
- The CP 1604 EEC (Enhanced Environmental Conditions) is suitable for use in extremely harsh industrial environments

Benefits

- Ideally suited for design of small local networks through integral 4-port real-time switch
- Simple portability to various operating system environments using DK-16xx PN IO development kit
- Uncrossed connecting cables can be used due to the integrated Autocrossover function
- Suitable for railway applications acc. to EN 50155 / IEC 60571 (EEC variant 6GK1160-4AT01 only)

Application

The CP 1604 provides high-performance support for control tasks on the PC (PC based Control, Numeric Control, Robot Control).

With IRT (Isochronous Real-Time), the CP is ideally suited to time-critical applications that are in the range of strictly isochronous closed-loop control in the motion control sector.

The integrated 4-port switch supports low-cost system solutions and the configuration of different topologies.

The DK-16xx PN IO development kit enables integration of the module into any operating systems.

The CP 1604 EEC (Enhanced Environmental Conditions) is suitable for use in extremely harsh industrial environments

Design

- Industrial Ethernet (via "Connection Board for CP 1604")
  - Ethernet real-time ASIC ERTEC 400
  - 4 x RJ45 connection
  - Integral 4-port real-time switch for 10/100 Mbit/s Ethernet
  - Half/full duplex
  - Autosensing/Autocrossover/Autonegotiation
- PCI-104-Plus interface:
  - PCI 2.2
  - 32 bits
  - 33 MHz or 66 MHz
  - Installation through PCI standard mechanisms (Plug & Play)
- Host interface/processor:
  - Dual-port RAM onboard
  - Flash for program memory onboard
  - ARM 946 RISK processor (32-bit) onboard for preprocessing
- Power supply:
  - Operating voltage: 5 V through PCI-104
- Size:
  - PCI-104 format

Product versions

CP 1604 EEC (6GK1160-4AT01), version suitable for use in railway applications

- Suitable for use in extreme environmental conditions

Technical specifications

Article number	**6GK1160-4AT01**
Product type designation	CP 1604 EEC
Transmission rate	
Transfer rate	100 Mbit/s
Interfaces	
Number of electrical connections • at the 1st interface acc. to Industrial Ethernet • for power supply	 4 1
Type of electrical connection • at the 1st interface acc. to Industrial Ethernet • for power supply	 RJ45 port via connection board 4-pole terminal block through power supply board
Supply voltage, current consumption, power loss	
Type of voltage of the supply voltage	DC
Type of voltage supply optional external supply	Yes
Supply voltage • 1 from backplane bus • external • Note	 5 V
Relative symmetrical tolerance at DC • at 5 V	 5 %
Consumed current • 1 from backplane bus at DC maximum • from external supply voltage at DC at 24 V maximum	 0.8 A
Power loss [W]	4 W
Power loss [W] in switch mode maximum	4.1 W
Permitted ambient conditions	
Ambient temperature • during operation • during storage • during transport	 -40 ... +70 °C -20 ... +60 °C -20 ... +60 °C
Relative humidity at 25 °C without condensation during operation maximum	95 %
Protection class IP	IP00
Design, dimensions and weight	
Module format	PC/104-Plus
Width	90 mm
Height	24 mm
Depth	95 mm
Net weight	110 g
Mounting type	Screw mounting
Number of plug-in cards of same design plug-in per PC station	1
Number of units Note	-
Product functions switch	
Product feature Switch	Yes
Product function switch-managed	No
Product functions Redundancy	
Software for redundancy function required	No
Product function • Ring redundancy • Redundancy manager **Protocol is supported Media Redundancy Protocol (MRP)**	 Yes Yes Yes
Standards, specifications, approvals	
Standard • for EMC • for safety from CSA and UL • for emitted interference • for interference immunity	 2004/108/EC CAN/CSA C22.2 & UL 60950-1 EN 61000-6-3, EN 61000-6-4 EN 61000-6-1, EN 61000-6-2
Certificate of suitability • CE marking • C-Tick	 Yes Yes
Accessories	
accessories	optional: Connection board for CP 1604, power supply board for CP 1604, HARDNET-IE DK (development kit)

Selection and ordering data

Version	Article No.
CP 1604 EEC communications processor PCI-104 card (32-bit) with ASIC ERTEC 400 for connecting PCI-104 systems to PROFINET IO with 4-port real-time switch (RJ45); incl. IO-Base software for PROFINET IO Controller and NCM PC; single license for one installation, runtime software, software and electronic manual on CD-ROM, Class A, for 32-bit Windows XP Professional and Windows 7; other operating systems using DK-16xx PN IO Development Kit English/German	**6GK1160-4AT01**
Accessories	
Connection board for CP 1604 Connection board for CP 1604 with four RJ45 sockets incl. connecting cable	**6GK1160-4AC00**
Power supply for CP 1604 Redundant power supply for CP 1604 for operating the integral 4-port switch of the CP 1604 with the PC-104 system switched off; includes connecting cable	**6GK1160-4AP00**
Development Kit DK-16xx PN IO Software Development Kit for CP 1616/CP 1604; driver and IO-Base software for CP 1616/CP 1604 as PN IO Controller and PN IO Device in source code for transfer to other PC-based operating systems; incl. executable sample code for SUSE Linux 10, Windows XP Professional and Windows 7	See https://support.industry.siemens.com/cs/de/en/view/109480928
IE TP Cord RJ45/RJ45 TP cable 4 x 2 with 2 RJ45 connectors	
• 0.5 m	**6XV1870-3QE50**
• 1 m	**6XV1870-3QH10**
• 2 m	**6XV1870-3QH20**
• 6 m	**6XV1870-3QH60**

More information

The DK-16xx PN IO Development Kit is available on the Internet at:
https://support.industry.siemens.com/cs/de/en/view/109480928

Overview

The RUGGEDCOM RM1224 is a small form-factor industrial 4G cellular router with integrated switch, which enables secure and cost effective connections to and from remote applications.

Features

- 4 copper fast Ethernet ports
- Available with LTE-Modem for Europe and North America
- 2 SMA antenna connectors for MIMO and diversity
- Digital in/out (I/O)
- Redundant Power Supply Inputs 24 V DC
- For use at ambient temperatures from -40 °C to +70 °C without the use of fans

Product versions

RUGGEDCOM RM1224

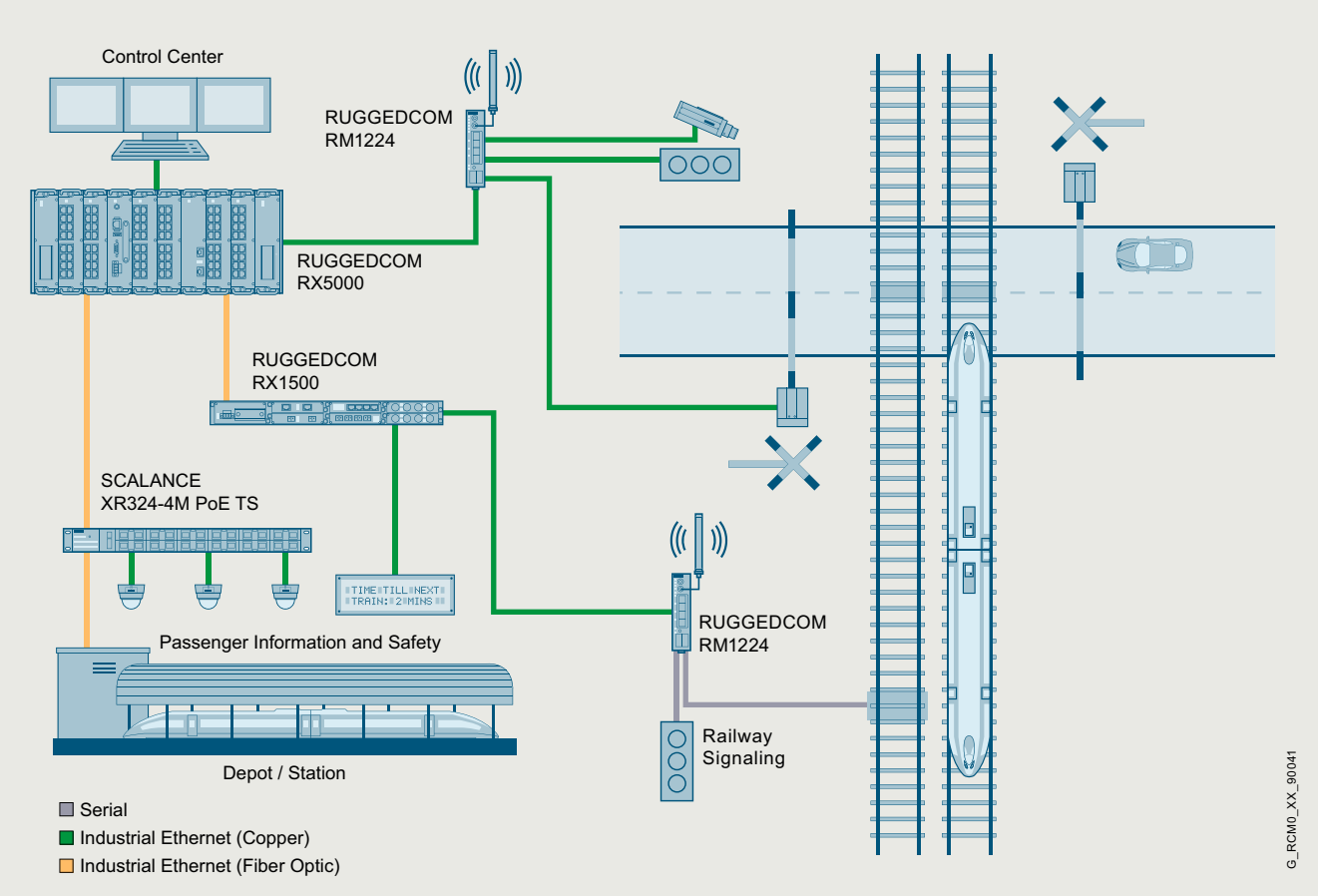
- Small form-factor industrial Ethernet-switch and TCP/IP router with LTE WAN option

Benefits

- Economical industrial graded cellular modem designed for space-saving integration in the cabinet
- Two antenna connectors for reliable wireless transmission
- Supports SINEMA Remote Connect
- Built-in Digital I/O which enables push-button VPN connectivity
- Robust plastic housing which fulfills a critical safety requirement in order to avoid using grounding in Mid & Low Voltage installations

RUGGEDCOM RM1224

Integration



Redundant connection to end-devices used in conjunction with signaling and monitoring when wireline backhaul is combined with cellular connectivity.

Selection and ordering data

Version	Article No.
RUGGEDCOM RM1224 The RUGGEDCOM RM1224 is a small form-factor industrial Ethernet-switch and TCP/IP router with 4 copper Ethernet ports, 1 digital I/O, and cellular LTE modem.	
• **RUGGEDCOM RM1224-EU**	**6GK6108-4AM00-2BA2**
• **RUGGEDCOM RM1224-NAM**	**6GK6108-4AM00-2DA2**

More information

To assist in selecting the right RUGGEDCOM products as well as configuration of variants, the RUGGEDCOM Selector is available at:
http://www.siemens.com/ruggedcom-selector

Overview

SCALANCE MUM856-1 are mobile wireless routers for high-performance and secure connection of Ethernet-based subnets and automation devices via mobile wireless networks with 5G, 4G (LTE) and 3G (UMTS). The devices can also be integrated as user equipment in private 5G networks.

SCALANCE MUM856-1 supports 5G Release 15. The device enables high transmission rates of up to 1000 Mbps in the downlink and up to 500 Mbps in the uplink.

Thanks to IPv6 support, the devices can also be connected to modern mobile wireless networks.

With an integrated firewall, the mobile routers offer data traffic control and thereby help protect against unauthorized access. Authentication of communication partners and encryption of transmitted data are performed via VPN, thus protecting against espionage and manipulation. The 5G routers offer a digital input and output. The digital output can be controlled remotely and used for example to put a remote device to sleep.

Features

- Rugged IP65 metal enclosure
- Wall mounting, top hat DIN rail mounting with adapter or top hat DIN rail mounting in control cabinet with angle adapter
- 1 x M12 Gbit Ethernet interface with 1x10/100/1000 Mbps, can also be used for power supply of the device via Power over Ethernet (PoE)
- M12 connector for redundant connection to the 24 V DC supply voltage
- Combined M12 connector for one digital input/output
- 4 x N-Connect antenna port
- Diagnostics LEDs for modem status, field strength, connection control, and DI/DO channels
- SET button
- CLP slot for connection of a removable data storage medium
- Micro SIM card slot on the back of the device

Product versions

SCALANCE MUM856-1 (EU):

- Support for 5G (downlink: up to 1000 Mbps, uplink: up to 500 Mbps)
- EU radio approval, further approvals available soon
- Without 5G network automatic switching to 4G or 3G
- Connection to SINEMA Remote Connect via VPN
- Rugged design in IP65 enclosure also enables use outside the control cabinet
- Power supply of the device also possible via Power over Ethernet (PoE)
- Meets the railway standards EN 50155, EN 45545 and EN 5012
- Ambient temperature -30 °C to +60 °C

Technical specifications

Article number	**6GK5856-2EA00-3DA1**
Product type designation	SCALANCE MUM856-1 (EU)
Transfer rate	
Transfer rate	10/100/1000 Mbit/s
• with UMTS transmission with downlink maximum	42 Mbit/s
• with UMTS transmission with uplink maximum	5.76 Mbit/s
• for LTE transmission with downlink maximum	1000 Mbit/s
• for LTE transmission with uplink maximum	200 Mbit/s
• for 5G transmission with downlink maximum	1000 Mbit/s
• for 5G transmission with uplink maximum	500 Mbit/s
Interfaces	
Number of electrical/optical connections for gigabit Ethernet maximum	1
Number of electrical connections	
• for network components or terminal equipment	1
Number of electrical connections	
• for external antenna(s)	4
• for operator console	1
• for management purposes	1
Type of electrical connection	
• for network components or terminal equipment	M12 (8-pin, X-coded), PoE
• for redundant voltage supply	M12 (4-pin, L-coded)
Memory	
Number of slots for Micro-SIM card	1
Design of the removable storage CLP	Yes

SCALANCE MUM856-1

Article number	**6GK5856-2EA00-3DA1**
Product type designation	SCALANCE MUM856-1 (EU)
Signal inputs/outputs	
Number of digital inputs	1
Number of digital outputs	1
Type of electrical connection at the digital inputs/outputs	M12 (4-pin, A-coded)
Signal range	
• at digital input	DC, -30 V ... 30 V
• at digital output	DC 24 V/0.5 A
Operational current of the signaling contacts at DC at 30 V maximum	0.008 A
WAN connection	
Type of wireless network is supported	5G public networks, 5G private networks, LTE, UMTS
Type of mobile wireless service is supported	HSDPA, HSUPA, HSPA+
Frequency band is supported	
• 5G Non-Standalone (NSA)	n1, n3, n7, n20, n28, n38, n41, n77, n78, n79
• LTE	B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B29, B30, B32, B66, B71, B34, B38, B39, B40, B41, B42, B43, B46, B48
• UMTS	B1, B2, B3, B4, B5, B8
Supply voltage, current consumption, power loss	
Supply voltage from Power-over-Ethernet according to IEEE802.3at for type 1 and IEEE802.3af	48 V
Type of voltage of the supply voltage	redundant supply, DC, 24 V, M12, L-coded
Consumed current	
• at DC at 24 V typical	0.55 A
• with Power-over-Ethernet according to IEEE802.3at for type 1 and IEEE802.3af typical	0.27 A
Power loss (W)	
• at DC at 24 V typical	13.2 W
• with Power-over-Ethernet according to IEEE802.3at for type 1 and IEEE802.3af typical	12.96 W
Type of voltage 1 of the supply voltage	DC
• supply voltage 1 rated value	24 V
Type of voltage 2 of the supply voltage	DC
• supply voltage 2 rated value	24 V
Type of voltage 3 of the supply voltage	DC, PoE
• supply voltage 3 rated value	48 V
Ambient conditions	
Ambient temperature	
• during operation	-30 ... +65 °C
• during storage	-40 ... +85 °C
relative humidity at 25 °C during operation maximum	95%
Protection class IP	IP65
Design, dimensions and weights	
Depth	45 mm
Height	179 mm
Width	166 mm
Net weight	1100 g
Fastening method	Wall mounting, mounting on a DIN rail with a separate mounting adapter
• 35 mm top hat DIN rail mounting	Yes
• wall mounting	Yes
Product features, product functions, product components general	
Product function	
• DynDNS client	Yes
• no-ip.com client	Yes

Article number	**6GK5856-2EA00-3DA1**
Product type designation	SCALANCE MUM856-1 (EU)
Product functions management, configuration, engineering	
Product function	
• CLI	Yes
• web-based management	Yes
• MIB support	Yes
• TRAP via email	Yes
Protocol is supported	
• Telnet	Yes
• HTTP	Yes
• HTTPS	Yes
type of configuration	web-based management
Product functions diagnostics	
Protocol is supported	
• SNMP v1	Yes
• SNMP v2	Yes
• SNMP v2c	Yes
• SNMP v3	Yes
Product function	
• statistic packet size	No
• statistic packet type	No
• error statistics	No
• SysLog	Yes
• packet filter log	Yes
Product functions DHCP	
Product function	
• DHCP client	Yes
• DHCP server - internal network	Yes
Product functions routing	
router function	
• NAT (IP masquerading)	Yes
• port forwarding	Yes
• NAT traversal	Yes
• 1:1 NAT	Yes
• DNS cache	Yes
Product functions security	
suitability for operation Virtual Private Network	Yes
firewall version	Statefull Inspection
Product function	
• password protection	Yes
• packet filter	Yes
• broadcast/multicast/unicast limiter	No
• broadcast blocking	No
• with VPN connection	IPsec, OpennVPN (as client)
number of possible connection with VPN connection	20
type of authentication with Virtual Private Network/PSK	Yes
Protocol is supported	
• IPsec tunnel and transport mode	Yes
Key length	
• 1 with IPsec AES with Virtual Private Network	128 bit
• 2 with IPsec AES with Virtual Private Network	192 bit
• 3 with IPsec AES with Virtual Private Network	256 bit
• with IPsec 3DES with Virtual Private Network	168 bit
Type of internet key exchange with Virtual Private Network	
• main mode	Yes
• quick mode	Yes
Type of packet authentication with Virtual Private Network	MD5, SHA-1, SHA-256, SHA-384, SHA-512
IETF profile with Virtual Private Network/X.509v3 certificate	Yes

SCALANCE MUM856-1

Article number	**6GK5856-2EA00-3DA1**
Product type designation	SCALANCE MUM856-1 (EU)
Product functions time	
Protocol is supported	
• NTP	Yes
• SNTP	Yes
Standards, specifications, approvals	
Certificate of suitability	
• EC Declaration of Conformity	Yes
• CE marking	Yes
• Power-over-Ethernet according IEEE802.3at for type 1 and IEEE802.3af	Yes

Selection and ordering data

	Version	Article No.
	SCALANCE MUM856-1 (EU) Mobile wireless router for wireless IP communication of Industrial Ethernet-based applications via public 3/4/5G mobile wireless networks and private 5G networks, VPN, firewall, NAT, IPv6, and connection to SINEMA Remote Connect via CLP.	
	• SCALANCE MUM856-1 (EU)	**6GK5856-2EA00-3DA1**

More information

To assist in selecting the right RUGGEDCOM products as well as configuration of variants, the RUGGEDCOM Selector is available at:
http://www.siemens.com/ruggedcom-selector

Overview

SCALANCE M876-4 is a mobile wireless router for cost-effective and secure connection of Ethernet-based subnets and programmable controllers via mobile networks of the 4th (LTE), 3rd (UMTS) or 2nd (GSM) generation.

SCALANCE M876-4 supports LTE (Long Term Evolution). As a result, high transmission rates of up to 100 Mbps in the downlink and up to 50 Mbps in the uplink are possible (depending on the infrastructure of the mobile wireless provider).

Secure access and communication is ensured by the security functions of the integrated firewall and by VPN tunnels (end-to-end encryption of the communication connection by creation of IPsec tunnels).

Product versions

SCALANCE M876-4 (EU)

- Pentaband LTE with frequency bands 800/900/1800/2100/2600 MHz
- Support of LTE (Downlink: up to 100 Mbps, uplink: up to 50 Mbps)
- Optimized for use in Europe
- Without LTE network, automatic switchover to UMTS (HSPA+) or GSM (EDGE, eGPRS or GPRS mode) data services

SCALANCE M876-4 (NAM)

- Pentaband LTE with frequency bands 700/850/AWS-1 (1700/2100)/1900 MHz
- Support of LTE (Downlink: up to 100 Mbps, uplink: up to 50 Mbps)
- Optimized for use in North America
- Without LTE network, automatic switchover to UMTS (HSPA+) or GSM (EDGE, eGPRS or GPRS mode) data services

Technical specifications

Article number	**6GK5876-4AA00-2BA2**	**6GK5876-4AA00-2DA2**
Product type designation	SCALANCE M876-4 (EU)	SCALANCE M876-4 (NAM)
Transmission rate		
Transmission rate	10 Mbps, 100 Mbps	10 Mbps, 100 Mbps
• GPRS transmission, in downlink, maximum	85.6 Kbps	85.6 Kbps
• GPRS transmission, in uplink, maximum	85.6 Kbps	85.6 Kbps
• eGPRS transmission, in downlink, maximum	236.8 Kbps	236.8 Kbps
• eGPRS transmission, in uplink, maximum	236.8 Kbps	236.8 Kbps
• UMTS transmission, in downlink, maximum	14.4 Mbps	14.4 Mbps
• UMTS transmission, in uplink, maximum	5.76 Mbps	5.76 Mbps
• LTE transmission, in downlink, maximum	100 Mbps	100 Mbps
• LTE transmission, in uplink, maximum	50 Mbps	50 Mbps
Interfaces		
Number of electrical connections		
• for internal network	4	4
• for external network	2	2
• for power supply	2	2
Type of electrical connection		
• for internal network	RJ45 port (10/100 Mbps, TP, autocrossover)	RJ45 port (10/100 Mbps, TP, autocrossover)
• for external network	SMA antenna socket (50 ohms)	SMA antenna socket (50 ohms)
• for power supply	Terminal strip	Terminal strip
Signal inputs/outputs		
Number of electrical connections		
• for digital input signals	1	1
• for digital output signals	1	1
Type of electrical connection		
• for digital input signals	Terminal strip	Terminal strip
• for digital output signals	Terminal strip	Terminal strip
WAN connection		
Type of wireless network is supported	GSM, UMTS, LTE	GSM, UMTS, LTE
Type of mobile wireless service is supported	GPRS, eGPRS, HSPA+	GPRS, eGPRS, HSPA+
Operating frequency for GSM transmission	900 MHz, 1800 MHz	850 MHz, 900 MHz, 1800 MHz, 1900 MHz
Operating frequency for UMTS transmission	900 MHz, 1800 MHz, 2100 MHz	850 MHz, AWS-1 (1700/2100 MHz), 1900 MHz
Operating frequency for LTE transmission	800 MHz, 900 MHz, 1800 MHz, 2100 MHz, 2600 MHz	700 MHz, 850 MHz, AWS-1 (1700/2100 MHz), 1900 MHz

SCALANCE M876-4

Article number	**6GK5876-4AA00-2BA2**	**6GK5876-4AA00-2DA2**
Product type designation	SCALANCE M876-4 (EU)	SCALANCE M876-4 (NAM)
Supply voltage, current consumption, power loss		
Supply voltage, nominal value	24 V	24 V
Supply voltage, rated value	10.8 ... 28.8	10.8 ... 28.8
Type of supply voltage	DC	DC
Current consumed at nominal value of supply voltage, maximum	330 mA	330 mA
Power loss [W]		
• Typical	8 W	8 W
Permissible ambient conditions		
Ambient temperature		
• during operation	-20 ... +60 °C	-20 ... +60 °C
• during storage	-40 ... +85 °C	-40 ... +85 °C
Relative humidity at 25 °C during operation, maximum	95%	95%
IP degree of protection	IP20	IP20
Design, dimensions and weights		
Model	Compact	Compact
Depth	127 mm	127 mm
Height	147 mm	147 mm
Width	35 mm	35 mm
Mounting type		
• 35 mm DIN rail mounting	Yes	Yes
• S7-300 rail mounting	Yes	Yes
• S7-1500 rail mounting	Yes	Yes
• Wall mounting	Yes	Yes
Product properties, functions, components - General		
Product function		
• DynDNS client	Yes	Yes
• no-ip.com client	Yes	Yes
Product functions - Management, configuration, engineering		
Product function		
• CLI	Yes	Yes
• Web-based management	Yes	Yes
• MIB support	Yes	Yes
• TRAPs via e-mail	Yes	Yes
Protocol is supported		
• Telnet	Yes	Yes
• HTTP	Yes	Yes
• HTTPS	Yes	Yes
Type of configuring	Web-based management	Web-based management
Product functions - Diagnostics		
Protocol is supported		
• SNMP v1	Yes	Yes
• SNMP v2	Yes	Yes
• SNMP v2c	Yes	Yes
• SNMP v3	Yes	Yes
Product function		
• Packet size statistics	No	No
• Packet type statistics	No	No
• Error statistics	No	No
• SysLog	Yes	Yes
• Packet filter log	Yes	Yes
Product functions - DHCP		
Product function		
• DHCP client	Yes	Yes
• DHCP server - internal network	Yes	Yes
Product functions - Routing		
Router function		
• NAT (IP masquerading)	Yes	Yes
• Port forwarding	Yes	Yes
• NAT traversal	Yes	Yes
• 1:1 NAT	Yes	Yes
• DNS cache	Yes	Yes
Product functions - Security		
Suitability for use of virtual private network	Yes	Yes
Type of firewall	Stateful inspection	Stateful inspection
Product function		
• Password protection	Yes	Yes
• Packet filter	Yes	Yes
• Broadcast/Multicast/Unicast Limiter	No	No
Product function		
• Broadcast blocking	No	No
• with VPN connection	IPsec, OpenVPN (as client for SINEMA RC)	IPsec, OpenVPN (as client for SINEMA RC)

Article number	**6GK5876-4AA00-2BA2**	**6GK5876-4AA00-2DA2**
Product type designation	SCALANCE M876-4 (EU)	SCALANCE M876-4 (NAM)
Number of possible connections when using VPN connection	20	20
PSK authentication method when using virtual private network	Yes	Yes
Protocol is supported		
• IPsec tunnel and transport mode	Yes	Yes
Key length		
• 1 with IPsec AES and virtual private network	128 bits	128 bits
• 2 with IPsec AES and virtual private network	192 bits	192 bits
• 3 with IPsec AES and virtual private network	256 bits	256 bits
• with IPsec 3DES and virtual private network	168 bits	168 bits
Internet key exchange mode when using virtual private network		
• Main mode	Yes	Yes
• Quick mode	Yes	Yes
Packet authentication method when using virtual private network	MD5, SHA-1, SHA-256, SHA-384, SHA-512	MD5, SHA-1, SHA-256, SHA-384, SHA-512
IETF profile X.509v3 certificate when using virtual private network	Yes	Yes
Product functions - Time of day		
Protocol is supported		
• NTP	Yes	Yes
• SNTP	Yes	Yes
Standards, specifications, approvals		
Standard		
• for EMC	ETSI EN 301 489-1, ETSI EN 301 489-7, ETSI EN 301 489-24, EN 61000-6-2, EN 61000-6-4	FCC CFR 47, Part 15, Subpart B
• for FM		FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4
• for safety, from CSA and UL		UL 60950-1, CAN/CSA C22.2 No. 60950-1-07, UL E115352 Vol. X2
• for hazardous zone	EN 60079-15, EN 60079-0, II 3 G Ex nA IIC T4 Gc, KEMA 07ATEX0145 X	
• for hazardous zone, from CSA and UL		ANSI/ISA 12.12.01-2013, CAN/CSA C22.2 No.213-M1987, CL. 1, Div. 2, GP A,B,C,D, T4 / CL. 1, Zone 2, GP IIC
• for emitted interference	ETSI EN 301 489-1, ETSI EN 301 489-7, ETSI EN 301 489-24, EN 61000-6-4	
• for noise immunity	ETSI EN 301 489-1, ETSI EN 301 489-7, ETSI EN 301 489-24, EN 61000-6-2	
Proof of suitability		
• CE mark	Yes	Yes
• Railway application in accordance with EN 50121-3-2	Yes	Yes
• Railway application in accordance with EN 50121-4	Yes	Yes
• Railway application in accordance with EN 50155	Yes; no coated printed-circuit boards	Yes; no coated printed-circuit boards
Standards, specifications, approvals product conformity		
MTBF at 40 °C	55 y	55 y

Selection and ordering data

Version	Article No.
Mobile wireless router SCALANCE M876	
Mobile wireless router for wireless IP communication of Industrial Ethernet-based subnets and programmable controllers via LTE, UMTS or GSM mobile networks; with integrated firewall and VPN with IPsec (OpenVPN for connection to SINEMA RC); 4 x RJ45 ports, 2 x antenna port	
• **SCALANCE M876-4 (EU)** [1]	**6GK5876-4AA00-2BA2**
• **SCALANCE M876-4 (NAM)** [1]	**6GK5876-4AA00-2DA2**
Accessories	
Lightning Protector LP798-1N	**6GK5798-2LP00-2AA6**
Lightning protector with N/N female/female connection, IP67 (-40 to +85 °C),frequency range: 0 ... 6 GHz	
N-Connect male/male flexible connection cable, pre-assembled	
suitable for railway applications; flexible cable, for example, for the connection to antennas, suitable for IWLAN and mobile radio	
• length 1 m	**6XV1875-5SH10**
• length 2 m	**6XV1875-5SH20**
• length 5 m	**6XV1875-5SH50**

Version	Article No.
N-Connect/ SMA male/male Flexible connection cable pre-assembled	
suitable for railway applications; flexible connecting cable e.g. for SCALANCE M antenna	
• length 1 m	**6XV1875-5UH10**
• length 2 m	**6XV1875-5UH20**
• length 5 m	**6XV1875-5UH50**
SIMATIC NET N-Connect/N-Connect Female/Female Panel Feedthrough	**6GK5798-2PP00-2AA6**
Cabinet feedthrough for wall thicknesses up to 4.5 mm,two N-Connect female connections	
C-PLUG	**6GK1900-0AB00**
Removable data storage medium for easy replacement of devices under fault conditions; for storing configuration and application data; can be used in SIMATIC NET products with C-PLUG slot	
KEY-PLUG SINEMA RC	**6GK5908-0PB00**
Removable data storage medium for activating the connection to SINEMA Remote Connect for S615 and SCALANCE M874-x and M876-x, for easy device replacement under fault conditions, and for storing configuration data.	
SCALANCE M Desktop Pedestal	**6GK5898-8MD00**
SCALANCE M-800 desktop pedestal for table mounting for SCALANCE M812 / M816 / M874-x / M876-x / S615	
IE TP Cord RJ45/RJ45	
TP cable 4 x 2 with 2 RJ45 plugs	
• 0.5 m	**6XV1870-3QE50**
• 1 m	**6XV1870-3QH10**
• 2 m	**6XV1870-3QH20**
• 6 m	**6XV1870-3QH60**
• 10 m	**6XV1870-3QN10**
IE TP Train Cable GP 2x2 (Type C)	**6XV1871-2T**
4-core, shielded TP installation cable for connection to IE FC outlet RJ45/IE FC RJ45 plug 180/90 for train applications: PROFINET-compliant; sold by the meter; maximum delivery unit 1000 m, minimum order quantity 20 m	
IE Train Cable GP 4x2	**6XV1878-2T**
8-core, shielded TP installation cable for connection to IE FC M12 Plug PRO 4x2 for use in railway applications; with railway approval; sold by the meter; maximum delivery unit 1000 m, minimum order quantity 20 m	

[1] Note national approvals under
http://www.siemens.com/mobilenetwork-approvals

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More information

You can find more information on remote networks on the Internet at:
http://www.siemens.com/remote-networks

You will find more information on industrial security on the Internet at:
http://www.siemens.com/industrialsecurity

Selection tool:

Our TIA Selection Tool is available to assist you in selecting the right remote networks products:
http://www.siemens.com/tia-selection-tool

Overview

Remote antennas increase the reliability of wireless links by optimizing signal reception and emission.

- Used for routers, modems and communications processors for the mobile network standards GSM/GPRS (2G), UMTS (3G), LTE (4G)

Benefits

- Cost-effective connection to devices in remote, difficult-to-access or hostile environments
- Establishment of a reliable mobile network infrastructure through the use of remote antennas, even if the mobile network devices are installed in the control cabinet, for example

Application

Remote antennas optimize transmission and reception conditions and enable use of remote network products in a large number of industrial applications.
In addition to antennas with directional radiation characteristics, omnidirectional antennas concentrate the radio field around the antenna in the shape of a disc. Both designs therefore result in improved radio communication quality.

Technical specifications

Article No.	**6GK5896-6MH00-0AA0**
Product type designation	Antenna ANT896-6MH
Radio frequencies	
Type of wireless network is supported	GSM, UMTS, LTE
Operating frequency	
• For WLAN in 2.4 GHz frequency band	2.4 … 2.7 GHz
Operating frequency	700 MHz, 800 MHz, 850 MHz, 900 MHz, 1575.42 MHz, 1700 MHz, 1800 MHz, 1900 MHz, 2100 MHz, 2600 MHz
Electrical specifications	
Impedance	50 ohms
Polarization	Linear vertical
Radiation characteristic	Omnidirectional
Antenna gain compared with the spherical radiator	
• With linear radiation	5 dB
Voltage standing wave ratio (VSWR), max.	2.2
Radiating angle of the antenna	
• Horizontal	360°
Number of electrical connections of the antenna	1
Design of the electrical connection of the antenna	N-connector
Connection version	Female
Transmit power, maximum	100 W; at 50 °C ambient temperature
Permissible ambient conditions	
Ambient temperature	
• during operation	-40 ... +85 °C
• during storage	-40 ... +85 °C
IP degree of protection	IP69K
Maximum wind load	Survival at 500 km/h

ANT896-6MH

Article No.	**6GK5896-6MH00-0AA0**
Product type designation	Antenna ANT896-6MH
Design, dimensions and weight	
Width	100 mm
Height	40 mm
Depth	145 mm
Net weight	0.488 kg
Mounting type	
• Flat-roof mounting	Yes
• Directly on the device	No
Product properties, functions, components - General	
Product property silicone-free	Yes
Standards, specifications, approvals	
Certificate of suitability	Railway application acc. to DIN5510-2, BS6853, NF-F-16-101, NF-F-16-102
Certificate of suitability	
• RoHS compliance	Yes
• Railway application in accordance with EN 50155	Yes
• Fire protection in accordance with EN 45545-2	Yes
Wireless approval	Current national approvals can be found on the Internet under www.siemens.com/wireless-approvals

Selection and ordering data

Version	Article No.
2G/3G/4G Antenna ANT896-6MH Omnidirectional mobile radio antenna for GSM (2G), UMTS (3G) and LTE (4G) networks; suitable for railway applications; omnidirectional characteristic; with N-female connector; mounting on vehicle roof; antenna gain 5/6 dBi, IP69K	**6GK5896-6MH00-0AA0**
Accessories	
Lightning Protector LP798-1N Lightning protection element with N/N Female/female connection, IP66/68 (-40...+85 °C), 0...6 GHz; with gas discharge technology for SCALANCE W and M antennas, compact instructions as hard copy German/English	**6GK5798-2LP00-2AA6**
N-Connect Female/female Panel feedthrough cabinet bushing, 2.4 GHz and 5 GHz for Wall thickness max. 4.5 mm.	**6GK5798-2PP00-2AA6**
N-Connect male/male flexible connection cable pre-assembled flexible cable, for example, for the connection to antennas, suitable for IWLAN and mobile radio	
• length 1 m	**6XV1875-5AH10**
• length 2 m	**6XV1875-5AH20**
• length 5 m	**6XV1875-5AH50**
• length 10 m	**6XV1875-5AN10**
N-Connect/SMA male/ male flexible connection cable pre-assembled flexible connecting cable SCALANCE M antenna	
• length 0,3 m	**6XV1875-5LE30**
• length 1 m	**6XV1875-5LH10**
• length 2 m	**6XV1875-5LH20**
• length 5 m	**6XV1875-5LH50**

More information

Cabling range:

Pre-assembled connecting cables for IRC products can be found in the Industry Mall under Antenna Connection System.

You can order components supplementary to the SIMATIC NET cabling range from your local contact. Technical advice on this subject is available from:

J. Hertlein
PD PA CI PRM 4
Phone: +49 (911) 750 44 65
E-Mail: juergen.hertlein@siemens.com

Overview

- Industrial Wireless LAN access points for installation in control cabinets or in indoor areas with support of IEEE 802.11a/b/g/h/n and data rates of up to 300 Mbps

Design

- Low-profile, compact aluminum housing, shock and vibration resistant for stringent mechanical requirements
- Special coating of the printed circuit boards (conformal coating)
- Resistant to condensation
- Railroad approval in accordance with EN 50155
- Degree of protection IP30
- For use at ambient temperatures from -30 ... +65 °C
- Support of 2.4 GHz and 5 GHz frequency bands
- 2 x R-SMA sockets for connection of directly mountable and remote antennas
- Optimized antenna placement for 2x2 MIMO technology; antennas do not interfere with each other when mounted directly on the device
- 2 x M12 connections for 10/100 Mbps, one with Power-over-Ethernet according to IEEE 802.3at
- 1 x M12 socket for power supply (24 V DC)
- 1 x PLUG slot (KEY-PLUG/C-PLUG)
- Function LEDs for optical signaling of faults and operating states
- Mounting: Wall, S7-1500 mounting rail, S7-300 mounting rail or 35 mm standard mounting rail
- A wireless card is permanently installed in the device; functional scope can be expanded by using a KEY-PLUG W780 iFeatures

Function

The SCALANCE W774-1 M12 EEC (Extended Environmental Conditions) access points are designed for use in a railway environment. The devices are EN 50155-approved for railway applications and can thus be used for rail traffic. Combined with antennas approved for the rail sector, which are connected via R-SMA antenna connections (female), these products can be used to set up a reliable IWLAN infrastructure.

The devices can be mounted at an optimal location for the wireless link. The housing and the connection plugs are resistant to high shock and vibration loads because all the connections are screwed or locked. The SCALANCE W774 M12 EEC is ideally suited for environments in which a compact size is important. Through its coated printed-circuit boards (conformal coating), the module is resistant to condensation caused, for example, by use in environments with large temperature variations.

SCALANCE W774-1 M12 EEC access points can also be operated as client modules.

Provided that a time delay (several 100 ms), which arises from the roaming defined in IEEE 802.11, is tolerated by all communication stations following a change from one radio cell to another, the communication continues uninterrupted.

For real-time requirements, the SCALANCE W774-1 M12 EEC can be equipped with KEY-PLUG functionality for activating iFeatures.

SCALANCE W774-1 M12 EEC

Technical specifications

Article number	**6GK5774-1FY00-0TA0,** **6GK5774-1FY00-0TB0** [1)]
Product type designation	SCALANCE W774-1 M12 EEC
Transmission rate	
Transmission rate • on WLAN, maximum • on Industrial Ethernet	 300 Mbps 10 Mbps, 100 Mbps, 10 Mbps, 100 Mbps
Interfaces	
Number of electrical connections • for network components or data terminal equipment • for power supply • for redundant power supply	 2 1 1
Type of electrical connection • for network components or data terminal equipment • for power supply	 M12 interface (4-pin, D-coded), PoE M12 interface (4-pin, A-coded)
Type of removable data storage medium • C-PLUG • KEY-PLUG	 Yes Yes
Wireless interfaces	
Number of permanently installed wireless cards	1
Type of transmission for multiple input multiple output (MIMO)	2x2
Number of spatial streams	2
Number of electrical connections for external antenna(s)	2
Type of electrical connection for external antenna(s)	R-SMA (socket)
Product property: external antenna can be mounted directly on device	Yes
Supply voltage, current consumption, power loss	
Type of supply voltage	DC
Supply voltage 1 • from M12 power connector (A-coded) for redundant power supply	 16.8 V
Supply voltage 2 • from M12 power connector (A-coded) for redundant power supply	 31.2 V
Supply voltage • from Power-over-Ethernet in accordance with IEEE802.3at for Type 1 and IEEE802.3af	 48 V
Permissible ambient conditions	
Ambient temperature • during operation • during storage • during transport	 -30 ... +65 °C -40 ... +85 °C -40 ... +85 °C
Relative humidity at 25 °C, without condensation during operation, maximum	100%
Ambient conditions for operation	When used under explosion protection conditions (Zone 2), the SCALANCE W744-1 M12 EEC product must be installed in an enclosure with at least IP54 degree of protection according to EN 60529 within the jurisdiction of EN 50021.
IP degree of protection	IP30
Design, dimensions and weights	
Width	26 mm
Height	156 mm
Depth	127 mm
Width of housing without antenna	26 mm
Height of housing without antenna	147 mm
Depth of housing without antenna	127 mm
Net weight	0.52 kg
Product property: conformal coating	Yes
Mounting type • S7-300 rail mounting • S7-1500 rail mounting • Wall mounting	Wall mounting only when mounted flat Yes Yes Yes
Radio frequencies	
Operating frequency • for WLAN in 2.4 GHz frequency band • for WLAN in 5 GHz frequency band	 2.41 ... 2.48 GHz 4.9 ... 5.8 GHz

Article number	**6GK5774-1FY00-0TA0, 6GK5774-1FY00-0TB0** [1]
Product type designation	SCALANCE W774-1 M12 EEC
Product properties, functions, components - General	
Product function - Access point mode	Yes
Product function - Client mode	Yes
Number of SSIDs	4
Product function	
• Dual client	No
• iPCF access point	Yes; only in combination with the 'KEY-PLUG W780 iFeatures'
• iPCF client	Yes; only in combination with the 'KEY-PLUG W740 iFeatures'
• iPCF-MC access point	No
• iPCF-MC client	Yes; only in combination with the 'KEY-PLUG W740 iFeatures'
Number of iPCF-enabled wireless modules	1
Product function - iREF	No
Number of iREF-enabled wireless modules	0
Product functions - Management, configuration, engineering	
Number of manageable IP addresses in the client	8
Product function	
• CLI	Yes
• Web-based management	Yes
• MIB support	Yes
• TRAPs via e-mail	Yes
• Configuration with STEP 7	Yes
• Configuration with STEP 7 in the TIA Portal	Yes
• Forced roaming with IWLAN	No
• WDS	Yes
Protocol is supported	
• Address Resolution Protocol (ARP)	Yes
• ICMP	Yes
• Telnet	Yes
• HTTP	Yes
• HTTPS	Yes
• TFTP	Yes
• DCP	Yes
• LLDP	Yes
Identification & Maintenance function	
• I&M0 - Device-specific information	Yes
• I&M1 - Higher level designation/location designation	Yes
Product functions - Diagnostics	
Product function	
• PROFINET IO diagnostics	Yes
• Link check	No
• Connection monitoring IP-Alive	No
• Localization using Aeroscout	No
• SysLog	Yes
Protocol is supported	
• SNMP v1	Yes
• SNMP v2	Yes
• SNMP v3	Yes
Product functions - VLAN	
Product function	
• VLAN function for IWLAN	Yes
Product functions - DHCP	
Product function	
• DHCP client	Yes
• In Client Mode, DHCP server via LAN	No
Product functions - Redundancy	
Protocol is supported	
• STP/RSTP	Yes
Product functions - Security	
Product function	
• ACL - MAC-based	No
• Management security with IP-based ACL	Yes
• IEEE 802.1X (RADIUS)	Yes
• NAT/NAPT	No
• Access protection in accordance with IEEE802.11i	Yes
• WPA/WPA2	Yes
• TKIP/AES	Yes
Protocol is supported	
• SSH	Yes
Product functions - Time of day	
Protocol is supported	
• SNTP	Yes
• SIMATIC Time	Yes

SCALANCE W774-1 M12 EEC

Article number	**6GK5774-1FY00-0TA0, 6GK5774-1FY00-0TB0** [1]
Product type designation	SCALANCE W774-1 M12 EEC
Standards, specifications, approvals	
Standard	
• for FM	FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4
• for hazardous zone	EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X
• for safety, from CSA and UL	UL 60950-1, CSA C22.2 No. 60950-1
• for hazardous zone, from CSA and UL	ANSI/ISA 12.12.01-2013, CAN/CSA C22.2 No.213-M1987, CL. CL.1, Div. 2 GP. A,B,C,D, T4 / CL. 1, Zone 2, GP IIC
Proof of suitability	
• EC Declaration of Conformity	Yes
• CE mark	Yes
• C-Tick	Yes
• CCC	No
• E1 approval	Yes
• Railway application in accordance with EN 50155	Yes
• Railway application in accordance with EN 50121-4	Yes
• Fire protection in accordance with EN 45545-2	Yes
• NEMA TS2	No
• IEC 61375	No
• IEC 61850-3	No
• NEMA4X	No
• Power-over-Ethernet in accordance with IEEE802.3at for Type 1 and IEEE802.3af	Yes
• Power-over-Ethernet in accordance with IEEE802.3at for Type 2	Yes
Standard for wireless communication	
• IEEE 802.11a	Yes
• IEEE 802.11b	Yes
• IEEE 802.11e	Yes
• IEEE 802.11g	Yes
• IEEE 802.11h	Yes
• IEEE 802.11i	Yes
• IEEE 802.11n	Yes
Wireless approval	You will find the current list of countries at: www.siemens.com/wireless-approvals
Marine classification association	
• American Bureau of Shipping Europe Ltd. (ABS)	No
• Bureau Veritas (BV)	No
• Det Norske Veritas (DNV)	No
• Germanischer Lloyd (GL)	No
• Lloyds Register of Shipping (LRS)	No
• Nippon Kaiji Kyokai (NK)	No
• Polski Rejestr Statkow (PRS)	No

[1] Wireless approval in the USA

Selection and ordering data

Version	Article No.
SCALANCE W774-1 M12 EEC Access Points	
IWLAN access points with built-in wireless interface; wireless networks IEEE 802.11a/b/g/h/n at 2.4/5 GHz up to 300 Mbps; railway approval in accordance with EN 50155; conformal coating; WPA2/AES; Power over Ethernet (PoE), IP20 degree of protection; scope of delivery: mounting hardware; manual on CD-ROM, German/English	
SCALANCE W774-1 M12 EEC	
IWLAN access point with one built-in wireless interface	
• National approvals for operation outside the U.S.	**6GK5774-1FY00-0TA0**
• National approvals for operation within the U.S.[1)]	**6GK5774-1FY00-0TB0**
Accessories	
KEY-PLUG W780 iFeatures Removable data storage medium for activating additional iFeatures, for easy device replacement under fault conditions and for recording configuration data; can be used in SCALANCE W access points with PLUG slot	**6GK5907-8PA00**
C-PLUG Removable data storage medium for easy replacement of devices under fault conditions; for recording configuration data; can be used in SIMATIC NET products with PLUG slot	**6GK1900-0AB00**
IE FC M12 Plug PRO 2 x 2 M12 plug connector (D-coded, IP65/IP67) that can be assembled in the field, metal enclosure, FastConnect connection method, for SCALANCE W774-1 M12 EEC	
• 1 unit	**6GK1901-0DB20-6AA0**
• 8 units	**6GK1901-0DB30-6AA8**
IE TP Train Cable GP 2x2 (Type C) 4-core, shielded TP installation cable for connection to IE FC outlet RJ45/IE FC RJ45 plug 180/90 for train applications: PROFINET-compliant; sold by the meter; maximum delivery unit 1000 m, minimum order quantity 20 m	**6XV1871-2T**
IE FC Stripping Tool Preset insulation stripping tool for fast stripping of Industrial Ethernet FC cables	**6GK1901-1GA00**
Power M12 Cable Connector PRO Connector socket for connection of SCALANCE W700 for 24 V DC supply voltage; 4-pin, A-coded, with assembly instructions, 3 units	**6GK1907-0DC10-6AA3**
Power Cable 2 x 0.75 Connecting cable for Power M12 Cable Connector PRO, sold by the meter	**6XV1812-8A**
N-Connect/SMA female/female panel feedthrough Cabinet bushing with fastening flange for wall thicknesses up to 5.5 mm, SMA female and N-Connect female connections	**6GK5798-0PT00-2AA0**
N-Connect/N-Connect female/female panel feedthrough Cabinet bushing for wall thicknesses up to 4.5 mm, two N-Connect female connections	**6GK5798-2PP00-2AA6**

1) Note national approvals under http://www.siemens.com/wireless-approvals

More information

Selection tools:

To assist in selecting Industrial Ethernet components, the TIA Selection Tool is available at:
http://www.siemens.com/tia-selection-tool

Wireless approvals:

Current approvals can be found on the Internet at:
http://www.siemens.com/wireless-approvals

SCALANCE W778-1 M12 EEC

Overview

Product variant

SCALANCE W778-1 M12 EEC

- Access point with a permanently installed radio card; functional scope can be expanded using a KEY-PLUG W780 iFeature; 1 radio; 2 N-CON antenna port; IEEE 802.11a/b/g/h/n; 2.4/5 GHz; gross data rate 300 Mbit/s; 2x M12 max. 100 Mbit/s; PoE integrated 2-port switch; redundant 24 V DC; M12 A-coded IP65; -30... 70 °C; plug slot WPA2/802.11i/e

Technical specifications

Article number	6GK5778-1GY00-0TA0	6GK5778-1GY00-0TB0 [1]
Transmission rate		
Transfer rate • with WLAN maximum • for Industrial Ethernet	 300 Mbit/s 10, 100 Mbit/s	 300 Mbit/s 10, 100 Mbit/s
Transfer rate for Industrial Ethernet • minimum • maximum	 10 Mbit/s 100 Mbit/s	 10 Mbit/s 100 Mbit/s
Interfaces		
Number of electrical connections • for network components or terminal equipment • for power supply • for redundant voltage supply	 2 1 1	 2 1 1
Type of electrical connection • for network components or terminal equipment • for power supply	 M12 interface (4-pole, D-coded), PoE M12 interface (4-pole, A-coded)	 M12 interface (4-pole, D-coded), PoE M12 interface (4-pole, A-coded)
design of the removable storage • C-PLUG • KEY-PLUG	 Yes Yes	 Yes Yes
Interfaces wireless		
Number of radio cards permanently installed	1	1
Transmission mode for multiple input multiple output (MIMO)	2x2	2x2
Number of spatial streams	2	2
Number of electrical connections for external antenna(s)	2	2
Type of electrical connection for external antenna(s)	N-Connect (socket)	N-Connect (socket)
Product feature external antenna can be mounted directly on device	Yes	Yes
Supply voltage, current consumption, power loss		
Type of voltage of the supply voltage	DC	DC
Supply voltage 1 • from M12 Power Connector (A-coded) for redundant power supply	16.8 V	16.8 V
Supply voltage 2 • from M12 Power Connector (A-coded) for redundant power supply	31.2 V	31.2 V
Supply voltage • from Power-over-Ethernet acc. to IEEE802.3at for type 1 and IEEE802.3af	48 V	48 V
Consumed current • at DC at 24 V typical • with Power-over-Ethernet acc. to IEEE802.3at for type 1 and IEEE802.3af typical	 0.25 A 0.125 A	 0.25 A 0.125 A
Power loss [W] • at DC at 24 V typical • with Power-over-Ethernet acc. to IEEE802.3at for type 1 and IEEE802.3af typical	 6 W 6 W	 6 W 6 W

[1] Wireless approval in the USA

Article number	6GK5778-1GY00-0TA0	6GK5778-1GY00-0TB0 [1]
Permitted ambient conditions		
Ambient temperature		
• during operation	-30 ... +75 °C	-30 ... +75 °C
• during storage	-40 ... +85 °C	-40 ... +85 °C
• during transport	-40 ... +85 °C	-40 ... +85 °C
Relative humidity at 25 °C without condensation during operation maximum	95 %	95 %
Protection class IP	IP65	IP65
Design, dimensions and weight		
Width	140 mm	140 mm
Height	160 mm	160 mm
Depth	45 mm	45 mm
Width of the enclosure without antenna	140 mm	140 mm
Height of the enclosure without antenna	149 mm	149 mm
Depth of the enclosure without antenna	45 mm	45 mm
Net weight	0.95 kg	0.95 kg
Product feature conformal coating	Yes	Yes
Mounting type		
• S7-300 rail mounting	No	No
• S7-1500 rail mounting	No	No
• 35 mm DIN rail mounting	Yes	Yes
• wall mounting	Yes	Yes
Wireless frequencies		
Operating frequency		
• for WLAN in 2.4 GHz frequency band	2.41 ... 2.48 GHz	2.41 ... 2.48 GHz
• for WLAN in 5 GHz frequency band	4.9 ... 5.8 GHz	4.9 ... 5.8 GHz
Product properties, functions, components general		
Product function Access Point Mode	Yes	Yes
Product function Client Mode	Yes	Yes
Number of SSIDs	4	4
Product function		
• iPCF Access Point	Yes; Only in combination with the 'KEY-PLUG W780 iFeatures'	Yes; Only in combination with the 'KEY-PLUG W780 iFeatures'
• iPCF client	Yes; Only in combination with the 'KEY-PLUG W780 iFeatures' or 'KEY-PLUG W740 iFeatures'	Yes; Only in combination with the 'KEY-PLUG W780 iFeatures' or 'KEY-PLUG W740 iFeatures'
• iPCF-MC Access Point	No	No
• iPCF-MC client	Yes; Only in combination with 'KEY-PLUG W780 iFeatures' or 'KEY-PLUG W740 iFeatures'	Yes; Only in combination with 'KEY-PLUG W780 iFeatures' or 'KEY-PLUG W740 iFeatures'
Number of iPCF-capable radio modules	1	1
Product function iREF	Yes	Yes
Number of iREF-capable radio modules	1	1
Product function iPRP	Yes; In combination with the 'KEY-PLUG W780 iFeatures' only	Yes; In combination with the 'KEY-PLUG W780 iFeatures' only
Product functions management, configuration		
Number of manageable IP addresses in client	8	8
Product function		
• CLI	Yes	Yes
• web-based management	Yes	Yes
• MIB support	Yes	Yes
• TRAPs via email	Yes	Yes
• Configuration with STEP 7	Yes	Yes
• configuration with STEP 7 in the TIA Portal	Yes	Yes
• operation with IWLAN controller	No	No
• operation with Enterasys WLAN controller	No	No
• forced roaming on IP down with IWLAN	Yes	Yes
• forced roaming on link down with IWLAN	Yes	Yes
• WDS	Yes	Yes
Protocol is supported		
• Address Resolution Protocol (ARP)	Yes	Yes
• ICMP	Yes	Yes
• Telnet	Yes	Yes
• HTTP	Yes	Yes
• HTTPS	Yes	Yes
• TFTP	Yes	Yes
• DCP	Yes	Yes
• LLDP	Yes	Yes
Identification & maintenance function		
• I&M0 - device-specific information	Yes	Yes
• I&M1 – higher-level designation/location designation	Yes	Yes

[1] Wireless approval in the USA

SCALANCE W778-1 M12 EEC

Article number	6GK5778-1GY00-0TA0	6GK5778-1GY00-0TB0 [1]
Product functions Diagnosis		
Product function		
• PROFINET IO diagnosis	Yes	Yes
• Link Check	No	No
• connection monitoring IP-Alive	No	No
• localization via Aeroscout	Yes	Yes
• SysLog	Yes	Yes
Protocol is supported		
• SNMP v1	Yes	Yes
• SNMP v2	Yes	Yes
• SNMP v3	Yes	Yes
Product functions VLAN		
Product function		
• function VLAN with IWLAN	Yes	Yes
Product functions DHCP		
Product function		
• DHCP client	Yes	Yes
• in Client Mode DHCP server via LAN	Yes	Yes
• DHCP Option 82	Yes	Yes
Product functions Redundancy		
Protocol is supported		
• STP/RSTP	Yes	Yes
• MSTP	Yes	Yes
• RSTP	Yes	Yes
Product functions Security		
Product function		
• ACL - MAC-based	Yes	Yes
• Management security, ACL-IP based	Yes	Yes
• IEEE 802.1x (radius)	Yes	Yes
• NAT/NAPT	Yes	Yes
• access protection according to IEEE802.11i	Yes	Yes
• WPA/WPA2	Yes	Yes
• TKIP/AES	Yes	Yes
Protocol is supported		
• SSH	Yes	Yes
• RADIUS	Yes	Yes
Product functions Time		
Protocol is supported		
• NTP	Yes	Yes
• SNTP	Yes	Yes
• SIMATIC Time	Yes	Yes
Standards, specifications, approvals		
Standard		
• for FM	FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4	FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4
• for hazardous zone	EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X	EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X
• for safety from CSA and UL	UL 60950-1 CSA C22.2 No. 60950-1	UL 60950-1 CSA C22.2 No. 60950-1
• for hazardous zone from CSA and UL	ANSI/ISA 12.12.01-2013, CAN/CSA C22.2 No.213-M1987, CL. 1, Div. 2, GP. A,B,C,D, T4 / CL. 1, Zone 2, GP IIC	ANSI/ISA 12.12.01-2013, CAN/CSA C22.2 No.213-M1987, CL. 1, Div. 2, GP. A,B,C,D, T4 / CL. 1, Zone 2, GP IIC
Certificate of suitability		
• EC declaration of conformity	Yes	Yes
• CE marking	Yes	Yes
• C-Tick	Yes	Yes
• E1 approval	No	No
• Railway application in accordance with EN 50155	Yes	Yes
• Railway application in accordance with EN 50121-4	Yes	Yes
• Fire protection in accordance with EN 45545-2	Yes	Yes
• NEMA TS2	No	No
• IEC 61375	No	No
• IEC 61850-3	No	No
• NEMA4X	No	No
• Power-over-Ethernet acc. to IEEE802.3at for type 1 and IEEE802.3af	Yes	Yes
• Power-over-Ethernet acc. to IEEE802.3at for type 2	Yes	Yes
Standard for wireless communication		
• IEEE 802.11a	Yes	Yes
• IEEE 802.11b	Yes	Yes
• IEEE 802.11e	Yes	Yes
• IEEE 802.11g	Yes	Yes
• IEEE 802.11h	Yes	Yes
• IEEE 802.11i	Yes	Yes
• IEEE 802.11n	Yes	Yes

[1] Wireless approval in the USA

Article number	6GK5778-1GY00-0TA0	6GK5778-1GY00-0TB0 [1]
Wireless approval	You will find the current list of countries at: www.siemens.com/wireless-approvals	You will find the current list of countries at: www.siemens.com/wireless-approvals
Marine classification association		
• American Bureau of Shipping Europe Ltd. (ABS)	Yes	Yes
• Bureau Veritas (BV)	Yes	Yes
• DNV GL	Yes	Yes
• Lloyds Register of Shipping (LRS)	Yes	Yes
• Nippon Kaiji Kyokai (NK)	Yes	Yes
• Polski Rejestr Statkow (PRS)	Yes	Yes
• Royal Institution of Naval Architects (RINA)	Yes	Yes

[1] Wireless approval in the USA

Selection and ordering data

Version	Article No.
Access Points SCALANCE W778-1 M12 EEC	
IWLAN access point with built-in wireless interfaces (radio) IEEE 802.11a/b/g/h/n wireless network with 2.4/5 GHz up to 300 Mbps; 2x M12 max. 100 Mbps; M12 A-coded; plug slot WPA2/802.11i/e; integrated Power over Ethernet (PoE) 2-port switch; 2 N-CON antenna port, iFeatures support via KEY-PLUG; IP65 degree of protection; redundant 24 V DC; -30 ... 75°C; Conformal Coating; EN 50155; EN45545; scope of delivery: Manuals on CD-ROM, English/German; M12 sealing caps	
SCALANCE W778-1 M12 EEC	
• Country approvals for operation outside the USA [1]	**6GK5778-1GY00-0TA0**
• Country approvals for operation within the USA [1]	**6GK5778-1GY00-0TB0**
Accessories	
KEY-PLUG W780 iFeatures Removable data storage medium for enabling additional iFeatures, simple device replacement in the event of a fault and storage of configuration data. Can be used in SCALANCE W access points with PLUG compartments	**6GK5907-8PA00**
C-plug Removable data storage medium for simple device replacement in the event of a fault and storage of configuration data; can be used in SIMATIC NET products with PLUG compartment	**6GK1900-0AB00**
IE FC M12 plug PRO 2 x 2 M12 connector for on-site assembly (D-coded, IP65/IP67), metal enclosure, FastConnect connection technology, for SCALANCE W778-1 M12	
• 1 unit	**6GK1901-0DB20-6AA0**
• 8 units	**6GK1901-0DB30-6AA8**
IE FC standard cable GP 2 x 2 /Type A 4-wire, shielded TP installation cable for connection to IE FC RJ45 outlet/ IE FC RJ45 plug; PROFINET-compatible; with UL approval; sold by the meter; max. length per delivery unit 1 000 m, minimum order quantity 20 m	**6XV1840-2AH10**
IE FC stripping tool Pre-adjusted stripping tool for fast stripping of Industrial Ethernet FC cables	**6GK1901-1GA00**
Power M12 Cable Connector PRO Terminal socket for connection of SCALANCE W700 for 24 V DC supply voltage; 4-pin, A-coded, with assembly instructions, 3 units	**6GK1907-0DC10-6AA3**
Power cable 2 x 0.75 Connecting cable for Power M12 Cable Connector PRO, sold by the meter	**6XV1812-8A**
N-Connect/SMA female/female panel feedthrough Cabinet bushing with fastening flange for wall thicknesses up to 5.5 mm, SMA female and N-Connect female connections	**6GK5798-0PT00-2AA0**
N-Connect/N-Connect female/female panel feedthrough Cabinet bushing for wall thicknesses up to 4.5 mm, two N-Connect female connections	**6GK5798-2PP00-2AA6**

[1] Please note country approvals under:
http://www.siemens.com/mobilenetwork-approvals

More information

Selection tools:

To assist in selecting Industrial Ethernet components, the TIA Selection Tool is available at:
http://www.siemens.com/tia-selection-tool

Wireless approvals:

Current approvals can be found on the Internet at:
http://www.siemens.com/wireless-approvals

SCALANCE W1788-2 M12 EEC

Overview

- Industrial Wireless LAN access point for installation in control cabinets or in indoor areas with support of IEEE 802. 11a/b/g/n/ac and data rates of up to 1733 Mbit/s

Design

- Rugged aluminum housing, shock and vibration-resistant, for stringent mechanical requirements
- Special coating of the printed circuit boards (conformal coating)
- Resistant to condensation
- Railway approval in accordance with EN 50155 and NEMA TS2
- Special features in addition to EN 50155, EN 45545-2, EN 50121-4, EN 50121-3-2, EN 50125-3
- High IP65 degree of protection against dust and water jets
- For use at ambient temperatures from -40 °C to +75 °C
- 8 x N-Connect sockets for the connection of direct mountable and remote antennas
- Optimized antenna placement for the 4x4 MIMO technology; antennas do not interfere with each other when mounted directly on the device
- Suitable for 2.4 GHz and 5 GHz
- 2 x M12 Ethernet x-coded Managed switch (1.000 Mbit/s), Power-over-Ethernet according to IEEE 802.3at
- 1 x M12 socket for power supply (24 V DC)
- 1 x C-PLUG slot (KEY-PLUG/C-PLUG)
- Function LEDs for optical signaling of faults and operating states
- VESA 100 mounting system
  Wall mounting
  DIN rail T35 (S7-1200) DIN rail S7-300
  DIN rail S7-1500
- Two wireless cards are permanently installed in the device; functional scope can be expanded by using a CLP

Technical specifications

Article number	**6GK5788-2GY01-0TA0**[1)]
Product type designation	SCALANCE W1788-2 M12 EEC
Transmission rate	
Transmission rate	
• on WLAN, maximum	1733 Mbps
• on Industrial Ethernet	10 Mbps, 100 Mbps, 1 000 Mbps
Interfaces	
Number of electrical connections	
• for network components or data terminal equipment	1
• for power supply	1
• for redundant power supply	1
Type of electrical connection	
• for network components or data terminal equipment	M12 interface (8-pin, X-coded), PoE
• for power supply	M12 interface (4-pin, A-coded)
Type of removable data storage medium	
• C-PLUG	Yes
• KEY-PLUG	Yes
Wireless interfaces	
Number of permanently installed wireless cards	2
Type of transmission for multiple input multiple output (MIMO)	4x4
Number of spatial streams	3
Number of electrical connections for external antenna(s)	8
Type of electrical connection for external antenna(s)	N-Connect (female)
Product property: external antenna can be mounted directly on device	Yes
Supply voltage, current consumption, power loss	
Type of supply voltage	DC
Supply voltage 1	
• from M12 power connector (A-coded) for redundant power supply	16.8 V
Supply voltage 2	
• from M12 power connector (A-coded) for redundant power supply	31.2 V
Supply voltage	
• from Power-over-Ethernet in accordance with IEEE802.3at for Type 1 and IEEE802.3af	48 V
• from Power-over-Ethernet in accordance with IEEE802.3at for Type 2	50 V

Article number	**6GK5788-2GY01-0TA0**[1)]
Product type designation	SCALANCE W1788-2 M12 EEC
Current consumption	
• with 24 V DC, typical	0.7 A
• with Power-over-Ethernet in accordance with IEEE802.3at for Type 1 and IEEE802.3af, typical	0.385 A
• with Power-over-Ethernet in accordance with IEEE802.3at for Type 2, typical	0.3 A
Power loss [W]	
• with 24 V DC, typical	16.8 W
• with Power-over-Ethernet in accordance with IEEE802.3at for Type 1 and IEEE802.3af, typical	18.5 W
• with Power-over-Ethernet in accordance with IEEE802.3at for Type 2, typical	15 W
Permissible ambient conditions	
Ambient temperature	
• during operation	-40 ... +75 °C
• during storage	-40 ... +85 °C
• during transport	-40 ... +85 °C
Relative humidity at 25 °C, without condensation during operation	90%
Ambient conditions for operation	When used under explosion protection conditions (Zone 2), the SCALANCE W788-x or W748-x product must be installed in an enclosure with at least IP54 degree of protection according to EN 60529 within the jurisdiction of EN 50021.
IP degree of protection	IP65
Design, dimensions and weights	
Width of housing without antenna	258 mm
Height of housing without antenna	258 mm
Depth of housing without antenna	80 mm
Net weight	2.7 kg
Mounting type	For 35 mm DIN rail mounting, an additional mounting adapter is needed
• S7-300 rail mounting	Yes
• S7-1500 rail mounting	Yes
• Wall mounting	Yes
Radio frequencies	
Operating frequency	
• for WLAN in 2.4 GHz frequency band	2.41 ... 2.48 GHz
• for WLAN in 5 GHz frequency band	4.9 ... 5.8 GHz
Product properties, functions, components - General	
Product function - Access point mode	Yes
Product function - Client mode	Yes
Number of SSIDs	16
Product function	
• Dual client	No
• iPCF access point	Yes; only in combination with the 'KEY-PLUG W780 iFeatures'
• iPCF client	Yes; only in combination with the 'KEY-PLUG W780 iFeatures' or 'KEY-PLUG W740 iFeatures'
• iPCF-MC access point	Yes; only in combination with the 'KEY-PLUG W780 iFeatures'
• iPCF-MC client	Yes; only in combination with the 'KEY-PLUG W780 iFeatures' or 'KEY-PLUG W740 iFeatures'
Number of iPCF-enabled wireless modules	0
Product function - iREF	Yes; only in combination with the 'KEY-PLUG W780 iFeatures'
Number of iREF-enabled wireless modules	0
Product functions - Management, configuration, engineering	
Number of manageable IP addresses in the client	8
Product function	
• CLI	Yes
• Web-based management	Yes
• MIB support	Yes
• TRAPs via e-mail	Yes
• Configuration with STEP 7	Yes
• Configuration with STEP 7 in the TIA Portal	Yes
• Operation with IWLAN controller	No
• Operation with Enterasys WLAN controller	No
• Forced roaming with IWLAN	Yes
• WDS	Yes
Protocol is supported	
• Address Resolution Protocol (ARP)	Yes
• ICMP	Yes
• Telnet	Yes
• HTTP	Yes
• HTTPS	Yes
• TFTP	Yes
• DCP	Yes
• LLDP	Yes

SCALANCE W1788-2 M12 EEC

Article number	**6GK5788-2GY01-0TA0**[1]
Product type designation	SCALANCE W1788-2 M12 EEC
Identification & Maintenance function	
• I&M0 - Device-specific information	Yes
• I&M1 - Higher level designation/location designation	Yes
Product functions - Diagnostics	
Product function	
• PROFINET IO diagnostics	Yes
• Link check	No
• Connection monitoring IP-Alive	No
• SysLog	Yes
Protocol is supported	
• SNMP v1	Yes
• SNMP v2	Yes
• SNMP v3	Yes
Product functions - VLAN	
Product function	
• VLAN function for IWLAN	Yes
Product functions - DHCP	
Product function	
• DHCP client	Yes
• In Client Mode, DHCP server via LAN	No
Product functions - Redundancy	
Protocol is supported	
• STP/RSTP	Yes
Product functions - Security	
Product function	
• Management security with IP-based ACL	Yes
• IEEE 802.1X (RADIUS)	Yes
• NAT/NAPT	No
• Access protection in accordance with IEEE802.11i	Yes
• WPA/WPA2	Yes
• TKIP/AES	Yes
Protocol is supported	
• SSH	Yes
Product functions - Time of day	
Protocol is supported	
• SNTP	Yes
• SIMATIC Time	Yes
Standards, specifications, approvals	
Standard	
• for FM	FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4
• for hazardous zone	EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X
• for safety, from CSA and UL	UL 60950-1, CSA C22.2 No. 60950-1
• for hazardous zone, from CSA and UL	ANSI/ISA 12.12.01-2013, CAN/CSA C22.2 No.213-M1987, CL. 1, Div. 2, GP A,B,C,D, T4 / CL. 1, Zone 2, GP IIC
Proof of suitability	
• EC Declaration of Conformity	Yes
• CE mark	Yes
• C-Tick	Yes
• CCC	No
• E1 approval	Yes
• Railway application in accordance with EN 50155	Yes
• Railway application in accordance with EN 50121-4	Yes
• Fire protection in accordance with EN 45545-2	Yes
• NEMA TS2	Yes
• IEC 61375	No
• IEC 61850-3	No
• NEMA4X	No
• Power-over-Ethernet in accordance with IEEE802.3at for Type 1 and IEEE802.3af	Yes
• Power-over-Ethernet in accordance with IEEE802.3at for Type 2	Yes
Standard for wireless communication	
• IEEE 802.11a	Yes
• IEEE 802.11ac	Yes
• IEEE 802.11b	Yes
• IEEE 802.11g	Yes
• IEEE 802.11n	Yes
Wireless approval	You will find the current list of countries at: www.siemens.com/wireless-approvals
Marine classification association	
• American Bureau of Shipping Europe Ltd. (ABS)	No
• Bureau Veritas (BV)	No
• Det Norske Veritas (DNV)	No
• Germanischer Lloyd (GL)	No
• Lloyds Register of Shipping (LRS)	No
• Nippon Kaiji Kyokai (NK)	No
• Polski Rejestr Statkow (PRS)	No

[1] Wireless approval in the USA

Selection and ordering data

Version	Article No.
SCALANCE W1788-2 M12 EEC Access Points	
IWLAN access points with built-in wireless interfaces; wireless networks IEEE 802.11a/ac/b/g/n at 2.4/5 GHz up to 1733 Mbps; railway approval in accordance with EN 50155 / NEMA TS2; conformal coating; WPA2/AES; Power over Ethernet (PoE), IP65 degree of protection; scope of delivery: mounting hardware; manual on CD-ROM, German/English	
SCALANCE W1788-2 M12 EEC	
IWLAN dual access point with two built-in wireless interfaces	
• National approvals for operation outside the U.S.[1)]	**6GK5788-2GY01-0TA0**
• National approvals for operation within the U.S. [1)]	**6GK5788-2GY01-0TB0**
Accessories	
KEY-PLUG W780 iFeatures Removable data storage medium for activating additional iFeatures, for easy device replacement under fault conditions and for recording configuration data; can be used in SCALANCE W access points with PLUG slot	**6GK5907-8PA00**
C-PLUG Removable data storage medium for easy replacement of devices under fault conditions; for recording configuration data; can be used in SIMATIC NET products with PLUG slot	**6GK1900-0AB00**
DIN Rail Mounting Adapter DIN rail mounting adapter for SCALANCE W788 M12 and SCALANCE W788 RJ45; screw mounting for mounting on a 35 mm DIN rail according to EN 50022; scope of delivery: 3 units per pack	**6GK5798-8ML00-0AB3**
IE FC M12 Plug PRO 4 x 2 M12 plug connector (X-coded, IP65/IP67) that can be assembled in the field, metal enclosure, insulation displacement fast connection method, for SCALANCE W	
• 1 unit	**6GK1901-0DB30-6AA0**
• 8 units	**6GK1901-0DB30-6AA8**
IE Train Cable GP 4x2 8-core, shielded TP installation cable for connection to IE FC M12 Plug PRO 4x2 for use in railway applications; with railway approval; sold by the meter; maximum delivery unit 1000 m, minimum order quantity 20 m	**6XV1878-2T**
IE FC Stripping Tool Preset insulation stripping tool for fast stripping of Industrial Ethernet FC cables	**6GK1901-1GA00**
Power M12 Cable Connector PRO Connector socket for connection of SCALANCE W700 for 24 V DC supply voltage; 4-pin, A-coded, with assembly instructions, 3 units	**6GK1907-0DC10-6AA3**
Power Cable 2 x 0.75 Connecting cable for Power M12 Cable Connector PRO, sold by the meter	**6XV1812-8A**

1) Note national approvals under
http://www.siemens.com/wireless-approvals

More information

Selection tools:

To assist in selecting Industrial Ethernet components, the TIA Selection Tool is available at:
http://www.siemens.com/tia-selection-tool

Wireless approvals:

Current approvals can be found on the Internet at:
http://www.siemens.com/wireless-approvals

SCALANCE WAM766-1 EEC

Overview

Industrial access point according to IEEE 802.11ax (WiFi 6).

- Particularly suitable for industrial applications with cabinet-free setup

Design

- Rugged enclosure, shock and vibration resistant for stringent mechanical requirements
- High IP65 degree of protection against dust and water jets
- For use at ambient temperatures from -30 °C to +75 °C (EEC variant)
- 2 x N-Connect sockets for the connection of direct mountable and remote antennas
- Supports channels in 2.4 GHz and 5 GHz band
- 1 x M12 connection for 10/100/1 000 Mbps with Power over Ethernet according to IEEE 802.3bt Type 1, Class 3
- 1 x M12 socket for redundant energy supply (24 V DC)
- 1 x M12 socket with digital input/digital output (DI/DO)
- 1 x CLP slot
- Function LEDs for optical signaling of faults/errors and operating states
- Mounting: Wall, VESA, 35 mm DIN rail (also in 90°) with mounting adapter

Product variants

SCALANCE WAM766-1 (6GK5766-1GE00-7DA0)

- Industrial access point for indoors, functional scope can be expanded using a CLP removable data storage medium.

SCALANCE WAM766-1 EEC (6GK5766-1GE00-7TA0)

- Industrial access point for extended ambient conditions, functional scope can be expanded using a CLP removable data storage medium.

Technical specifications

Article number	**6GK5766-1GE00-7TA0, 6GK5766-1GE00-7TB0**
Product type designation	SCALANCE WAM766-1 EEC
Transfer rate	
Transfer rate • with WLAN, maximum • for Industrial Ethernet	 1201 Mbit/s 10/100/1000 Mbit/s
Transfer rate for Industrial Ethernet • minimum • maximum	 10 Mbit/s 1000 Mbit/s
Interfaces	
Number of electrical/optical connections for gigabit Ethernet maximum	1
number of electrical connections • for network components or terminal equipment • for power supply • for redundant voltage supply	 1 1 1
Type of electrical connection • for network components or terminal equipment • for redundant voltage supply	 M12 interface (8-pole, X-coded), PoE M12 interface (4-pin, L-coded)
design of the removable storage • CLP • CLP iFeatures	 Yes Yes
Memory	
design of the removable storage • CLP • CLP iFeatures	 Yes Yes
Interfaces wireless	
Number of radio cards permanently installed	2
Transmission mode for multiple input multiple output (MIMO)	2x2
Number of spatial streams	2
Number of electrical connections for external antenna(s)	2
Type of electrical connection for external antenna(s)	N-Connect (socket)
Product feature external antenna can be mounted directly on device	Yes

Article number	**6GK5766-1GE00-7TA0, 6GK5766-1GE00-7TB0**
Product type designation	SCALANCE WAM766-1 EEC
Signal inputs/outputs	
Number of digital inputs	1
Number of digital outputs	1
Type of electrical connection at the digital inputs/outputs	M12 interface (4-pin, A-coded)
Signal range at digital input	-30 V DC 30 V
Signal range at digital output	24 V / 0.5 A DC
Operational current of the signaling contacts at DC at 30 V maximum	0.008 A
Supply voltage, current consumption, power loss	
Type of voltage of the supply voltage	Redundant 24 V DC Power Supply, M12, L-coded
Supply voltage • from Power-over-Ethernet acc. to IEEE802.3at for type 1 and IEEE802.3af	 48 V
Consumed current • at DC at 24 V typical • with Power-over-Ethernet according to IEEE802.3at for type 1 and IEEE802.3af typical	 0.55 V 0.27 V
Power loss (W) • at DC at 24 V typical • with Power-over-Ethernet according to IEEE802.3at for type 1 and IEEE802.3af typical	 13.2 W 12.96 W
Supply voltage 1 • from M12 power Connector (L-coded) for redundant voltage supply	 24 V
Supply voltage 1 rated value • type of voltage 1 of the supply voltage	24 V DC
Supply voltage 2 • from M12 power Connector (L-coded) for redundant voltage supply	 24 V
Supply voltage 2 rated value • type of voltage 2 of the supply voltage	24 V DC
Supply voltage 3 rated value	48 V
Ambient conditions	
Ambient temperature • during operation • during storage • during transport	 -30 ... +75 °C -40 ... +85 °C -40 ... +85 °C
Relative humidity at 25 °C, without condensation during operation maximum	90%
Protection class IP	IP65
Design, dimensions and weights	
Width	150 mm
Height	179.5 mm
Depth	45 mm
Width of housing without antenna	150 mm
Height of housing without antenna	179.5 mm
Depth of housing without antenna	45 mm
Net weight	1.1 kg
Product feature conformal coating	Yes
Fastening method • 35 mm top hat DIN rail mounting • Wall mounting • VESA mounting	 Yes Yes Yes
Radio frequencies	
Operating frequency • for WLAN in 2.4 GHz frequency band • for WLAN in 5 GHz frequency band	 2.41 ... 2.48 GHz; depending on the country approvals 4.9 ... 5.8 GHz; depending on the country approvals
Product features, functions, components general	
Product function • access point mode • client mode • iPCF access point • iPRP • automatic selection of the fastest transfer rate	 Yes Yes No Yes Yes
Number of SSIDs	1
Product functions, management, configuration, engineering	
Product function • CLI • Web-based management • MIB support • TRAPs via e-mail • Configuration with STEP 7 • Configuration with STEP 7 in the TIA Portal • WDS	 Yes Yes Yes Yes Yes Yes No

SCALANCE WAM766-1 EEC

Article number	**6GK5766-1GE00-7TA0, 6GK5766-1GE00-7TB0**
Product type designation	SCALANCE WAM766-1 EEC
Protocol is supported	
• Address Resolution Protocol (ARP)	Yes
• ICMP	Yes
• Telnet	Yes
• HTTP	Yes
• HTTPS	Yes
• TFTP	Yes
• DCP	Yes
• LLDP	Yes
Identification & Maintenance function	
• I&M0 - Device-specific information	Yes
• I&M1 - Higher level designation/location designation	Yes
Product functions diagnostics	
Product function	
• PROFINET IO diagnostics	Yes
• SysLog	Yes
Protocol is supported	
• SNMP v1	Yes
• SNMP v2	Yes
• SNMP v3	Yes
Product functions VLAN	
Product function	
• VLAN function for IWLAN	Yes
Number of VLANs maximum	24
Product functions DHCP	
Product function	
• DHCP client	Yes
Product functions Redundancy	
Protocol is supported	
• STP/RSTP	Yes
• MSTP	Yes
• RSTP	Yes
Product functions security	
Product function	
• Management security with IP-based ACL	No
• IEEE 802.1X (RADIUS)	Yes
• NAT/NAPT	Yes
• Access protection in according to IEEE802.11i	Yes
• WPA/WPA2	Yes
• TKIP/AES	Yes
Protocol is supported	
• SSH	Yes
Product functions time	
Protocol is supported	
• NTP	Yes
• SNTP	Yes
• SIMATIC time synchronization (SIMATIC Time)	Yes
Standards, specifications, approvals	
Certificate of suitability	
• EC Declaration of Conformity	Yes
• CE marking	Yes
• E1 approval	Yes
• Railway application in accordance with EN 50155	Yes
• Fire protection in accordance with EN 45545-2	Yes
• Power-over-Ethernet in according IEEE802.3at for Type 1 and IEEE802.3af	Yes
Standard for wireless communication	
• IEEE 802.11a	Yes
• IEEE 802.11b	Yes
• IEEE 802.11e	Yes
• IEEE 802.11g	Yes
• IEEE 802.11h	Yes
• IEEE 802.11i	Yes
• IEEE 802.11n	Yes
• IEEE 802.11ac	Yes
• IEEE 802.11ax	Yes
Wireless approval	You will find the current list of countries at: www.siemens.com/wireless-approvals or directly on the device

Selection and ordering data

Version	Article No.
SCALANCE WAM766-1 EEC Access Points	
IWLAN access point; 1 radio, 2.4/5 GHz, 2 N-Connect connectors, iFeatures support via CLP, IEEE 802.11ax (Wi-Fi 6), 1 201 Mbps (gross) per radio, 1x10/100/1 000 Mbps M12 socket, redundant 24 V DC, M12 L-coded, PoE, IP65 (-30°C to +75°C); CLP slot, DI/DQ, A-coded, observe national approvals! CERT ID: MSAX65-W1-M12-E2, FCCID: LYHMSAX*, scope of delivery: Manuals on DVD, English/German, sealing caps for connectors	
SCALANCE WAM766-1 EEC	
• Country approvals for operation outside the USA/Israel	**6GK5766-1GE00-7TA0**
• National approvals for operation in the USA [1]	**6GK5766-1GE00-7TB0**
Accessories	
SCALANCE CLP EEC 2GB Removable data storage medium for simple device replacement in the event of a fault and storage of configuration data; can be used in SIMATIC NET products with CLP slot	**6GK1900-0UQ00-0AA0**
SCALANCE CLP 2GB W700 AP iFeatures Removable data storage medium for simple device replacement in the event of a fault and storage of configuration data; can be used in SIMATIC NET products with CLP slot	**6GK5907-8UA00-0AA0**
IE TP cord M12/M12 4 x 2 Pre-assembled flexible connecting cable 4 x 2 with two M12 plugs (X-coded)	
• 0.3 m	**6XV1878-5HE30**
• 0.5 m	**6XV1878-5HE50**
• 1 m	**6XV1878-5HH10**
• 1.5 m	**6XV1878-5HH15**
• 2 m	**6XV1878-5HH20**
• 3 m	**6XV1878-5HH30**
• 5 m	**6XV1878-5HH50**
• 10 m	**6XV1878-5HN10**
• 15 m	**6XV1878-5HN15**
IE FC standard cable GP 4x2 8-wire, shielded TP installation cable for connection to IE FC RJ45 plug 4 x 2 and IE M12 plug PRO 4 x 2; PROFINET-compatible; with UL approval; sold by the meter; maximum delivery unit 1000 m, minimum order quantity 20 m	**6XV1878-2A**
IE FC M12 plug PRO 4 x 2 M12 plug-in connector suitable for on-site assembly (X-coded, IP65/IP67), metal enclosure, insulation displacement fast connection method, for SCALANCE W	
• 1 unit	**6GK1901-0DB30-6AA0**
• 8 units	**6GK1901-0DB30-6AA0**

[1] Note national approvals under
http://www.siemens.com/wireless-approvals

More information

Selection tools:

To assist in selecting Industrial Ethernet components, the TIA Selection Tool is available at:
http://www.siemens.com/tia-selection-tool

Wireless approvals:

Current approvals can be found on the Internet at:
http://www.siemens.com/wireless-approvals

ANT795-4MX / ANT795-6MN / ANT795-6MT / ANT793-8DL / ANT793-8DP / ANT795-6DC / ANT793-6DG

Overview

Remote antennas increase the reliability of wireless links by optimizing signal reception and emission.

- Use in Industrial Wireless LAN (IWLAN) and WLAN in accordance with IEEE 802.11 at 2.4 GHz and 5 GHz
- Coordinated range of antennas for the most diverse applications both indoors and outdoors

Benefits

- Investment protection thanks to compliance with the globally recognized standard IEEE 802.11 and – depending on the version – suitability for 2.4 GHz and/or 5 GHz
- Cost-effective connection to devices in remote, difficult-to-access or hostile environments
- Establishment of a reliable IWLAN wireless infrastructure through the use of remote antennas, even if the access points and client modules are installed in the control cabinet, for example

Application

Remote antennas optimize transmission and reception conditions and enable use of IWLAN products in a number of industrial applications.
With sector antennas, for example, conveyor lines or corridors can be specifically covered with radio links, or strongly directional antennas can be used to implement point-to-point connections over distances of up to several 1000 meters.

Alternatively, an omnidirectional antenna concentrates the radio field around the antenna in the shape of a disc, which enhances the quality of the connection.

Application examples:

Omnidirectional antennas

- Coverage of an area which has at its center a mast for mounting the antenna
- Installation of the antenna on the roof in the case of automated guided vehicle systems for reliable data exchange with the vehicles
- Wide-area coverage of a production cell or robot station

Directional antennas

- Communication between buildings over long distances with the help of an antenna with narrow beam angle and high gain

Sector antennas

- Selective coverage of warehouse/high-bay warehouse aisles with the help of a wide-angle antenna prevents interference with neighboring wireless fields

All antennas can be connected to SCALANCE W via an antenna connection cable from the range of IWLAN cabling technology.

For details and direct ordering, please see:
https://mall.industry.siemens.com/mall/de/de/Catalog/Products/10090612?tree=CatalogTree

Technical specifications

Article number	6GK5795-4MX00-0AA0	6GK5795-6MN10-0AA6	6GK5795-6MT00-0AA0
Product type designation	Antenna ANT795-4MX	Antenna ANT795-6MN	Antenna ANT795-6MT
Radio frequencies			
Type of mobile network is supported	5G private networks, WLAN	5G private networks, WLAN	WLAN
Operating frequency 1	1700 ... 2000 MHz	2400 ... 2700 MHz	
Operating frequency 2	2000 ... 2700 MHz	3400 ... 3800 MHz	
Operating frequency 3	2700 ... 3800 MHz	4900 ... 5925 MHz	
Operating frequency 4	4900 ... 5925 MHz	5925 ... 7125 MHz	
Operating frequency	5925 ... 7125 MHz		
Antenna gain compared to spherical radiator • for WLAN in 2.4 GHz frequency band • for WLAN in 5 GHz frequency band 1 • for WLAN in 5 GHz frequency band 2			 2.4 ... 2.69 GHz 5.15 ... 5.35 GHz 5.47 ... 5.935 GHz
Antenna gain compared to spherical radiator • of the WLAN antenna in the 2.4 GHz frequency band • of the WLAN antenna in the 5 GHz frequency band	 2 dB 2.5 dB	 6 dB 8 dB	 5 dB 7 dB
Electrical data			
Impedance	50 Ω	50 Ω	50 Ω
Polarization	linear vertical	linear vertical	3 ports: linear vertical
Radiation characteristic	omnidirectional	omnidirectional	omnidirectional
Antenna gain compared to spherical radiator • of the WLAN antenna in the 2.4 GHz frequency band • of the WLAN antenna in the 5 GHz frequency band	 2 dB 2.5 dB	 6 dB 8 dB	 5 dB 7 dB
Standing wave ratio (VSWR) maximum	2	2	1.5

Article number	**6GK5795-4MX00-0AA0**	**6GK5795-6MN10-0AA6**	**6GK5795-6MT00-0AA0**
Product type designation	Antenna ANT795-4MX	Antenna ANT795-6MN	Antenna ANT795-6MT
Radiating angle of the antenna			
• horizontal		360°	
• in the 2.4 GHz frequency band horizontal	360°		360°
• in the 2.4 GHz frequency band vertical			
• in the 5 GHz frequency band horizontal	360°	150°	360°
• in the 5 GHz frequency band vertical		take the antenna diagram into account regaring the horizontal beam angle	
Number of electrical connections of the antenna	1	1	
Type of electrical connection of the antenna	N-Connector	N-Connector	QMA Connector
Design of plug-in connection	male, straight	female	female
Angle of inclination downward maximum	0°	0°	0°
Crosstalk attenuation between the antenna connections	10 W; at 25° ambient temperature		20 dB
Mechanical data			
Material			
• of outer shell	ASA	Polycarbonate	Polycarbonate
Ambient conditions			
Ambient temperature			
• during operation	-40 ... +85 °C	-40 ... +80 °C	-40 ... +85 °C
• during storage	-40 ... +85 °C	-40 ... +80 °C	-40 ... +85 °C
• during transport	-40 ... +85 °C	-40 ... +80 °C	-40 ... +85 °C
Protection class IP	IP68/IP69K	IP65	IP65
Shock resistance	according to EN 61373, category1, class b (for railway carriage)		
Wind load maximum		10 N; at 160 km/h	
Design, dimensions and weight			
Width		86 mm	282 mm
Height	55 mm	43 mm	32 mm
Depth		86 mm	92 mm
Diameter	22 mm		
Net weight	50 g	300 g	320 g
Fastening method			
• mast mounting		No	No
• flat roof mounting		Yes	
• wall mounting	No	Yes	Yes
• roof mounting	No	Yes	Yes
• directly on the device	Yes	No	No
Product features, functions, components general			
Product feature silicon-free	Yes	Yes	Yes
Standards, specifications, approvals			
Certificate of suitability		Railway application in accordance with NF-F-16-101, NF-F-16-102	
Certificate of suitability			
• RoHS conformity	Yes	Yes	Yes
• Railway application in accordance with EN 50155	Yes	Yes	Yes
• Fire protection in accordance with EN 45545-2	Yes	Yes	Yes
• Marine classification association / Korean Register of Shipping (KRS)		Yes	Yes
Product conformity	UL 94-HB	UL 94-V0	UL 94-V0
Wireless approval	Current national approvals can be found on the Internet under www.siemens.com/funkzulassungen	Current national approvals can be found on the Internet under www.siemens.com/funkzulassungen	Current national approvals can be found on the Internet under www.siemens.com/funkzulassungen
Reference code			
• according to IEC 81346-2	TF	TF	TF
• according to IEC 81346-2:2019	TFB	TFB	TFB

ANT795-4MX / ANT795-6MN / ANT795-6MT / ANT793-8DL / ANT793-8DP / ANT795-6DC / ANT793-6DG

Article number	6GK5793-8DL00-0AA0	6GK5793-8DP00-0AA0	6GK5795-6DC00-0AA0	6GK5793-6DG00-0AA0
Product type designation	Antenna ANT793-8DL	Antenna ANT793-8DP	Antenna ANT795-6DC	Antenna ANT793-6DG
Wireless frequencies				
Type of mobile network is supported	WLAN	WLAN	WLAN	WLAN
Operating frequency				
• for WLAN in 2.4 GHz frequency band			2.4 ... 2.5 GHz	
• for WLAN in 5 GHz frequency band 1	4.9 ... 5.9 GHz	4.9 ... 5.35 GHz	5.15 ... 5.875 GHz	5.15 ... 5.875 GHz
Antenna gain compared to spherical radiator				
of the WLAN antenna in the 2.4 GHz frequency band			9 dB	
of the WLAN antenna in the 5 GHz frequency band	14 dB	13.5 dB	9 dB	9 dB
Electrical data				
Impedance	50 Ω	50 Ω	50 Ω	50 Ω
Polarization	dual linear vertical-horizontal	linear vertical	linear vertical	dual linear +/- 45° slant
Radiation characteristic	directional	directional	Sector antenna	Sector antenna
Antenna gain compared to spherical radiator				
• of the WLAN antenna in the 2.4 GHz frequency band			9 dB	
• of the WLAN antenna in the 5 GHz frequency band	14 dB	13.5 dB	9 dB	9 dB
Standing wave ratio (VSWR) maximum	2.5	1.5	2	2
Radiating angle of the antenna				
• in the 2.4 GHz frequency band horizontal			75°	
• in the 2.4 GHz frequency band vertical			55°	
• in the 5 GHz frequency band horizontal	30°	40°	55°	70°
• in the 5 GHz frequency band vertical	30°, take the antenna diagram into account	35°	55°	60°
Number of electrical connections of the antenna	2	1	1	2
Opening angle Note	Note antenna diagram			
Number of electrical connections of the antenna	2	1	1	2
Type of electrical connection of the antenna	N-Connector	N-Connector	N-Connector	N-Connector
Design of plug-in connection	female	female	female	female
Angle of inclination downward maximum		0°	0°	0°
Crosstalk attenuation between the antenna connections	19 dB		25 dB	20 dB
Front-to-back ratio	35 dB	20 dB	15 dB	20 dB
Mechanical data				
Material				
• of outer shell	ASA	Lexan EXL 9330	Lexan EXL 9330	Lexan EXL 9330
Permitted ambient conditions				
Ambient temperature				
• during operation	-40 ... +70 °C	-40 ... +80 °C	-40 ... +80 °C	-40 ... +80 °C
• during storage	-40 ... +70 °C	-40 ... +80 °C	-40 ... +80 °C	-40 ... +80 °C
• during transport	-40 ... +70 °C	-40 ... +80 °C	-40 ... +80 °C	-40 ... +80 °C
Protection class IP	IP66	IP66/67	IP66/67	IP66/67
Wind load maximum	suitable for wind speeds up to 200 km/h	15 N; frontal at 160 km/h	15 N; at 160 km/h	15 N; frontal at 160 km/h
Design, dimensions and weight				
Width	100 mm	80 mm	80 mm	80 mm
Height	283 mm; incl. bracket	101 mm	101 mm	101 mm
Depth	40 mm	35 mm	35 mm	35 mm
Net weight	520 g	110 g	110 g	110 g
Mounting type				
• mast mounting	Yes	Yes	Yes	Yes
• flat-roof mounting	No			
• wall mounting	Yes	Yes	Yes	Yes
• roof mounting	No	No	No	No
• directly on the device	No	No	No	No
Product features, functions, components general				
Product feature silicon-free	Yes	Yes	Yes	

Article number	6GK5793-8DL00-0AA0	6GK5793-8DP00-0AA0	6GK5795-6DC00-0AA0	6GK5793-6DG00-0AA0
Product type designation	Antenna ANT793-8DL	Antenna ANT793-8DP	Antenna ANT795-6DC	Antenna ANT793-6DG
Standards, specifications, approvals				
Certificate of suitability				
• RoHS conformity	Yes	Yes	Yes	Yes
• Railway application in accordance with EN 50155	Yes	Yes	Yes	Yes
• Fire protection in accordance with EN 45545-2	Yes	Yes	Yes	Yes
• Marine classification association / Korean Register of Shipping (KRS)			Yes	
Product conformity		UL 94-V0	UL 94-V0	
Wireless approval	Current national approvals can be found on the Internet under www.siemens.com/funkzulassungen	Current national approvals can be found on the Internet under www.siemens.com/funkzulassungen	Current national approvals can be found on the Internet under www.siemens.com/funkzulassungen	Current national approvals can be found on the Internet under www.siemens.com/funkzulassungen
Reference code				
• according to IEC 81346-2	TF	TF	TF	TF
• according to IEC 81346-2:2019	TFB	TFB	TFB	TFB

Selection and ordering data

Version	Article No.
Antennas with omnidirectional characteristic	
National approvals, compact instructions on paper German/English	
Direct mount	
• **ANT795-4MX IWLAN antenna** with omnidirectional characteristic; incl. N-Connect Male connector straight: 2/2.5 dBi; IP67/69K (-40-+85°C), 2.4/5GHz; Wi-Fi compliance and Observe national approvals;	**6GK5795-4MX00-0AA0**
Wall or mast mounting	
• **ANT795-6MN IWLAN antenna** Antenna gain incl. N-Connect connector 6/8 dBi, 2.4/5 GHz; IP65 (-40 to +80 °C) with terminating resistor 1 x TI795-1R	**6GK5795-6MN10-0AA6**
• **Antenna Mounting Tool (ANT795-6MN)** Mounting aid for installing ANT795-6MN below a roof	**6GK5795-6MN01-0AA6**
• **ANT795-6MT IWLAN antenna** MIMO antenna with 3 QMA sockets, antenna gain 6 dBi, 2.4/5 GHz; (-40 to +85 °C), incl. mounting bracket	**6GK5795-6MT00-0AA0**
Directional antennas	
Including mounting hardware for wall or mast mounting	
Strongly directional antennas	
• **ANT793-8DL IWLAN antenna** Vertical-horizontal polarized antenna; antenna gain incl. two N-Connect connectors 14 dBi, 5 GHz; -45 to +70 °C, suitable for railway applications (especially for the railway line)	**6GK5793-8DL00-0AA0**
• **ANT793-8DP IWLAN antenna** Antenna gain 13.5 dBi incl. N-connect connector, 4.9 GHz, -40 to +85°C, especially for use in Japan	**6GK5793-8DP00-0AA0**
Sector antennas	
Including mounting hardware for wall or mast mounting	
• **ANT795-6DC IWLAN antenna** with weak directional effect; incl. N-female connector: 9 dBi; IP67 (-40 to +80°C), 2.4/5GHz; Wi-Fi compliance and Observe national approvals	**6GK5795-6DC00-0AA0**
• **ANT793-6DG IWLAN antenna** Dual-slant antenna with weak directional effect incl. 2x N-female connectors: 9 dBi; IP67 (-40 to +80°C), 5 GHz; Wi-Fi compliance and Observe national approvals	**6GK5793-6DG00-0AA0**

More information

Selection tools:

To assist in selecting Industrial Ethernet components, the TIA Selection Tool is available at: http://www.siemens.com/tia-selection-tool

For all details about the cabling technology portfolio and direct order, please see the Industry Mall: https://mall.industry.siemens.com/mall/en/de/Catalog/Products/9300238?tree=CatalogTree

For current information about cabling technology, inluding further information material, please visit the website: www.siemens.com/fastconnect

Cabling range:

You can order components supplementary to the SIMATIC NET cabling range from your local contact. Technical advice on this subject is available from:

J. Hertlein
DI PA DCP IWA
Phone: +49 (172) 3172810
E-Mail: juergen.hertlein@siemens.com

RUGGEDCOM RSG907R and RSG909R

Overview

The RUGGEDCOM RSG907R and RSG909R, two full Gigabit switches in a compact design, offering both HSR and PRP functionality to mitigate the risk of communication disruptions and downtime. These rugged Gigabit switches are designed to operate in harsh environments with widely varying climatic and environmental conditions. Tested and certified to withstand extreme temperature, vibration and shock, the RUGGEDCOM RSG907R and RSG909R offer exceptional reliability for industrial applications such as electric utility substations, transportation systems and oil&gas.

The RUGGEDCOM RSG907R and RSG909R are ideal for applications that require high bandwidths and accommodate future network expansions. Three Redundant Network Access SFP ports providing ultimate flexibility in media and distance, with support for Gigabit bandwidth. The RSG907R connects up to 4 IEDs via 100BASE-FX fiber optics and RSG909R connects up to 6 IEDs via copper Ethernet on the Singly Attached Node ports.

Both products offer various network design options and cost savings through increased redundancy, reduced downtimes and high reliability.

HSR / PRP with Gigabit/s interfaces

Avoid revenue loss by mitigating the risk of communication disruptions and downtime with a redundant fault tolerant network supporting high bandwidth.

SFP RNA ports

SFP ports can be modified at any time allowing deployment flexibility for varying customer needs.

Power redundancy

Maintain continuous safe and reliable operations even during power failures, diminishing the risk of revenue and data loss.

Full fiber solution

Reduce failure rates due to increased immunity from electromagnetic phenomena. IEEE 1588The RSG907R and RSG909R enable the creation of a future proof network with support for IEEE 1588 time synchronisation.

Technical specifications

Article number	**6GK6498-0RB00....**	**6GK6490-7RB00....**
Product type designation	RUGGEDCOM RSG909R	RUGGEDCOM RSG907R
Transfer rate		
Transfer rate	10/100/1000 Mbit/s	10/100/1000 Mbit/s
Number of ports maximum	9	7
Interfaces for communication integrated		
Number of electrical connections • for network components or terminal equipment	9	7
Number of 100 Mbit/s LC ports • for multimode		4
Number of 10/100/1000 Mbit/s RJ45 ports integrated	6	
Number of electrical connections • for SFP	3	3
Interfaces other		
Number of electrical connections • for operator console • for management purposes • for signaling contact • for power supply	 1 9 1 2	 1 7 1 2
Type of electrical connection • for operator console • for management purposes • for signaling contact • for power supply	 USB USB 3-pole terminal block, screwable 5-pole terminal block, screwable	 USB USB 3-pole terminal block, screwable 5-pole terminal block, screwable
Signal inputs/outputs		
Relay design	Form-C contact relay (SPDT)	Form-C contact relay (SPDT)
Type of relay output	changeover contact (CO)	changeover contact (CO)
Number of relay outputs as CO contact	1	1
Operating voltage of the signaling contacts • at AC maximum • at DC maximum	 250 V 30 V	 250 V 30 V
operational current of the signaling contacts • at AC maximum • at DC maximum	 2 A 2 A	 2 A 2 A

Article number	**6GK6498-0RB00….**	**6GK6490-7RB00….**
Product type designation	RUGGEDCOM RSG909R	RUGGEDCOM RSG907R
Supply voltage, current consumption, power loss		
Product options wide range power supply	Yes	Yes
Product component connection for redundant voltage supply	Yes	Yes
Type of voltage 1 of the supply voltage • power loss [W] 1 rated value • supply voltage 1 rated value	DC 15.5 W 10 ... 60 V	DC 15.5 W 10 ... 60 V
Type of voltage 2 of the supply voltage • supply voltage 2 rated value	DC 88 ... 300 V	DC 88 ... 300 V
Type of voltage 3 of the supply voltage • supply voltage 3 rated value	AC 85 ... 264 V	AC 85 ... 264 V
Ambient conditions		
Ambient temperature • during operation • during storage • during transport • note	 -40 ... +85 °C -40 ... +85 °C -40 ... +85 °C A maximum operating temperature of +85 °C is permissible for a duration of 16 hours	 -40 ... +85 °C -40 ... +85 °C -40 ... +85 °C A maximum operating temperature of +85 °C is permissible for a duration of 16 hours
Operating condition fanless operation	Yes	Yes
Protection class IP	IP40	IP40
Design, dimensions and weights		
Design	compact	compact
Width	90 mm	90 mm
Height	177 mm	177 mm
Depth	163 mm	163 mm
Net weight	2.4 kg	2.4 kg
Product feature onformal coating	optional	optional
Material f the enclosure	Cast Aluminum Enclosure	Cast Aluminum Enclosure
Fastening method • 19-inch installation • 35 mm top hat DIN rail mounting • wall mounting	 No Yes Yes	 No Yes Yes
Product features, product functions, product components general		
Number of automatically learnable MAC addresses	16384	16384
Storage capacity • of message buffer maximum	 2048 Kibyte	 2048 Kibyte
Switch latency period	3 µs	3 µs
Transfer rate of the switch	58 Gbit/s	58 Gbit/s
Number of priority channels	8	8
Product feature • No head-off-line-blocking • Cut Through switching method • Store & Forward switching method • Zero-Packet-Loss technology	 Yes Yes Yes Yes; Zero-Packet-Loss applies to fiber optic interfaces	 Yes Yes Yes Yes; Zero-Packet-Loss applies to fiber optic interfaces
Product functions management, configuration, engineering		
Product function • CLI • web-based management • MIB support • RMON • port mirroring • CoS	 Yes Yes Yes Yes Yes Yes	 Yes Yes Yes Yes Yes Yes
Product function switch-managed	Yes	Yes
Protocol is supported • Telnet • HTTP • HTTPS • TFTP • SFTP • GMRP • LLDP • SNMP v1 • SNMP v2 • SNMP v2c • SNMP v3 • IGMP (snooping/querier)	 Yes Yes Yes Yes Yes Yes Yes Yes No Yes Yes Yes	 Yes Yes Yes Yes Yes Yes Yes Yes No Yes Yes Yes
Number of groups t IGMP	1024	1024

RUGGEDCOM RSG907R and RSG909R

Article number	**6GK6498-0RB00….**	**6GK6490-7RB00….**
Product type designation	RUGGEDCOM RSG909R	RUGGEDCOM RSG907R
Product functions VLAN		
Product function		
• VLAN - port based	Yes	Yes
Number of VLANs maximum	255	255
Protocol is supported GVRP	Yes	Yes
Product functions DHCP		
Product function		
• DHCP client	Yes	Yes
• DHCP Option 82	Yes	Yes
• DHCP Option 66	No	No
• DHCP Option 67	No	No
Product functions redundancy		
Product function		
• High Speed Redundancy Protocol (HRP)	No	No
• redundancy procedure STP	Yes	Yes
• redundancy procedure RSTP	Yes	Yes
• redundancy procedure MSTP	Yes	Yes
• High-availability Seamless Redundancy (HSR)	Yes	Yes
• Parallel Redundancy Protocol (PRP)/operation in the PRP-network	Yes	Yes
• Parallel Redundancy Protocol (PRP)/Redundant Network Access (RNA)	Yes	Yes
• High-availability Seamless Redundancy (HSR) and Parallel Redundancy Protocol (PRP) coupling	Yes	Yes
• eRSTP	Yes	Yes
Protocol is supported		
• STP	Yes	Yes
• RSTP	Yes	Yes
• MSTP	Yes	Yes
Product functions security		
Product function		
• IEEE 802.1x (radius)	Yes	Yes
Protocol is supported		
• RADIUS	Yes	Yes
• TACACS+	Yes	Yes
• SSH	Yes	Yes
• SSL	Yes	Yes
Key length		
• with SSL	256 bit	256 bit
• with RSA	3072 bit	3072 bit
Product functionport-rate-limiting	Yes	Yes
Product functions time		
Product function		
• NTP-client	Yes	Yes
• SNTP client	Yes	Yes
• SNTP server	Yes	Yes
• IEEE 1588 v2 transparent forwarding	Yes	Yes
Protocol is supported		
• SNTP	Yes	Yes
Product function hardware-supported timestamp at all ports	Yes	Yes
Standards, specifications, approvals		
Standard		
• for safety from CSA and UL	cCSAus (Compliant with CSA C22.2 No. 60950, UL 60950, EN 60950)	cCSAus (Compliant with CSA C22.2 No. 60950, UL 60950, EN 60950)
Reference code		
• according to IEC 81346-2	KF	KF
• according to IEC 81346-2:2019	KFE	KFE
Standards, specifications, approvals CE		
Certificate of suitability CE marking	Yes	Yes
Standard		
• for EMC	FCC Part 15 (Class A), EN 55022 (CISPR22 Class A)	FCC Part 15 (Class A), EN 55022 (CISPR22 Class A)
Standards, specifications, approvals other		
Laser protection class	Complies with 21 CFR chapter 1, subchapter J	Complies with 21 CFR chapter 1, subchapter J
Certificate of suitability		
• IEC 61850-3	Yes	Yes
• IEEE 1613	Yes	Yes

Selection and ordering data

Version	Article No.
RUGGEDCOM RSG909R RUGGEDCOM RSG909R is a 9 port industrially hardened, fully managed Ethernet switch featuring an integrated HSR/PRP RedBox for use in harsh industrial environments. The product has 3x 1Gbit/s SFP slots and 6x 10/100/1000Mbit/s RJ45 Ethernet ports. -40°C to +85°C operating temperature (fanless).	**6GK6498-0RB00-..N.**
RUGGEDCOM RSG907R RUGGEDCOM RSG907R is a 7 port industrially hardened, fully managed Ethernet switch featuring an integrated HSR/PRP RedBox for use in harsh industrial environments. The product has 3x 1Gbit/s SFP slots and 4x 100Mbit/s multimode LC ports (max 2km). -40°C to +85°C operating temperature (fanless).	**6GK6490-7RB00-..N.**
RUGGEDCOM accessories	
• **USB Console cable** USB 2.0 A type to B type Cable Assembly 10 feet / 3 meters	**6GK6000-8DT01-0AA0**
• **Panel mounting kit** Allows wall and other lateral mounting possible, requires assembly and even mounting plane	**6GK6000-8MR00-0AA1**
• **Power cable without lugs** Power Cable with north-american plug for pluggable terminal blocks (6 ft.) for RUGGEDCOM products	**6GK6000-8BB00-0AA0**
Fiber Optic SFPs (Gigabit)	
• **RUGGEDCOM SFP1122-1SX** 1000BASE-SX, LC-Interface, Optical: Multi Mode Fiber Optic up to max. 500m, 850nm, -40 °C ...+85 °C	**6GK6000-8FG51-0AA0**
• **RUGGEDCOM SFP1122-1SX2** 1000BASE-SX, LC-Interface, Optical: Multi Mode Fiber Optic up to max. 2km, 1310nm, -40 °C ...+85 °C	**6GK6000-8FE58-0AA0**
• **RUGGEDCOM SFP1132-1LX10** 1000BASE-LX, LC-Interface, Optical: Single Mode Fiber Optic up to max. 10km, 1310nm, -40 °C ...+85 °C	**6GK6000-8FG52-0AA0**
• **RUGGEDCOM SFP1132-1LX25** 1000BASE-LX, LC-Interface, Optical: Single Mode Fiber Optic up to max. 25km, 1310nm, -40 °C ...+85 °C	**6GK6000-8FG53-0AA0**
• **RUGGEDCOM SFP1132-1LX40** 1000BASE-LX, LC-Interface, Optical: Single Mode Fiber Optic up to max. 40km, 1550nm, -40 °C ...+85 °C	**6GK6000-8FG57-0AA0**
• **RUGGEDCOM SFP1132-1LX70** 1000BASE-LX, LC-Interface, Optical: Single Mode Fiber Optic up to max. 70km, 1550nm, -40 °C ...+85 °C	**6GK6000-8FG54-0AA0**
• **RUGGEDCOM SFP1132-1LX100** 1000BASE-LX, LC-Interface, Optical: Single Mode Fiber Optic up to max. 100km, 1550nm, 0 °C ...+70 °C	**6GK6000-8FG55-0AA0**
• **RUGGEDCOM SFP1132-1LX115** 1000BASE-LX, LC-Interface, Optical: Single Mode Fiber Optic up to max. 115km, 1550nm, -10 °C ...+70 °C	**6GK6000-8FE56-0AA0**
Fiber Optic Bi-Directional SFPs (Gigabit)	
• **RUGGEDCOM SFP1132-1BX10R** 1000BASE-BX-U, LC-Interface, Opti cal: Single Mode Fiber Optic up to max. 10km, 1310nm TX/1490 nm RX, -40 °C ...+85 °C	**6GK6000-8FB51-0AA0**
• **RUGGEDCOM SFP1132-1BX10T** 1000BASE-BX-D, LC-Interface, Opti cal: Single Mode Fiber Optic up to max. 10km, 1490nm TX/1310 nm RX, -40 °C ...+85 °C	**6GK6000-8FB52-0AA0**
• **RUGGEDCOM SFP1132-1BX40R** 1000BASE-BX-U, LC-Interface, Optical: Single Mode Fiber Optic up to max. 40km, 1310nm TX/1490 nm RX, -40 °C ...+85 °C	**6GK6000-8FB53-0AA0**
• **RUGGEDCOM SFP1132-1BX40T** 1000BASE-BX-D, 1 X 1000MBIT/S, LC-Interface, Optical: Single Mode Fiber Optic up to max. 40km, 1490nm TX/1310 nm RX, -40 °C ...+85 °C	**6GK6000-8FB54-0AA0**

More information

The RUGGEDCOM Selector assists you in selecting the right RUGGEDCOM products and in configuring variants and is available at:
http://www.siemens.com/ruggedcom-selector

RUGGEDCOM RSG920P

Overview

The RUGGEDCOM RSG920P is a rugged Layer 2 Gigabit switch with high port density in small form factor with Power-over-Ethernet (PoE) capability that has been designed for control cabinets with limited space and for high bandwidth requirements. The RUGGEDCOM RSG920P provides maximum reliability for industrial applications, such as in transportation and oil & gas applications, and is tested and certified to withstand extreme temperatures, vibrations and shocks.

The Power-over-Ethernet interfaces of the RUGGEDCOM RSG920P are fed by an external power supply. RUGGEDCOM RPS1300 is the related power supply. It is adequately sized to operate all 4 Power-over-Ethernet interfaces simultaneously.

Technical specifications

Article number	**6GK6092-0PS1.-....**	**6GK6092-0PS2.-....**
Product type designation	RUGGEDCOM RSG920PNC	RUGGEDCOM RSG920P
Transfer rate		
Transfer rate	10/100/1000 Mbit/s	10/100/1000 Mbit/s
Number of ports maximum	20	20
Interfaces for communication integrated		
Number of electrical connections • for network components or terminal equipment • for Power-over-Ethernet / for network components or terminal equipment	 16 4	 16 4
Number of electrical connections • for SFP	 4	 4
Interfaces other		
Number of electrical connections • for operator console • for management purposes • for signaling contact • for power supply	 2 2 1 1	 2 2 1 1
Type of electrical connection • for operator console • for management purposes • for signaling contact • for power supply	 RJ45, USB RJ45, USB 3-pole terminal block, screwable 3-pole or 4-pole terminal block, screwable	 RJ45, USB RJ45, USB 3-pole terminal block, screwable 3-pole or 4-pole terminal block, screwable
Signal inputs/outputs		
Relay design	Form-C contact relay (SPDT)	Form-C contact relay (SPDT)
Type of relay output	changeover contact (CO)	changeover contact (CO)
Operational current of the signaling contacts • at DC at 30 V maximum	 2 A	 2 A
Supply voltage, current consumption, power loss		
Product options wide range power supply	Yes	Yes
Type of voltage 1 of the supply voltage • power loss (W) 1 rated value • supply voltage 1 rated value	DC 27 W 9 ... 60 V	DC 27 W 9 ... 60 V
Type of voltage 3 of the supply voltage • supply voltage 3 rated value	DC 98 ... 300 V	DC 98 ... 300 V
Type of voltage 4 of the supply voltage • supply voltage 4 rated value	AC 88 ... 264 V	AC 88 ... 264 V
Ambient conditions		
Ambient temperature • during operation • during storage • during transport • note	 -40 ... +85 °C -40 ... +85 °C -40 ... +85 °C A maximum operating temperature of +85 °C is permissible for a duration of 16 hours	 -40 ... +85 °C -40 ... +85 °C -40 ... +85 °C A maximum operating temperature of +85 °C is permissible for a duration of 16 hours
Operating condition fanless operation	Yes	Yes
Protection class IP	IP40	IP40

Article number	**6GK6092-0PS1.-....**	**6GK6092-0PS2.-....**
Product type designation	RUGGEDCOM RSG920PNC	RUGGEDCOM RSG920P
Design, dimensions and weights		
Design	compact	compact
Width	152 mm	152 mm
Height	177 mm	177 mm
Depth	165.6 mm	165.6 mm
Net weight	4.7 kg	4.7 kg
Product feature onformal coating	optional	optional
Material f the enclosure	Cast Aluminum Enclosure	Cast Aluminum Enclosure
Fastening method		
• 19-inch installation	No	No
• 35 mm top hat DIN rail mounting	Yes	Yes
• wall mounting	Yes	Yes
Product features, product functions, product components general		
Storage capacity		
• of message buffer maximum	1536 Kibyte	1536 Kibyte
Switch latency period	4 µs	4 µs
Transfer rate of the switch	108.92 Gbit/s	108.92 Gbit/s
Product feature		
• No head-off-line-blocking	Yes	Yes
• Store & Forward switching method	Yes	Yes
Product functions management, configuration, engineering		
Product function		
• CLI	Yes	Yes
• web-based management	Yes	Yes
• MIB support	Yes	Yes
• RMON	Yes	Yes
• port mirroring	Yes	Yes
• CoS	Yes	Yes
Product function switch-managed	Yes	Yes
Protocol is supported		
• Telnet	Yes	Yes
• HTTP	Yes	Yes
• HTTPS	Yes	Yes
• TFTP	Yes	Yes
• SFTP	Yes	Yes
• GMRP	Yes	Yes
• LLDP	Yes	Yes
• SNMP v1	Yes	Yes
• SNMP v2	No	No
• SNMP v2c	Yes	Yes
• SNMP v3	Yes	Yes
• IGMP (snooping/querier)	Yes	Yes
Number of groups / at IGMP	256	256
Product function		
• for MIB support by BRIDGE-MIB	RFC4188	RFC4188
• for MIB support / by IF-MIB	RFC2863	RFC2863
• for MIB support / by RMON-MIB	RFC2819	RFC2819
• for MIB support / by RSTP-MIB	RFC4318	RFC4318
• for MIB support / by SNMPv2-MIB	RFC1907	RFC1907
• for MIB support / by SNMPv2-SMI	RFC2578	RFC2578
• for MIB support / by SNMPv2-TC	RFC2579	RFC2579
• for MIB support / by TCP-MIB	RFC2012	RFC2012
• for MIB support / by UDP-MIB	RFC2013	RFC2013
Product functions VLAN		
Product function		
• VLAN - port based	Yes	Yes
Number of VLANs maximum	255	255
Protocol is supported GVRP	Yes	Yes
Product functions DHCP		
Product function		
• DHCP client	Yes	Yes
• DHCP Option 82	Yes	Yes
• DHCP Option 66	No	No
• DHCP Option 67	No	No

RUGGEDCOM RSG920P

Article number	6GK6092-0PS1.-....	6GK6092-0PS2.-....
Product type designation	RUGGEDCOM RSG920PNC	RUGGEDCOM RSG920P
Product functions redundancy		
Product function		
• redundancy procedure STP	Yes	Yes
• redundancy procedure RSTP	Yes	Yes
• redundancy procedure MSTP	Yes	Yes
• eRSTP	Yes	Yes
Protocol is supported		
• STP	Yes	Yes
• RSTP	Yes	Yes
• MSTP	Yes	Yes
Product functions security		
Product function		
• IEEE 802.1x (radius)	Yes	Yes
Protocol is supported		
• TACACS+	Yes	Yes
• SSH	Yes	Yes
• SSL	Yes	Yes
Key length		
• with SSL	56 bit	128 bit
• with RSA	1024 bit	1024 bit
Product function port-rate-limiting	Yes	Yes
adjustable port-rate-limitation	128 kbit/s ... 8 Mbit/s	128 kbit/s ... 8 Mbit/s
Product functions time		
Product function		
• SNTP client	Yes	Yes
• SNTP server	Yes	Yes
Protocol is supported		
• SNTP	Yes	Yes
Standards, specifications, approvals		
Reference code		
• according to IEC 81346-2	KF	KF
• according to IEC 81346-2:2019	KFE	KFE
Standards, specifications, approvals CE		
Certificate of suitability CE marking	Yes	Yes
Standard for EMC	FCC Part 15 (Class A), EN 55022 (CISPR22 Class A)	FCC Part 15 (Class A), EN 55022 (CISPR22 Class A)
Standards, specifications, approvals other		
Laser protection class	Complies with 21 CFR chapter 1, subchapter J	Complies with 21 CFR chapter 1, subchapter J
Certificate of suitability		
• IEC 61850-3	Yes	Yes
Standards, specifications, approvals product conformity		
Product conformity		
• according to IEEE 802.3-10BaseT	Yes	Yes
• according to IEEE 802.3u-100BaseTX	Yes	Yes
• according to IEEE 802.3u-100BaseFX	Yes	Yes
• according to IEEE 802.3ab-1000BaseT	Yes	Yes
• according to IEEE 802.3z-1000BaseLX	Yes	Yes
• according to IEEE 802.3ad-Link Aggregation	Yes	Yes
• according to IEEE 802.3af-Power-over-Ethernet	Yes	Yes
• according to IEEE 802.3x-Flow Control	Yes	Yes
• according to IEEE 802.1d-MAC Bridges	Yes	Yes
• according to IEEE 802.1d-STP	Yes	Yes
• according to IEEE 802.1p-class of service	Yes	Yes
• according to IEEE 802.1Q-VLAN tagging	Yes	Yes
• according to IEEE 802.1Q-2005 (formerly IEEE 802.1s) MSTP	Yes	Yes
• according to IEEE 802.1w-RRST	Yes	Yes
• according to IEEE 802.1x-port based Network Access Control	Yes	Yes
• RFC768-UDP	Yes	Yes
• RFC783-TFTP	Yes	Yes
• RFC791-IP	Yes	Yes
• RFC792-ICMP	Yes	Yes
• RFC793-TCP	Yes	Yes
• RFC826-ARP	Yes	Yes
• RFC854-Telnet	Yes	Yes
• RFC894-IP over Ethernet	Yes	Yes
• RFC1112-IGMPv1	Yes	Yes
• RFC1519-CIDR	Yes	Yes
• RFC1541-DHCP (client)	Yes	Yes
• RFC2068-HTTP	Yes	Yes
• RFC2236-IGMPv2	Yes	Yes
• RFC2284-EAP	Yes	Yes
• RFC2475-Differentiated Service	Yes	Yes
• RFC2865-RADIUS	Yes	Yes
• RFC3414-SNMPv3-USM	Yes	Yes
• RFC3415-SNMPv3-VACM	Yes	Yes

Selection and ordering data

Version	Article No.
RUGGEDCOM RSG920PNC RUGGEDCOM RSG920PNC is a fully-managed Ethernet switch with 56-bit encryption and 20 non-blocking Gigabit Ethernet ports; supports 4 SFP modules and 4 PoE ports; operating temperature -40°C to +85°C (without fan)	**6GK6092-0PS1.-….**
RUGGEDCOM RSG920P RUGGEDCOM RSG920P is a fully-managed Ethernet switch with 128-bit encryption and 20 non-blocking Gigabit Ethernet ports; supports 4 SFP modules and 4 PoE ports; operating temperature -40°C to +85°C (without fan)	**6GK6092-0PS2.-….**
RUGGEDCOM RPS1300 Power Supply 54 V/2.6 A power supply, input: 120/230 V AC, output: 54 V DC /2.6 A, -40°C to 75°C, suitable for RUGGEDCOM PoE applications	**6GK6000-8HS01-0AA0**

More information

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http://www.siemens.com/ruggedcom-selector

RUGGEDCOM RS900G / RUGGEDCOM RS900GP

Overview

The RUGGEDCOM RS900 product family for use in the power supply sector comprises a number of fully-managed Ethernet switches that are specially designed for reliable use in hostile operating environments for electrical equipment and demanding climatic conditions. They provide a high degree of immunity to electromagnetic interference and strong electrical disturbances, which are typically present in factory buildings and in roadside traffic control cabinets. A temperature range from -40 °C to +85 °C enables them to be placed almost anywhere.

Characteristics

- Many different copper and fiber-optic port configurations with transmission rates up to 1 Gbps
- Fiber-optic cable variants are available with multimode or single-mode optical transceiver-receivers and various interfaces (LC, SC, SFP)
- Options for 24 V DC to 48 V DC or high voltage (88-300 V DC / 85-264 V AC) for worldwide operation
- Operation without fans for operating temperatures from -40 °C to +85 °C
- Variety of management interfaces: web-based, Telnet, command line
- Available in a version that supports Power over Ethernet (PoE)

Product versions

RUGGEDCOM RS900G

- Managed Ethernet switch with 10 ports, Gigabit fiber-optic uplinks and 56- or 128-bit encryption

RUGGEDCOM RS900GP

- Managed Ethernet switch with 10 ports, including 8 Power over Ethernet (PoE) ports and 2 Gigabit uplinks, with 56- or 128-bit encryption

Technical specifications

Article number	**6GK6090-0GS2.-….**	**6GK6090-0GS1.-….**	**6GK6090-0PS2.-0.A.**	**6GK6090-0PS1.-0.A.**
Product type designation	RUGGEDCOM RS900G	RUGGEDCOM RS900GNC	RUGGEDCOM RS900GP	RUGGEDCOM RS900GPNC
Transfer rate				
Transfer rate	10/100/1000 Mbit/s	10/100/1000 Mbit/s	10/100/1000 Mbit/s	10/100/1000 Mbit/s
Number of ports maximum	10	10	10; Number of ports depending on configuration	10; Number of ports depending on configuration
Interfaces for communication integrated				
Number of electrical connections				
• for network components or terminal equipment	8	8	--	--
Interfaces other				
Number of electrical connections				
• for operator console	1	1	1	1
• for management purposes	0	0	0	0
Type of electrical connection				
• for operator console	RS232	RS232	RS232	RS232
• for signaling contact	3-pole terminal block, screwable	3-pole terminal block, screwable	3-pole terminal block, screwable	3-pole terminal block, screwable
• for power supply	5-pole terminal block, screwable	5-pole terminal block, screwable	5-pole terminal block, screwable	5-pole terminal block, screwable
Signal inputs/outputs				
Relay design	Form-C contact relay (SPDT)	Form-C contact relay (SPDT)	Form-C contact relay (SPDT)	Form-C contact relay (SPDT)
Type of relay output	changeover contact (CO)	changeover contact (CO)	changeover contact (CO)	changeover contact (CO)
Operational current of the signaling contacts				
• at DC at 30 V maximum	2 A	2 A	2 A	2 A
Supply voltage, current consumption, power loss				
Product options wide range power supply	Yes	Yes	No	No
Type of voltage 1 of the supply voltage	DC	DC	DC	DC
• power loss (W) 1 rated value	10 W	10 W	15 W	15 W
• supply voltage 1 rated value	24 V	24 V	--	--
• consumed current 1 at rated supply voltage maximum	0.4 A	0.4 A	--	--
• supply voltage 1 rated value	10 ... 36 V	10 ... 36 V	--	--
Type of voltage 2 of the supply voltage	DC	DC	DC	DC
• supply voltage 2 rated value	48 V	48 V	54 V	54 V
• consumed current 2 at rated supply voltage maximum	0.2 A	0.2 A	--	--
• supply voltage 2 rated value	36 ... 72 V	36 ... 72 V	45 ... 57 V	45 ... 57 V
Type of voltage 3 of the supply voltage	DC	DC	--	--
• supply voltage 3 rated value	88 ... 300 V	88 ... 300 V	--	--

Article number	**6GK6090-0GS2.-….**	**6GK6090-0GS1.-….**	**6GK6090-0PS2.-0.A.**	**6GK6090-0PS1.-0.A.**
Product type designation	RUGGEDCOM RS900G	RUGGEDCOM RS900GNC	RUGGEDCOM RS900GP	RUGGEDCOM RS900GPNC
Type of voltage 4 of the supply voltage	AC	AC	--	--
• supply voltage 4 rated value	85 ... 265 V	85 ... 265 V	--	--
Ambient conditions				
Ambient temperature				
• during operation	-40 ... +85 °C	-40 ... +85 °C	-40 ... +85 °C	-40 ... +85 °C
• note	A maximum operating temperature of +85 °C is permissible for a duration of 16 hours	A maximum operating temperature of +85 °C is permissible for a duration of 16 hours	A maximum operating temperature of +85 °C is permissible for a duration of 16 hours	A maximum operating temperature of +85 °C is permissible for a duration of 16 hours
Operating condition / fanless operation	Yes	Yes	Yes	Yes
Protection class IP	IP40	IP40	IP40	IP40
Design, dimensions and weights				
Design	compact	compact	compact	compact
Width	66 mm	66 mm	90 mm	90 mm
Height	188 mm	188 mm	176.53 mm	176.53 mm
Depth	127 mm	127 mm	154.432 mm	154.432 mm
Net weight	1.22 kg	1.22 kg	2.3 kg	2.3 kg
Product feature onformal coating	optional	optional	optional	optional
Material f the enclosure	20 AWG galvanized steel enclosure	20 AWG galvanized steel enclosure	Cast Aluminum Enclosure	Cast Aluminum Enclosure
Fastening method				
• 19-inch installation	No	No	No	No
• 35 mm top hat DIN rail mounting	Yes	Yes	Yes	Yes
• wall mounting	Yes	Yes	Yes	Yes
• S7-300 rail mounting	No	No	--	--
• fixed-mounted	Yes	Yes	--	--
Product features, product functions, product components general				
number of automatically learnable MAC addresses	8192	8192	8192	8192
Storage capacity				
• of message buffer maximum	128 Kibyte	128 Kibyte	128 Kibyte	128 Kibyte
• of the MAC-address table	32 Kibyte	32 Kibyte	32 Kibyte	32 Kibyte
Switch latency period	4 µs	4 µs	4 µs	4 µs
Transfer rate of the switch	7.6 Gbit/s	7.6 Gbit/s	5.6 Gbit/s	5.6 Gbit/s
Number of priority channels	4	4	4	4
Product feature				
• No head-off-line-blocking	Yes	Yes	Yes	Yes
• Store & Forward switching method	Yes	Yes	Yes	Yes
• Zero-Packet-Loss technology	Yes; Zero-Packet-Loss applies to fiber optic interfaces	Yes; Zero-Packet-Loss applies to fiber optic interfaces	No	No
Product functions management, configuration, engineering				
Product function				
• CLI	Yes	Yes	Yes	Yes
• web-based management	Yes	Yes	Yes	Yes
• MIB support	Yes	Yes	Yes	Yes
• RMON	Yes	Yes	Yes	Yes
Product function switch-managed	Yes	Yes	Yes	Yes
Protocol is supported				
• Telnet	Yes	Yes	Yes	Yes
• HTTP	Yes	Yes	Yes	Yes
• HTTPS	Yes	Yes	Yes	Yes
• TFTP	Yes	Yes	Yes	Yes
• SFTP	Yes	NO	Yes	Yes
• LLDP	Yes	Yes	Yes	Yes
• SNMP v1	Yes	Yes	Yes	Yes
• SNMP v2	No	No	No	No
• SNMP v2c	Yes	Yes	Yes	Yes
• SNMP v3	Yes	Yes	Yes	Yes
• IGMP (snooping/querier)	Yes	Yes	Yes	Yes
Number of groups / at IGMP	256	256	256	256
Product function				
• for MIB support by BRIDGE-MIB	RFC4188	RFC4188	RFC4188	RFC4188
• for MIB support / by IF-MIB	RFC2863	RFC2863	RFC2863	RFC2863
• for MIB support / by RMON-MIB	RFC2819	RFC2819	RFC2819	RFC2819
• for MIB support / by RSTP-MIB	RFC4318	RFC4318	RFC4318	RFC4318
• for MIB support / by SNMPv2-MIB	RFC1907	RFC1907	RFC1907	RFC1907
• for MIB support / by SNMPv2-SMI	RFC2578	RFC2578	RFC2578	RFC2578
• for MIB support / by SNMPv2-TC	RFC2579	RFC2579	RFC2579	RFC2579
• for MIB support / by TCP-MIB	RFC2012	RFC2012	RFC2012	RFC2012
• for MIB support / by UDP-MIB	RFC2013	RFC2013	RFC20L13	RFC20L13

RUGGEDCOM RS900G / RUGGEDCOM RS900GP

Article number	6GK6090-0GS2.-....	6GK6090-0GS1.-....	6GK6090-0PS2.-0.A.	6GK6090-0PS1.-0.A.
Product type designation	RUGGEDCOM RS900G	RUGGEDCOM RS900GNC	RUGGEDCOM RS900GP	RUGGEDCOM RS900GPNC
Product functions VLAN				
Product function				
• VLAN - port based	Yes	Yes	Yes	Yes
Number of VLANs maximum	255	255	255	255
Protocol is supported GVRP	Yes	Yes	Yes	Yes
Product functions DHCP				
Product function				
• DHCP client	Yes	Yes	Yes	Yes
• DHCP Option 82	Yes	Yes	Yes	Yes
• DHCP Option 66	No	No	No	No
• DHCP Option 67	No	No	No	No
Product functions redundancy				
Product function				
• redundancy procedure STP	Yes	Yes	Yes	Yes
• redundancy procedure RSTP	Yes	Yes	Yes	Yes
• redundancy procedure MSTP	Yes	Yes	Yes	Yes
• eRSTP	Yes	Yes	Yes	Yes
Protocol is supported				
• STP/RSTP	Yes	Yes	--	--
• STP	Yes	Yes	Yes	Yes
• RSTP	Yes	Yes	Yes	Yes
• MSTP	Yes	Yes	Yes	Yes
Product functions security				
Product function				
• IEEE 802.1x (radius)	Yes	Yes	Yes	Yes
Protocol is supported				
• TACACS+	Yes	Yes	Yes	Yes
• SSH	Yes	NO	Yes	Yes
• SSL	Yes	Yes	Yes	Yes
Key length				
• with SSL	128 bit	56 bit	128 bit	56 bit
• with RSA	1024 bit	1024 bit	1024 bit	1024 bit
Product function port-rate-limiting	Yes	Yes	Yes	Yes
adjustable port-rate-limitation	128 kbit/s ... 8 Mbit/s	128 kbit/s ... 8 Mbit/s	128 kbit/s ... 8 Mbit/s	128 kbit/s ... 8 Mbit/s
Product functions time				
Product function				
• SNTP client	Yes	Yes	Yes	Yes
• SNTP server	Yes	Yes	Yes	Yes
Protocol is supported				
• SNTP	Yes	Yes	Yes	Yes
Standards, specifications, approvals				
Standard				
• for safety from CSA and UL	cCSAus (Compliant with CSA C22.2 No 60950, UL 60950, EN 60950	cCSAus (Compliant with CSA C22.2 No 60950, UL 60950, EN 60950	cCSAus (Compliant with CSA C22.2 No 60950, UL 60950, EN 60950	cCSAus (Compliant with CSA C22.2 No 60950, UL 60950, EN 60950
Reference code				
• according to IEC 81346-2	KF	KF	KF	KF
• according to IEC 81346-2:2019	KFE	KFE	KFE	KFE
Standards, specifications, approvals CE				
Certificate of suitability CE marking	Yes	Yes	Yes	Yes
Standard				
• for EMC	FCC Part 15 (Class A), EN 55022 (CISPR22 Class A)	FCC Part 15 (Class A), EN 55022 (CISPR22 Class A)	FCC Part 15 (Class A), EN 55022 (CISPR22 Class A)	FCC Part 15 (Class A), EN 55022 (CISPR22 Class A)
Standards, specifications, approvals other				
Laser protection class	Complies with 21 CFR chapter 1, subchapter J	Complies with 21 CFR chapter 1, subchapter J	Complies with 21 CFR chapter 1, subchapter J	Complies with 21 CFR chapter 1, subchapter J
Certificate of suitability				
• railway application in according with EN 50155	No	No	--	--
• IEC 61850-3	Yes	Yes	Yes	Yes
• according to FIPS 140-2	No	No	No	No
• according to Common Criteria (CC)	No	No	No	No
Standards, specifications, approvals				
Laser protection class	Complies with 21 CFR chapter 1, subchapter J	Complies with 21 CFR chapter 1, subchapter J		

Article number	6GK6090-0GS2.-....	6GK6090-0GS1.-....	6GK6090-0PS2.-0.A.	6GK6090-0PS1.-0.A.
Product type designation	RUGGEDCOM RS900G	RUGGEDCOM RS900GNC	RUGGEDCOM RS900GP	RUGGEDCOM RS900GPNC
Standards, specifications, approvals - Marine classification				
Marine classification association				
• American Bureau of Shipping Europe Ltd. (ABS)	Yes	No	--	
• Bureau Veritas (BV)	Yes	No	--	
• Det Norske Veritas (DNV)	Yes	No	--	
• Germanischer Lloyd (GL)	No	No	--	
• Lloyds Register of Shipping (LRS)	Yes	No	--	
• Nippon Kaiji Kyokai (NK)	Yes	No	--	
• Polski Rejestr Statkow (PRS)	Yes	No	--	
Standards, specifications, approvals product conformity				
Product conformity				
• according to IEEE 802.3-10BaseT	Yes	Yes	Yes	Yes
• according to IEEE 802.3u-100BaseTX	Yes	Yes	Yes	Yes
• according to IEEE 802.3u-100BaseFX	Yes	Yes	Yes	Yes
• according to IEEE 802.3ab-1000BaseT	Yes	Yes	Yes	Yes
• according to IEEE 802.3z-1000BaseLX	Yes	Yes	Yes	Yes
• according to IEEE 802.3ad-Link Aggregation	Yes	Yes	Yes	Yes
• according to IEEE 802.3af-Power-over-Ethernet	No	No	Yes	Yes
• according to IEEE 802.3x-Flow Control	Yes	Yes	Yes	Yes
• according to IEEE 802.1d-MAC Bridges	Yes	Yes	Yes	Yes
• according to IEEE 802.1d-STP	Yes	Yes	Yes	Yes
• according to IEEE 802.1p-class of service	Yes	Yes	Yes	Yes
• according to IEEE 802.1Q-VLAN tagging	Yes	Yes	Yes	Yes
• according to IEEE 802.1Q-2005 (formerly IEEE 802.1s) MSTP	Yes	Yes	Yes	Yes
• according to IEEE 802.1w-RRST	Yes	Yes	Yes	Yes
• according to IEEE 802.1x-port based Network Access Control	Yes	Yes	Yes	Yes
• RFC768-UDP	Yes	Yes	Yes	Yes
• RFC783-TFTP	Yes	Yes	Yes	Yes
• RFC791-IP	Yes	Yes	Yes	Yes
• RFC792-ICMP	Yes	Yes	Yes	Yes
• RFC793-TCP	Yes	Yes	Yes	Yes
• RFC826-ARP	Yes	Yes	Yes	Yes
• RFC854-Telnet	Yes	Yes	Yes	Yes
• RFC894-IP over Ethernet	Yes	Yes	Yes	Yes
• RFC1112-IGMPv1	Yes	Yes	Yes	Yes
• RFC1519-CIDR	Yes	Yes	Yes	Yes
• RFC1541-DHCP (client)	Yes	Yes	Yes	Yes
• RFC2068-HTTP	Yes	Yes	Yes	Yes
• RFC2236-IGMPv2	Yes	Yes	Yes	Yes
• RFC2284-EAP	Yes	Yes	Yes	Yes
• RFC2475-Differentiated Service	Yes	Yes	Yes	Yes
• RFC2865-RADIUS	Yes	Yes	Yes	Yes
• RFC3414-SNMPv3-USM	Yes	Yes	Yes	Yes
• RFC3415-SNMPv3-VACM	Yes	Yes	Yes	Yes

Selection and ordering data

Version	Article No.
RUGGEDCOM RS900G The RUGGEDCOM RS900G is a fully-managed Ethernet switch that has two Gigabit Ethernet fiber-optic ports and eight Fast Ethernet copper ports; 56- or 128-bit encryption; 2 Gigabit Ethernet fiber-optic ports (1000BaseX); 8 Fast Ethernet ports (10/100BaseTX); various fiber-optic connection options (pluggable LC, SC, SFP optics); support of bidirectional single strand fiber-optic cable; long-distance fiber-optic connections enable distances up to 70 km in the Gigabit range	
• **RUGGEDCOM RS900GNC** (not subject to export controls)	**6GK6090-0GS1.-....**
• **RUGGEDCOM RS900G** (subject to export controls)	**6GK6090-0GS2.-....**
RUGGEDCOM RS900GP The RUGGEDCOM RS900GP is a fully-managed Ethernet switch that has two Gigabit Ethernet fiber-optic ports and eight Fast Ethernet copper ports; 56- or 128-bit encryption; 2 Gigabit Ethernet fiber-optic ports (1000BaseX); 8 Fast Ethernet ports (10/100BaseTX); various fiber-optic connection options (pluggable LC, SC, SFP optics); support of bidirectional single strand fiber-optic cable; long-distance fiber-optic connections enable distances up to 70 km in the Gigabit range	
• **RUGGEDCOM RS900GPNC** (not subject to export controls)	**6GK6090-0PS1.-0.A.**
• **RUGGEDCOM RS900GP** (subject to export controls)	**6GK6090-0PS2.-0.A.**

More information

The RUGGEDCOM Selector assists you in selecting the right RUGGEDCOM products and in configuring variants and is available at:
http://www.siemens.com/ruggedcom-selector

RUGGEDCOM RSG908C / RUGGEDCOM RSG910C

Overview

The RUGGEDCOM RSG910C and RSG908C are compact all Gigabit, IEEE 1588 compatible Ethernet switches. The RSG910C supports 4 Gigabit SFP uplink ports and 6 10/100/1000TX copper ethernet ports while the RSG908C supports 4 Gigabit SFP uplink ports and 4 multi mode fiber 100FX ports with LC connectors. Both products come with an integrated DIN rail mount and front-facing interfaces for easy installation in space-limited areas. They offer redundant power inputs for both DC and high voltage AC/DC applications, eliminating a single point of failure. Designed to operate in harsh environments with widely varying climatic and environmental conditions, these devices can be used for precise time synchronization in the Electric Power industry; for high-bandwidth applications such as video streaming in the Transportation industry and for time-critical applications such as drilling automation, SCADA (Supervisory Control and Data Acquisition) and RTU (Remote terminal unit) solutions for wellhead automation, pipeline monitoring, compression or pumping stations in the oil & gas industry.

Characteristics

- 4 Fiber optic (100BASE-FX, LC) or 6 Copper (10/100/1000BASE-X, RJ45) ports
- Industry standard connectors: SFP, LC and/or RJ45
- Fully integrated power supply with redundant power inputs
  - Universal high-voltage dual inputs: 100 VAC – 240 VAC/ 100 VDC – 300 VDC
  - Universal low-voltage DC dual inputs with nominal voltages: 12 VDC, 24 VDC, 48 VDC (10 – 60 VDC)
- Non-blocking store and forward switching
- For use at ambient temperatures from –40 °C to +85 °C without the use of fans

Product versions

RUGGEDCOM RSG910C

- The RUGGEDCOM RSG910C is a compact Gigabit IEEE 1588 compatible Ethernet switch, providing 4 Gigabit SFP ports and 6 Gigabit copper ports

RUGGEDCOM RSG908C

- The RUGGEDCOM RSG908C is a compact Gigabit IEEE 1588 compatible Ethernet switch, providing 4 Gigabit SFP ports and 4 100 FX multimode fiber optic ports with LC connectors.

Technical specifications

Article number	**6GK6491-0CB..-....**	**6GK6490-8CB..-....**
Product type designation	RUGGEDCOM RSG910C	RUGGEDCOM RSG908C
Transfer rate		
Transfer rate	10/100/1000 Mbit/s	10/100/1000 Mbit/s
Number of ports maximum	10	8
Interfaces for communication integrated		
Number of electrical connections		
• for network components or terminal equipment	10	8
Number of 10/100/1000 Mbit/s RJ45 ports integrated	6	
Number of 100 Mbit/s LC ports		
• for multimode		4
Number of electrical connections		
• for SFP	4	4
Interfaces other		
Number of electrical connections		
• for operator console	1	1
• for management purposes	10	8
• for signaling contact	1	1
• for power supply	2	2
Type of electrical connection		
• for operator console	USB	USB
• for management purposes	USB	USB
• for signaling contact	3-pole terminal block, screwable	3-pole terminal block, screwable
• for power supply	5-pole terminal block, screwable	5-pole terminal block, screwable

Article number	**6GK6491-0CB..-....**	**6GK6490-8CB..-....**
Product type designation	RUGGEDCOM RSG910C	RUGGEDCOM RSG908C
Signal inputs/outputs		
Relay design	Form-C contact relay (SPDT)	Form-C contact relay (SPDT)
Type of relay output	changeover contact (CO)	changeover contact (CO)
Number of relay outputs as CO contact	1	1
Operating voltage of the signaling contacts		
• at AC maximum	250 V	250 V
• at DC maximum	30 V	30 V
Operational current of the signaling contacts		
• at AC maximum	2 A	2 A
• at DC maximum	2 A	2 A
Supply voltage, current consumption, power loss		
Product options wide range power supply	Yes	Yes
Product component connection for redundant voltage supply	Yes	Yes
Type of voltage 1 of the supply voltage	DC	DC
• power loss (W) 1rated value	15.5 W	15.5 W
• supply voltage 1 rated value	10 ... 60 V	10 ... 60 V
Type of voltage 2 of the supply voltage	DC	DC
• supply voltage 2 rated value	88 ... 300 V	88 ... 300 V
Type of voltage 3 of the supply voltage	AC	AC
• supply voltage 3 rated value	85 ... 264 V	85 ... 264 V
Ambient conditions		
Ambient temperature		
• during operation	-40 ... +85 °C	-40 ... +85 °C
• during storage	-40 ... +85 °C	-40 ... +85 °C
• during transport	-40 ... +85 °C	-40 ... +85 °C
• note	A maximum operating temperature of +85 °C is permissible for a duration of 16 hours	A maximum operating temperature of +85 °C is permissible for a duration of 16 hours
Operating condition / fanless operation	Yes	Yes
Protection class IP	IP40	IP40
Design, dimensions and weights		
Design	compact	compact
Width	90 mm	90 mm
Height	177 mm	177 mm
Depth	163 mm	163 mm
Net weight	2.4 kg	2.4 kg
Product feature onformal coating	optional	optional
Material f the enclosure	Cast Aluminum Enclosure	Cast Aluminum Enclosure
Fastening method		
• 19-inch installation	No	No
• 35 mm top hat DIN rail mounting	Yes	Yes
• wall mounting	Yes	Yes
Product features, product functions, product components general		
Number of automatically learnable MAC addresses	16384	16384
Storage capacity		
• of message buffer maximum	2048 Kibyte	2048 Kibyte
Switch latency period	3 µs	3 µs
Transfer rate of the switch	58 Gbit/s	58 Gbit/s
Number of priority channels	8	8
Product feature		
• No head-off-line-blocking	Yes	Yes
• Cut Through switching method	Yes	Yes
• Store & Forward switching method	Yes	Yes
• Zero-Packet-Loss technology	Yes; Zero-Packet-Loss applies to fiber optic interfaces	Yes; Zero-Packet-Loss applies to fiber optic interfaces

RUGGEDCOM RSG908C / RUGGEDCOM RSG910C

Article number	**6GK6491-0CB..-....**	**6GK6490-8CB..-....**
Product type designation	RUGGEDCOM RSG910C	RUGGEDCOM RSG908C
Product functions management, configuration, engineering		
Product function		
• CLI	Yes	Yes
• web-based management	Yes	Yes
• MIB support	Yes	Yes
• RMON	Yes	Yes
• port mirroring	Yes	Yes
• CoS	Yes	Yes
Product function switch-managed	Yes	Yes
Protocol is supported		
• Telnet	Yes	Yes
• HTTP	Yes	Yes
• HTTPS	Yes	Yes
• TFTP	Yes	Yes
• SFTP	Yes	Yes
• GMRP	Yes	Yes
• LLDP	Yes	Yes
• SNMP v1	Yes	Yes
• SNMP v2	No	No
• SNMP v2c	Yes	Yes
• SNMP v3	Yes	Yes
• IGMP (snooping/querier)	Yes	Yes
Number of groups / at IGMP	1024	1024
Product functions VLAN		
Product function		
• VLAN - port based	Yes	Yes
Number of VLANs maximum	255	255
Protocol is supported GVRP	Yes	Yes
Product functions DHCP		
Product function		
• DHCP client	Yes	Yes
• DHCP Option 82	Yes	Yes
• DHCP Option 66	No	No
• DHCP Option 67	No	No
Product functions redundancy		
Product function		
• High Speed Redundancy Protocol (HRP)	No	No
• redundancy procedure STP	Yes	Yes
• redundancy procedure RSTP	Yes	Yes
• redundancy procedure MSTP	Yes	Yes
• eRSTP	Yes	Yes
Protocol is supported		
• STP	Yes	Yes
• RSTP	Yes	Yes
• MSTP	Yes	Yes
Product functions security		
Product function		
• IEEE 802.1x (radius)	Yes	Yes
Protocol is supported		
• RADIUS	Yes	Yes
• TACACS+	Yes	Yes
• SSH	Yes	Yes
• SSL	Yes	Yes
Key length		
• with SSL	256 bit	256 bit
• with RSA	3072 bit	3072 bit
Product functionport-rate-limiting	Yes	Yes
Product functions time		
Product function		
• NTP-client	Yes	Yes
• SNTP client	Yes	Yes
• SNTP server	Yes	Yes
• IEEE 1588 v2 transparent forwarding	Yes	Yes
Protocol is supported		
• SNTP	Yes	Yes
product function hardware-supported timestamp at all ports	Yes	Yes

Article number	**6GK6491-0CB..-....**	**6GK6490-8CB..-....**
Product type designation	RUGGEDCOM RSG910C	RUGGEDCOM RSG908C
Standards, specifications, approvals		
Standard		
• for safety from CSA and UL	cCSAus (Compliant with CSA C22.2 No. 60950, UL 60950, EN 60950)	cCSAus (Compliant with CSA C22.2 No. 60950, UL 60950, EN 60950)
Reference code		
• according to IEC 81346-2	KF	KF
• according to IEC 81346-2:2019	KFE	KFE
Standards, specifications, approvals CE		
Certificate of suitability CE marking	Yes	Yes
Standard		
• for EMC	FCC Part 15 (Class A), EN 55022 (CISPR22 Class A)	FCC Part 15 (Class A), EN55022 (CISPR22 Class A)
Standards, specifications, approvals other		
Laser protection class	Complies with 21 CFR chapter 1, subchapter J	Complies with 21 CFR chapter 1, subchapter J
Certificate of suitability		
• IEC 61850-3	Yes	Yes
• IEEE 1613	Yes	Yes

Selection and ordering data

Version	Article No.
RUGGEDCOM RSG910C The RUGGEDCOM RSG910C is a 10 port industrially hardened, fully managed Ethernet switch featuring integrated IEEE 1588 support for use in harsh industrial environments. The product has 4x 1 Gbit/s SFP slots and 6x 10/100/1000Mbit/s RJ 45 Ethernet ports. -40°C to +85°C operating temperature (fanless).	
• **RUGGEDCOM RSG910C** (not subject to export controls)	**6GK6491-0CB..-....**
RUGGEDCOM RSG908C The RUGGEDCOM RSG908C is an 8 port industrially hardened, fully managed Ethernet switch featuring integrated IEEE 1588 support for use in harsh industrial environments. The product has 4x 1 Gbit/s SFP slots and 4x 100Mbit/s multimode LC ports (max 2km). -40°C to +85°C operating temperature (fanless)	
• **RUGGEDCOM RSG908C** (not subject to export controls)	**6GK6490-8CB..-....**

More information

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http://www.siemens.com/ruggedcom-selector

RUGGEDCOM RST916P / RUGGEDCOM RST916C

Overview

The RUGGEDCOM RST916 product family are utility-grade, fully-managed 16-port compact Ethernet switches designed for reliable high-bandwidth connectivity in harsh industrial environments, and CSA/UL 62368 safety approved from -40 °C to +85 °C.

Characteristics

- 12 x 10/100/1000BASE-T RJ45 ports
- 4 x 1G/10G BASE-X/1000BASE-X SFP+
- Long-haul fiber optics allow Gigabit distances of up to 115 km
- IEEE 1588 v2 Transparent Clock
- Removable storage medium, CLP, for device configuration back-up

Product versions

RUGGEDCOM RST916P

16-port managed 10 Gigabit PoE switch

- 10 x 10/100/1000BASE-T IEEE 802.3bt Types 1, 2, and 3 compliant PoE ports (up to 60 W/port)
- Supplies up to 420 W of PoE power

RUGGEDCOM RST916C

16-port managed 10 Gigabit Ethernet switch with redundant

Technical specifications

Article number	**6GK6491-6PD..-....**	**6GK6491-6CD..-....**
Product type designation	RUGGEDCOM RST916P	RUGGEDCOM RST916C
Transfer rate		
Transfer rate	10/100/1000 Mbit/s	10/100/1000 Mbit/s
Number of ports maximum	16	16
Interfaces for communication integrated		
Number of electrical connections • for network components or terminal equipment • for Power-over-Ethernet for network components or terminal equipment	 16 10	 16 --
Number of 10/100/1000 Mbit/s RJ45 ports integrated • with PoE	12 10	12 --
Number of electrical connections • for SFP+	4	4
Interfaces other		
Number of electrical connections • for operator console • for signaling contact • for power supply	 1 1 2	 1 1 2
Type of electrical connection • for operator console • for management purposes • for signaling contact • for power supply	 USB USB 3-pole terminal block, screwable 5-pole terminal block, screwable	 USB USB 3-pole terminal block, screwable 5-pole terminal block, screwable
Design of the removable storage • CLP	Yes	Yes
Signal inputs/outputs		
Relay design	Fully sealed contact relay with changeover contact (SPDT)	Fully sealed contact relay with changeover contact (SPDT)
Type of relay output	changeover contact (CO)	changeover contact (CO)
Number of relay outputs as CO contact	1	1
Operating voltage of the signaling contacts • at AC maximum • at DC maximum	 250 V 30 V	 250 V 30 V
Operational current of the signaling contacts • at AC maximum • at DC maximum	 2 A 2 A	 2 A 2 A
Supply voltage, current consumption, power loss		
product options wide range power supply	--	Yes
Supplied active power of PSE with PoE • per port maximum • total maximum	 60 W 420 W	 -- --
Type of voltage 1 of the supply voltage • supply voltage 1 rated value • supply voltage 1 rated value	DC 54 V 52 ... 57 V	DC -- 10 ... 60 V

Article number	**6GK6491-6PD..-....**	**6GK6491-6CD..-....**
Product type designation	RUGGEDCOM RST916P	RUGGEDCOM RST916C
Type of voltage 2 of the supply voltage	--	DC
• supply voltage 2 rated value	--	88 ... 300 V
Type of voltage 3 of the supply voltage	--	AC
• supply voltage 3 rated value	--	85 ... 264 V
Ambient conditions		
Ambient temperature		
• during operation	-40 ... +85 °C	-40 ... +85 °C
• during storage	-40 ... +85 °C	-40 ... +85 °C
• during transport	-40 ... +85 °C	-40 ... +85 °C
Operating condition fanless operation	Yes	Yes
Protection class IP	IP30	IP30
Design, dimensions and weights		
Design	compact	compact
Width	116 mm	116 mm
Height	177 mm	177 mm
Depth	163 mm	163 mm
Net weight	3.75 kg	3.75 kg
Product feature onformal coating	optional	optional
Material f the enclosure	Cast Aluminum Enclosure	Cast Aluminum Enclosure
Fastening method		
• 19-inch installation	No	No
• 35 mm top hat DIN rail mounting	Yes	Yes
• wall mounting	Yes	Yes
Product features, product functions, product components general		
Number of automatically learnable MAC addresses	16384	16384
Storage capacity		
• of message buffer maximum	2048 Kibyte	2048 Kibyte
Switch latency period	3 µs	3 µs
Transfer rate of the switch	68 Gbit/s	68 Gbit/s
Number of priority channels	8	8
Product feature		
• No head-off-line-blocking	Yes	Yes
• Cut Through switching method	Yes	Yes
• Store & Forward switching method	Yes	Yes
• Zero-Packet-Loss technology	Yes; Zero-Packet-Loss applies to fiber optic interfaces	Yes; Zero-Packet-Loss applies to fiber optic interfaces
Product functions management, configuration, engineering		
Product function		
• CLI	Yes	Yes
• web-based management	Yes	Yes
• MIB support	Yes	Yes
• RMON	Yes	Yes
• port mirroring	Yes	Yes
• CoS	Yes	Yes
Product function switch-managed	Yes	Yes
Protocol is supported		
• Telnet	Yes	Yes
• HTTP	Yes	Yes
• HTTPS	Yes	Yes
• TFTP	Yes	Yes
• SFTP	Yes	Yes
• GMRP	Yes	Yes
• LLDP	Yes	Yes
• SNMP v1	Yes	Yes
• SNMP v2	No	No
• SNMP v2c	Yes	Yes
• SNMP v3	Yes	Yes
• IGMP (snooping/querier)	Yes	Yes
Number of groups at IGMP	1024	1024
Product functions VLAN		
Product function		
• VLAN - port based	Yes	Yes
Number of VLANs maximum	255	255
Protocol is supported GVRP	Yes	Yes
Product functions DHCP		
Product function		
• DHCP client	Yes	Yes
• DHCP Option 82	Yes	Yes
• DHCP Option 66	No	No
• DHCP Option 67	No	No

RUGGEDCOM RST916P / RUGGEDCOM RST916C

Article number	**6GK6491-6PD..-....**	**6GK6491-6CD..-....**
Product type designation	RUGGEDCOM RST916P	RUGGEDCOM RST916C
Product functions redundancy		
Product function		
• redundancy procedure STP	Yes	Yes
• redundancy procedure RSTP	Yes	Yes
• redundancy procedure MSTP	Yes	Yes
• eRSTP	Yes	Yes
Protocol is supported		
• STP	Yes	Yes
• RSTP	Yes	Yes
• MSTP	Yes	Yes
Product functions security		
Product function		
• IEEE 802.1x (radius)	Yes	Yes
Protocol is supported		
• RADIUS	Yes	Yes
• TACACS+	Yes	Yes
• SSH	Yes	Yes
• SSL	Yes	Yes
Key length		
• with SSL	256 bit	256 bit
• with RSA	3072 bit	3072 bit
Product function port-rate-limiting	Yes	Yes
Product functions time		
Product function		
• NTP-client	Yes	Yes
• SNTP client	Yes	Yes
• SNTP server	Yes	Yes
• IEEE 1588 v2 transparent forwarding	Yes	Yes
Protocol is supported		
• SNTP	Yes	Yes
product function hardware-supported timestamp at all ports	Yes	Yes
Standards, specifications, approvals		
Standard		
• for safety from CSA and UL	cTUVus (Compliant with CSA C22.2 No. 60950, UL 60950, EN 60950)	cTUVus (Compliant with CSA C22.2 No. 60950, UL 60950, EN 60950)
Reference code		
• according to IEC 81346-2	KF	KF
• according to IEC 81346-2:2019	KFE	KFE
Standards, specifications, approvals CE		
Certificate of suitability CE marking	Yes	Yes
Standard		
• for EMC	FCC Part 15 (Class A), EN 55022 (CISPR22 Class A)	FCC Part 15 (Class A), EN 55022 (CISPR22 Class A)
Standards, specifications, approvals other		
Laser protection class	Complies with 21 CFR chapter 1, subchapter J	Complies with 21 CFR chapter 1, subchapter J
Certificate of suitability		
• IEC 61850-3	Yes	Yes
• IEEE 1613	Yes	Yes
Accessories		
Product extension optional C-PLUG	Yes	Yes

Selection and ordering data

Version	Article No.
RUGGEDCOM RST916P RUGGEDCOM RST916P is a 16 port industrially hardened, fully managed 10 G Ethernet switch featuring integrated 60 W PoE++ ports and a power budget of 420 W for use in harsh industrial environments. The product has 4x 1/10 Gbit/s SFP+ slots and 12x 10/100/1000 Mbit/s RJ45 ports, 10x of which are PoE++ capable -40°C to +85°C operating temperature (fanless).	
• **RUGGEDCOM RST916P**	**6GK6491-6PD..-....**
RUGGEDCOM RST916C RUGGEDCOM RST916C is a 16 port industrially hardened, fully managed 10 G Ethernet switch featuring integrated IEEE 1588 support for use in harsh industrial environments. The product has 4x 1/10 Gbit/s SFP+ slots and 12x 10/100/1000 Mbit/s RJ45 ports. -40°C to +85°C operating temperature (fanless).	
• **RUGGEDCOM RST916C**	**6GK6491-6CD..-....**

More information

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http://www.siemens.com/ruggedcom-selector

RUGGEDCOM RSG2100 / RUGGEDCOM RSG2300

Overview

RUGGEDCOM RSG2100

RUGGEDCOM RSG2300

RUGGEDCOM RSG2100

The RUGGEDCOM RSG2100 is a modular fully-managed Ethernet switch that is especially well-suited for use in hostile operating environments for electrical equipment and demanding climatic conditions.

RUGGEDCOM RSG2300

The RUGGEDCOM RSG2300 product family consists of fully-managed Ethernet switches with 32 ports and 4 modular Gigabit uplink ports.

Characteristics

- Fully integrated dual redundant (optional) high voltage and low voltage power supplies
- Operation without fans for operating temperatures from -40 °C to +85 °C

RUGGEDCOM RSG2100

- Modular managed Ethernet switch with 19 ports, Gigabit uplinks and 56- or 128-bit encryption
- Up to 3 Gigabit Ethernet ports and 16 Fast Ethernet ports - copper and/or fiber-optic
- 2-port modules for outstanding flexibility
- Store und Forward switching
- Support of many different fiber-optic cable types (multimode, single-mode) with a variety of connections (ST, MTRJ, LC, SC, SFP)
- Variant with 4 fixed 10/100BaseTX, 802.3af-compliant (PoE) Ethernet ports (RUGGEDCOM RSG2100P and RSG2100PNC)

RUGGEDCOM RSG2300

- Managed Ethernet switch with 32 ports, Gigabit uplinks and 56- or 128-bit encryption
- 24 Fast Ethernet copper ports
- Optional: Up to 4x 1000LX Gigabit Ethernet ports (copper and/or fiber-optic) and up to 8x 100FX Fast Ethernet fiber-optic ports
- Non-blocking, Store und Forward switching
- Support of many different fiber-optic cable types (multimode, single-mode, bidirectional single strand) with a variety of connections (ST, MTRJ, LC, SC, SFP)
- Variant available with up to four 802.3af-compliant ports (10/100BaseTX) (RUGGEDCOM RSG2300P and RSG2300PNC)

Selection and ordering data

Version	Article No.
RUGGEDCOM RSG2100	
The RUGGEDCOM RSG2100 is a fully-managed Ethernet switch; 56- or 128-bit encryption; up to 3 Gigabit Ethernet ports - copper and/or fiber-optic; up to 16 Fast Ethernet ports - copper and/or fiber-optic; 2-port modules for outstanding flexibility; non-blocking, Store and Forward switching; support of many different fiber-optic cable types (multimode, single-mode, bidirectional single strand); long-distance fiber-optic connections enable distances up to 70 km in the Gigabit range; variety of connection types (ST, MTRJ, LC, SC, RJ45, Micro-D)	
• **RUGGEDCOM RSG2100NC** (not subject to export controls)	**6GK6021-0AS1.-....**
• **RUGGEDCOM RSG2100** (subject to export controls)	**6GK6021-0AS2.-....**
• **RUGGEDCOM RSG2100PNC** (not subject to export controls)	**6GK6021-0PS1.-....**
• **RUGGEDCOM RSG2100P** (subject to export controls)	**6GK6021-0PS2.-....**
RUGGEDCOM RSG2300	
The RUGGEDCOM RSG2300 is a modular fully-managed Ethernet switch; 24x 10/100TX copper ports; optional: up to 4x 1000LX Gigabit Ethernet ports (copper and/or fiber-optic) and up to 8x 100FX Fast Ethernet fiber-optic ports; 2-port modules for outstanding flexibility; non-blocking, Store and Forward switching; multimode, single-mode; long-distance fiber-optic connections enable distances up to 90 km; variety of connection types (ST, MTRJ, LC, SC)	
• **RUGGEDCOM RSG2300NC** (not subject to export controls)	**6GK6023-0AS1.-....**
• **RUGGEDCOM RSG2300** (subject to export controls)	**6GK6023-0AS2.-....**
• **RUGGEDCOM RSG2300PNC** (not subject to export controls)	**6GK6023-0PS1.-....**
• **RUGGEDCOM RSG2300P** (subject to export controls)	**6GK6023-0PS2.-....**

More information

The RUGGEDCOM Selector assists you in selecting the right RUGGEDCOM products and in configuring variants and is available at:
http://www.siemens.com/ruggedcom-selector

Overview

The RUGGEDCOM RST2228 is a high port density field modular 19“ Layer 2 rack switch with 10 Gbit/s uplinks, support for IEEE 1588.

Design

- Up to 28 Ethernet ports – 4 x 1000BASE-X/10GBASE-X integrated uplinks and up to 24 x 10/100/1000BASE-X ports
- 6 slots for 4-port Media Modules for tremendous flexibility
- Media modules with 4 x 10/100/1000 Mbit/s RJ45, FastConnect or 100/1000 Mbit/s SFP interfaces
- Supports precision timing according to IEEE 1588 (transparent clock). Support HSR/PRP functions (with RedBox, QuadBox and Coupling capabilities) with the help of RUGGEDCOM RMM2972-2RNA, Media Module, 2 x 100/1000 Base-X SFPs (SFPs not included)
- Non-blocking, store and forward switching
- Dual-redundant (optional), load sharing, high-voltage power supplies
- For use at ambient temperatures from –40 °C to +85 °C without the use of fans
- Power-over-Ethernet variant available supporting IEEE 802.3at/802.3bt (draft) with up to 60 W/port and a maximum power budget from 500 W. RUGGEDCOM RST2228P is compatible with the rack-mount RUGGEDCOM RPS2410 600 W PoE power supply.

Product versions

RUGGEDCOM RST2228

- 28-port field modular managed layer 2 Gigabit/s switch with 10 Gbit/s uplinks supporting IEEE 1588

RUGGEDCOM RST2228P

- 28-port field modular managed layer 2 Gigabit/s switch with 10 GBit/s uplinks supporting IEEE 1588 and Power-over-Ethernet according IEEE 802.3at/803.bt (draft)

Benefits

- Future-proof Ethernet switch with high port density to minimize capital expense by reducing the number of devices needed.
- Field-modular media modules with RJ45, FastConnect & SFP interfaces and build-to-order design ensures seamless servicing and tremendous flexibility in tailoring the device configuration resulting in lower operating expenses
- Suitable for usage in electric power, transportation and oil & gas applications due to a utility grade design with immunity against EMI and heavy electrical surges
- Future-proof due to support of modern IEEE 1588 time synchronization features. Improved network reliability with 0s failover time providing seamless redundancy.
- Suitable for usage in harsh environments with the minimal risk of mechanical failures due to an operating temperature from -40 °C to +85 °C without fans

Technical specifications

Article number	**6GK6222-6AB..-....**	**6GK6222-6PB..-....**
Product type designation	RUGGEDCOM RST2228	RUGGEDCOM RST2228P
Transfer rate		
Transfer rate	110/100/1000 Mbit/s, 10 Gbit/s	10/100/1000 Mbit/s, 10 Gbit/s
Number of ports maximum	28; Number of ports depending on configuration	28; Number of ports depending on configuration
Interfaces for communication maximum configuration for modular devices		
Number of electrical ports maximum	24	24
Number of electrical ports with PoE maximum	0	24
Number of optical ports maximum	28	28
Interfaces for communication integrated		
Number of optical interfaces for network components or terminal equipment	28; Depending on device configuration	28; Depending on device configuration
Number of electrical connections • for SFP+	4; Compatible with SFP (1000BASE-X) and SFP+ (10GBASE-X)	4; Compatible with SFP (1000BASE-X) and SFP+ (10GBASE-X)
Number of connectable media modules • with 4 ports	6	6

RUGGEDCOM RST2228

Article number	**6GK6222-6AB..-....**	**6GK6222-6PB..-....**
Product type designation	RUGGEDCOM RST2228	RUGGEDCOM RST2228P
interfaces for communication plug-in		
Number of 10/100/1000 Mbit/s RJ45 ports	24	24
• with PoE	0	24
• with securing collar	24	24
• with securing collar / with PoE	0	24
Number of 100 Mbit/s LC ports		
• for multimode	24	24
Number of electrical connections		
• for SFP	24; Compatible with Fast Ethernet (100BASE-X) and Gigabit (1000BASE-X) SFPs	24; Compatible with Fast Ethernet (100BASE-X) and Gigabit (1000BASE-X) SFPs
• for SFP+	4; Compatible with SFP (1000BASE-X) and SFP+ (10GBASE-X)	4; Compatible with SFP (1000BASE-X) and SFP+ (10GBASE-X)
Interfaces other		
Number of electrical connections		
• for operator console	1	1
• for signaling contact	1	1
• for media module	6	6
• for power supply	1	1
Type of electrical connection		
• for operator console	USB	USB
• for power supply and signaling contact	3-pole terminal block, screwable or plugable	3-pole terminal block, screwable or plugable
Design of the removable storage		
• CLP	Yes	Yes
Product feature hot-swappable interface modules	No	No
Signal inputs/outputs		
Relay design	Form-C contact relay (SPDT)	Form-C contact relay (SPDT)
Type of relay output	changeover contact (CO)	changeover contact (CO)
Operating voltage of the signaling contacts		
• at AC maximum	230 V	230 V
• at DC maximum	250 V	250 V
Operational current of the signaling contacts		
• at AC at 250 V maximum	2 A	2 A
• at DC at 30 V maximum	2 A	2 A
Supply voltage, current consumption, power loss		
Product options wide range power supply	Yes	Yes
Product component connection for redundant voltage supply	Yes	Yes
Product feature		
• modular power supply	No	No
• hot-swappable power supply	No	No
Type of voltage supply redundant power supply unit	Yes	Yes
Type of voltage 1 of the supply voltage	DC	DC
• supply voltage 1 rated value	12 V	12 V
• supply voltage 1 rated value	10 ... 15 V	10 ... 15 V
Type of voltage 2 of the supply voltage	DC	DC
• supply voltage 2 rated value	24 V	24 V
• power loss (W) 2 rated value	72 W	72 W
• supply voltage 2 rated value	13 ... 36 V	13 ... 36 V
Type of voltage 3 of the supply voltage	DC	DC
• supply voltage 3 rated value	48 V	48 V
• power loss (W) 3 rated value	72 W	72 W
• supply voltage 3 rated value	36 ... 72 V	36 ... 72 V
Type of voltage 4 of the supply voltage	DC	DC
• power loss (W) 4 rated value	77 W	77 W
• supply voltage 4 rated value	88 ... 300 V	88 ... 300 V
Type of voltage 5 of the supply voltage	AC	AC
• power loss (W) 5 rated value	76 W	76 W
• supply voltage 5 rated value	85 ... 264 V	85 ... 264 V
Ambient conditions		
Ambient temperature		
• during operation	-40 ... +85 °C	-40 ... +85 °C
• note	A maximum operating temperature of +85 °C is permissible for a duration of 16 hours	A maximum operating temperature of +85 °C is permissible for a duration of 16 hours
relative humidity		
• at 25 °C /without condensation during operation / maximum	95 %	95 %
Operating condition / fanless operation	Yes	Yes
Protection class IP	IP3X	IP3X

Article number	**6GK6222-6AB..-....**	**6GK6222-6PB..-....**
Product type designation	RUGGEDCOM RST2228	RUGGEDCOM RST2228P
Design, dimensions and weights		
Display version LED panel mounted on the front or on the rear side	Yes	Yes
Design	19" rack	19" rack
Number of modular height units relating to 19-inch cabinet	1	1
Number of slots	6	6
Width	446 mm	446 mm
Height	43.6 mm	43.6 mm
Depth	340 mm	340 mm
Net weight	8.6 kg; Weight depends on selected options	8.6 kg; Weight depends on selected options
Product feature onformal coating	Yes; optional	Yes; optional
Material f the enclosure	Aluminum 18 AWG galvanized steel enclosure	Aluminum 18 AWG galvanized steel enclosure
Fastening method		
• 19-inch installation	Yes	Yes
• 35 mm top hat DIN rail mounting	No	No
• wall mounting	Yes	Yes
Product features, product functions, product components general		
Number of automatically learnable MAC addresses	16384	16384
Storage capacity		
• of the MAC-address table	64 Kibyte	64 Kibyte
• of message buffer maximum	2000 Kibyte	2000 Kibyte
Switch latency period	3 µs	3 µs
Transfer rate of the switch	128 Gbit/s	128 Gbit/s
Number of priority channels	8	8
Number of QoS queues per port	4	4
Size per QoS queues	1536 frames	1536 frames
Product function QoS according to IEEE 802.1Q	Yes	Yes
Product feature		
• No head-off-line-blocking	Yes	Yes
• Store & Forward switching method	Yes	Yes
• Zero-Packet-Loss technology	Yes; Zero-Packet-Loss applies to fiber optic interfaces	Yes; Zero-Packet-Loss applies to fiber optic interfaces
Product functions management, configuration, engineering		
Product function		
• CLI	Yes	Yes
• web-based management	Yes	Yes
• MIB support	Yes	Yes
• RMON	Yes	Yes
Product function switch-managed	Yes	Yes
Protocol is supported		
• Telnet	Yes	Yes
• HTTP	Yes	Yes
• HTTPS	Yes	Yes
• TFTP	Yes	Yes
• SNMP v1	Yes	Yes
• SNMP v2	No	No
• SNMP v2c	Yes	Yes
• SNMP v3	Yes	Yes
• IGMP (snooping/querier)	Yes	Yes
Number of groups / at IGMP	256	256
Product functions VLAN		
Product function		
• VLAN - port based	Yes	Yes
Number of VLANs maximum	255	255
VLAN identification number	1 ... 4094	1 ... 4094
Protocol is supported GVRP	Yes	Yes
Product functions DHCP		
Product function		
• DHCP client	Yes	Yes
• DHCP Option 82	Yes	Yes
• DHCP Option 66	No	No
• DHCP Option 67	No	No

RUGGEDCOM RST2228

Article number	**6GK6222-6AB..-....**	**6GK6222-6PB..-....**
Product type designation	RUGGEDCOM RST2228	RUGGEDCOM RST2228P
Product functions redundancy		
Product function		
• ring redundancy	Yes	Yes
• media redundancy protocol (MRP) with redundancy manager	Yes	Yes
• redundancy procedure STP	Yes	Yes
• redundancy procedure RSTP	Yes	Yes
• redundancy procedure MSTP	Yes	Yes
• eRSTP	Yes	Yes
Protocol is supported Media Redundancy Protocol (MRP)	Yes	Yes
Protocol is supported		
• STP	Yes	Yes
• RSTP	Yes	Yes
• MSTP	Yes	Yes
Product functions security		
Product function		
• ACL - MAC-based	Yes	Yes
• IEEE 802.1x (radius)	Yes	Yes
• blocking of communication via physical ports	Yes	Yes
Protocol is supported		
• TACACS+	Yes	Yes
• SSH	Yes	Yes
• SSL	Yes	Yes
Key length		
• with SSL	128 bit	128 bit
• with RSA	1024 bit	1024 bit
Product functionport-rate-limiting	Yes	Yes
Product functions time		
Product function		
• SNTP client	Yes	Yes
• SNTP server	Yes	Yes
• IEEE 1588 v2 master	No	No
• IEEE 1588 v2 slave	No	No
• IEEE 1588 v2 transparent forwarding	Yes	Yes
Protocol is supported		
• NTP	Yes	Yes
• SNTP	Yes	Yes
• product function hardware-supported timestamp at all ports	Yes	Yes
• product component hardware real time clock	Yes	Yes
Standards, specifications, approvals		
Standard		
• for safety / from CSA and UL	cCSAus (Compliant with CSA C22.2 No. 60950-1, UL60950-1, EN60950-1, IEC60950-1)	cCSAus (Compliant with CSA C22.2 No. 60950-1, UL 60950-1, EN 60950-1, IEC 60950-1)
• for emitted interference	CISPR32, EN 55032, FCC Part15 Class A, CAN ICES-3 Class A / NMB-3 Class A	CISPR32, EN 55032, FCC Part15 Class A, CAN ICES-3 Class A / NMB-3 Class A
• for interference immunity	IEC 61000-6-2	IEC 61000-6-2
Reference code		
• according to IEC 81346-2	KF	KF
• according to IEC 81346-2:2019	KFE	KFE
Standards, specifications, approvals CE		
Certificate of suitability CE marking	Yes	Yes
Standard		
• for EMC	EN55032, IEC/EN 61000-6-2	EN 55032, IEC/EN 61000-6-2
• for immunity to EMC	CISP322, EN 55032, FCC Part15 Class A, CAN ICES-3 Class A / NMB-3 Class A	CISP322, EN 55032, FCC Part15 Class A, CAN ICES-3 Class A / NMB-3 Class A
Certificate of suitability / RoHS conformity	Yes	Yes
Standards, specifications, approvals other		
Laser protection class	Complies with 21 CFR chapter 1, subchapter J (Health and safety, class I laser)	Complies with 21 CFR chapter 1, subchapter J
Certificate of suitability		
• relating to NEMA	NEMA TS-2	Yes; 12/24/48 V DC
• KC approval	Yes	Yes
• railway application in accordance with EN 50155	Yes	Yes
• railway application in accordance with EN 50121-4	Yes	Yes
• railway application in accordance with EN 50124-1	No	No
• fire protection in accordance with EN 45545-2	Yes	Yes
• IEC 61850-3	Yes	Yes
• IEEE 1613	Yes	Yes
• Regulatory Compliance Mark (RCM)	No	No
• EAC approval	Yes	Yes
Standards, specifications, approvals marine classification		
Marine classification association		
• American Bureau of Shipping Europe Ltd. (ABS)	Yes	Yes
• DNV GL	Yes; 12/24/48 V DC	No

Selection and ordering data

Version	Article No.
RUGGEDCOM RST2228 RUGGEDCOM RST2228 is a field modular, fully managed Layer 2 Ethernet switch with 4 x 1/10 GBit/s and 24 x 100/1000 MBit/s non-blocking ethernet ports. Support for up to six 4-port media modules with RJ45, SFP or LC interfaces; -40 °C ...+85 °C operating temperature (fanless)	**6GK6222-6AB00-….**
RUGGEDCOM RST2228P RUGGEDCOM RST2228P is a field modular, fully managed Layer 2 Ethernet switch with 4 x 1/10 GBit/s and 24 x 100/1000 MBit/s non-blocking ethernet ports with Power-over-Ethernet support. Support for up to six 4-port media modules with RJ45, SFP or LC interfaces; -40 °C ...+85 °C operating temperature (fanless)	**6GK6222-6PB00-….**
RUGGEDCOM accessories	
• **USB Console cable** USB 2.0 A type to B type Cable Assembly 10 feet / 3 meters	**6GK6000-8DT01-0AA0**
• **Power cable with lugs** Power Cable with north-american plug for screw terminal blocks (6 ft.) for RUGGEDCOM products	**6GK6000-8BA00-0AA0**
• **Power cable without lugs** Power Cable with north-american plug for pluggable terminal blocks (6 ft.) for RUGGEDCOM products	**6GK6000-8BB00-0AA0**
• **Pluggable terminal block RST2228** Connector Kit RST2228 Pluggable terminal blocks (5 sets)	**6GK6000-8HC05-0AA0**
• **Screw terminal block RST2228** Connector Kit RST2228 Screw terminal blocks (5 sets)	**6GK6000-8HC06-0AA0**
• **Rack / Panel Mounting Kit for RUGGEDCOM RST2228** Allows for mounting in a 19" rack or in a panel	**6GK6000-8MA01-0AA0**
RUGGEDCOM Storage Media	
• **RUGGEDCOM CLP 2GB** Storage media for simple device exchange in case of failure, for storage of configuration or user data with 2 GB capacity.	**6GK6000-8RA00-1HA0**
• **RUGGEDCOM CLP 2GB CC** Storage media for simple device exchange in case of failure, for storage of configuration or user data with 2 GB capacity and Conformal Coating.	**6GK6000-8RA00-1HA1**
RUGGEDCOM SFPs	
Copper Ethernet SFP	
• **RUGGEDCOM SFP1112-1** Copper SFP, 10/100/1000MBIT/S, RJ45-Interface, Copper, up to max. 100m, 0 °C ...+70 °C	**6GK6000-8CG01-0AA0**
Fiber Optic SFPs (Fast Ethernet)	
• **RUGGEDCOM SFP1121-1FX2** 100BASE-FX, LC-Interface, Optical: Multi Mode Fiber Optic up to max. 2km, 1310nm, -40 °C ...+85 °C	**6GK6000-8FE51-0AA0**
• **RUGGEDCOM SFP1121-1FX2A** 100BASE-FX, LC-In terface, Optical: Multi Mode F iber Optic up to max. 2km, 1310nm, -40 °C ...+85 °C. Active SFP which is only compatible with the RUGGEDCOM RX1400 and RST2228 uplink interfaces.	**6GK6000-8FE50-0AA0**
• **SFP1131-1FX20** 100BASE-FX, LC-Interface, Optical: Single Mode Fiber Optic up to max. 20km, 1310nm, -40 °C ...+85 °C	**6GK6000-8FE52-0AA0**
• **SFP1131-1XF50** 100BASE-FX, LC-Interface, Optical: Single Mode Fiber Optic up to max. 50km, 1310nm, -40 °C ...+85 °C	**6GK6000-8FE53-0AA0**
• **SFP1131-1FX90** 100BASE-FX, LC-Interface, Optical: Single Mode Fiber Optic up to max. 90km, 1550nm, -40 °C ...+85 °C	**6GK6000-8FE54-0AA0**
Fiber Optic SFPs (Gigabit)	
• **RUGGEDCOM SFP1122-1SX** 1000BASE-SX, LC-Interface, Optical: Multi Mode Fiber Optic up to max. 500m, 850nm, -40 °C ...+85 °C	**6GK6000-8FG51-0AA0**
• **RUGGEDCOM SFP1122-1SX2** 1000BASE-SX, LC-Interface, Optical: Multi Mode Fiber Optic up to max. 2km, 1310nm, -40 °C ...+85 °C	**6GK6000-8FE58-0AA0**
• **RUGGEDCOM SFP1132-1LX10** 1000BASE-LX, LC-Interface, Optical: Single Mode Fiber Optic up to max. 10km, 1310nm, -40 °C ...+85 °C	**6GK6000-8FG52-0AA0**
• **RUGGEDCOM SFP1132-1LX25** 1000BASE-LX, LC-Interface, Optical: Single Mode Fiber Optic up to max. 25km, 1310nm, -40 °C ...+85 °C	**6GK6000-8FG53-0AA0**
• **RUGGEDCOM SFP1132-1LX40** 1000BASE-LX, LC-Interface, Optical: Single Mode Fiber Optic up to max. 40km, 1550nm, -40 °C ...+85 °C	**6GK6000-8FG57-0AA0**
• **RUGGEDCOM SFP1132-1LX70** 1000BASE-LX, LC-Interface, Optical: Single Mode Fiber Optic up to max. 70km, 1550nm, -40 °C ...+85 °C	**6GK6000-8FG54-0AA0**

RUGGEDCOM RST2228

Version	Article No.
• **RUGGEDCOM SFP1132-1LX100** 1000BASE-LX, LC-Interface, Optical: Single Mode Fiber Optic up to max. 100km, 1550nm, 0 °C ...+70 °C	**6GK6000-8FG55-0AA0**
• **RUGGEDCOM SFP1132-1LX115** 1000BASE-LX, LC-Interface, Optical: Single Mode Fiber Optic up to max. 115km, 1550nm, -10 °C ...+70 °C	**6GK6000-8FE56-0AA0**
Fiber Optic Bi-Directional SFPs (Gigabit)	
• **RUGGEDCOM SFP1132-1BX10R** 1000BASE-BX-U, LC-Interface, Opti cal: Single Mode Fiber Optic up to max. 10km, 1310nm TX/1490 nm RX, -40 °C ...+85 °C	**6GK6000-8FB51-0AA0**
• **RUGGEDCOM SFP1132-1BX10T** 1000BASE-BX-D, LC-Interface, Opti cal: Single Mode Fiber Optic up to max. 10km, 1490nm TX/1310 nm RX, -40 °C ...+85 °C	**6GK6000-8FB52-0AA0**
• **RUGGEDCOM SFP1132-1BX40R** 1000BASE-BX-U, LC-Interface, Optical: Single Mode Fiber Optic up to max. 40km, 1310nm TX/1490 nm RX, -40 °C ...+85 °C	**6GK6000-8FB53-0AA0**
• **RUGGEDCOM SFP1132-1BX40T** 1000BASE-BX-D, 1 X 1000MBIT/S, LC-Interface, Optical: Single Mode Fiber Optic up to max. 40km, 1490nm TX/1310 nm RX, -40 °C ...+85 °C	**6GK6000-8FB54-0AA0**
Fiber Optic SFP+ (10 Gigabit)	
• **RUGGEDCOM SFP2133-1LR10** 10GBASE-LR, LC- Interface, Optical: Single Mode Fiber Optic up to max. 10km, 1310nm, -40 °C ...+85 °C	**6GK6000-8FT51-0AA0**
• **RUGGEDCOM SFP2133-1ER40** 10GBASE-ER, LC- Interface, Optical: Single Mod e Fiber Optic up to max. 40km, 1550nm, -40 °C ...+85 °C	**6GK6000-8FT53-0AA0**
• **RUGGEDCOM SFP2133-1ZR80** 10GBASE-ZR, LC- Interface, Optical: Single Mode Fiber Optic up to max. 80km, 1550nm, -40 °C ...+85 °C	**6GK6000-8FT52-0AA0**

More information

To assist in selecting the right RUGGEDCOM products as well as configuration of variants, the RUGGEDCOM Selector is available at:
http://www.siemens.com/ruggedcom-selector

Overview

The RUGGEDCOM RSG2488 is the first locally upgradable Layer 2 switch with 28 non-blocking Gigabit ports and dual redundant power supplies that are replaceable during operation.

Characteristics

- Up to 28 Gigabit Ethernet ports - copper and/or fiber-optic; 19-inch, 1 HU rack mounting
- Fully modular; field-replaceable Ethernet media modules with 2/4 ports for outstanding flexibility
- Support of media modules with 100FX or 1000SX fiber-optic ports
- Optional PTP module provides GPS time source and IRIG-B input/output
- Support of IEEE 1588 (PTP), SNTP, IRIG-B; the time of day can be converted between all these formats
- Non-blocking, Store und Forward switching
- Support of many different fiber-optic cable types (multimode, single-mode, bidirectional single strand) with a variety of connections (LC, SC, SFP, ST)
- Dual redundant (optional) load-dividing high voltage and low voltage power supplies that are replaceable during operation
- Operation without fans for operating temperatures from -40 °C to +85 °C

Product versions

RUGGEDCOM RSG2488

- Modular managed Gigabit Ethernet switch with 28 ports and 128-bit encryption

RUGGEDCOM RSG2488NC

- Modular managed Gigabit Ethernet switch with 28 ports and 56-bit encryption

Technical specifications

Article number	**6GK6024-8GS1.-....**	**6GK6024-8GS2.-....**
Product type designation	RUGGEDCOM RSG2488	RUGGEDCOM RSG2488NC
Transfer rate		
Transfer rate	10/100/1000 Mbit/s	10/100/1000 Mbit/s
Number of ports maximum	28; Number of ports depending on configuration	28; Number of ports depending on configuration
Interfaces other		
Number of electrical connections • for operator console • for management purposes	 1 1	 1 1
Type of electrical connection • for operator console • for signaling contact • for power supply and signaling contact	 RS232 RJ45 10-pole terminal block, screwable or plugable, screw contact	 RS232 RJ45 10-pole terminal block, screwable or plugable, screw contact
Supply voltage, current consumption, power loss		
Product options wide range power supply	Yes	Yes
Product feature • modular power supply • hot-swappable power supply	 Yes Yes	 Yes Yes
Type of voltage supply redundant power supply unit	Yes	Yes
Type of voltage 1 of the supply voltage • supply voltage 1 rated value • supply voltage 1 rated value • product component 1 fusing at power supply input	DC 24 V 13 ... 36 V Yes	DC 24 V 13 ... 36 V Yes
Type of voltage 2 of the supply voltage • supply voltage 2 rated value • supply voltage 2 rated value	DC 48 V 38 ... 72 V	DC 48 V 38 ... 72 V
Type of voltage 3 of the supply voltage • supply voltage 3 rated value	DC 98 ... 300 V	DC 98 ... 300 V
Type of voltage 4 of the supply voltage • supply voltage 4 rated value	AC 85 ... 264 V	AC 85 ... 264 V

RUGGEDCOM RSG2488

Article number	**6GK6024-8GS1.-....**	**6GK6024-8GS2.-....**
Product type designation	RUGGEDCOM RSG2488	RUGGEDCOM RSG2488NC
Ambient conditions		
Ambient temperature		
• during operation	-40 ... +85 °C	-40 ... +85 °C
• note	A maximum operating temperature of +85 °C is permissible for a duration of 16 hours	A maximum operating temperature of +85 °C is permissible for a duration of 16 hours
Operating condition fanless operation	Yes	Yes
Protection class IP	IP30	IP30
Design, dimensions and weights		
Display version LED panel mounted on the front or on the rear side	Yes	Yes
Design	19" rack	19" rack
Number of modular height units relating to 19-inch cabinet	1	1
Number of slots	8	8
Width	442.4 mm	442.4 mm
Height	44 mm	44 mm
Depth	376 mm	376 mm
Net weight	8.6 kg	8.6 kg
Product feature onformal coating	optional	optional
Material f the enclosure	Aluminum	Aluminum
Fastening method	Mounting Kits for different mounting options	Mounting Kits for different mounting options
• 19-inch installation	Yes	Yes
• 35 mm top hat DIN rail mounting	Yes	Yes
• wall mounting	Yes	Yes
Product features, product functions, product components general		
Number of automatically learnable MAC addresses	8192	8192
Storage capacity		
• of message buffer maximum	1536 Kibyte	1536 Kibyte
• of the MAC-address table	64 Kibyte	64 Kibyte
Switch latency period	4 µs	4 µs
Transfer rate of the switch	56000 Gbit/s	56000 Gbit/s
Number of priority channels	4	4
Product feature		
• No head-off-line-blocking	Yes	Yes
• Store & Forward switching method	Yes	Yes
• Zero-Packet-Loss technology	Yes; Zero-Packet-Loss applies to fiber optic interfaces	Yes; Zero-Packet-Loss applies to fiber optic interfaces
Product functions management, configuration, engineering		
Product function		
• CLI	Yes	Yes
• web-based management	Yes	Yes
• MIB support	Yes	Yes
• RMON	Yes	Yes
Product function switch-managed	Yes	Yes
Protocol is supported		
• Telnet	Yes	Yes
• HTTP	Yes	Yes
• HTTPS	Yes	Yes
• TFTP	Yes	Yes
• SNMP v1	Yes	Yes
• SNMP v2	No	No
• SNMP v2c	Yes	Yes
• SNMP v3	Yes	Yes
• IGMP (snooping/querier)	Yes	Yes
Number of groups at IGMP	256	256
Product function		
• for MIB support by BRIDGE-MIB	RFC4188	RFC4188
• for MIB support / by IF-MIB	RFC2863	RFC2863
• for MIB support / by RMON-MIB	RFC2819	RFC2819
• for MIB support / by RSTP-MIB	RFC4318	RFC4318
• for MIB support / by SNMPv2-MIB	RFC1907	RFC1907
• for MIB support / by SNMPv2-SMI	RFC2578	RFC2578
• for MIB support / by SNMPv2-TC	RFC2579	RFC2579
• for MIB support / by TCP-MIB	RFC2012	RFC2012
• for MIB support / by UDP-MIB	RFC2013	RFC2013
Product functions VLAN		
Product function		
• VLAN - port based	Yes	Yes
Number of VLANs maximum	255	255
VLAN identification number	1 ... 4094	1 ... 4094
Protocol is supported GVRP	Yes	Yes

Article number	**6GK6024-8GS1.-....**	**6GK6024-8GS2.-....**
Product type designation	RUGGEDCOM RSG2488	RUGGEDCOM RSG2488NC
Product functions DHCP		
Product function		
• DHCP client	Yes	Yes
• DHCP Option 82	Yes	Yes
• DHCP Option 66	No	No
• DHCP Option 67	No	No
Product functions redundancy		
Product function		
• ring redundancy	Yes	Yes
Protocol is supported Media Redundancy Protocol (MRP)	Yes	Yes
Product function		
• media redundancy protocol (MRP) with redundancy manager	Yes	Yes
• redundancy procedure STP	Yes	Yes
• redundancy procedure RSTP	Yes	Yes
• redundancy procedure MSTP	Yes	Yes
• eRSTP	Yes	Yes
Protocol is supported		
• STP	Yes	Yes
• RSTP	Yes	Yes
• MSTP	Yes	Yes
Product functions security		
Product function		
• IEEE 802.1x (radius)	Yes	Yes
Protocol is supported		
• TACACS+	Yes	Yes
• SSL	Yes	Yes
Key length		
• with SSL	56 bit	128 bit
• with RSA	1024 bit	1024 bit
Product function port-rate-limiting	Yes	Yes
Product functions time		
Product function		
• SNTP client	Yes	Yes
• SNTP server	Yes	Yes
Protocol is supported		
• SNTP	Yes	Yes
Standards, specifications, approvals		
Standard		
• for interference immunity	IEC 61000-6-2, IEEE 1613 Class 2, IEC 61850-3, IEC 61800-3	IEC 61000-6-2, IEEE 1613 Class 2, IEC 61850-3, IEC 61800-3
Reference code		
• according to IEC 81346-2	KF	KF
• according to IEC 81346-2:2019	KFE	KFE
Standards, specifications, approvals CE		
Certificate of suitability CE marking	Yes	Yes
Standards, specifications, approvals other		
Certificate of suitability		
• IEC 61850-3	Yes	Yes
• according to FIPS 140-2	No	No
• according to Common Criteria (CC)	No	No
Standards, specifications, approvals product conformity		
Product conformity		
• according to IEEE 1588 v2-Precision Time Protocol	Yes	Yes
accessories		
accessories	Mounting kits, port modules, power supplys, cables, connectors additional available	Mounting kits, port modules, power supplys, cables, connectors additional available

RUGGEDCOM RSG2488

Selection and ordering data

	Version	Article No.
	RUGGEDCOM RSG2488 The RUGGEDCOM RSG2488 is a rugged fully-managed Ethernet switch; up to 28 non-blocking ports; configured as follows: 10/100/1000TX copper ports, 100FX or 1000SX fiber-optic ports; support of six 4-port modules plus two 2-port modules; combination of Gigabit copper and fiber-optic ports with up to 28 Gigabit Ethernet ports; operating temperatures from -40 °C to +85 °C (operation without fan)	
	• **RUGGEDCOM RSG2488NC** (not subject to export controls)	**6GK6024-8GS1.-....**
	• **RUGGEDCOM RSG2488** (subject to export controls)	**6GK6024-8GS2.-....**

More information

The RUGGEDCOM Selector assists you in selecting the right RUGGEDCOM products and in configuring variants and is available at:
http://www.siemens.com/ruggedcom-selector

Overview

The RUGGEDCOM RX1400 is a rugged Industrial Ethernet switch and TCP/IP router with LTE and fiber-optic WAN options in compact size for reliable, cost-effective implementation of comprehensive communication applications and a high processing output in harsh industrial environments.

Characteristics

- 4x Fast Ethernet copper ports and 2x Gigabit SFP (small form factor pluggable) slots
- Support of multimode and single-mode SFPs for distances of 500 m up to 100 km
- Equipped with GPS input
- Available with or without LTE modem for Europe, North America, the Asia-Pacific region and Japan. Fully integrated power supply, +/-12-24 V DC
- Operation without fans for operating temperatures from -40 °C to +85 °C
- RUGGEDCOM VPE1400: Virtualization enables a complete Linux image (with dedicated memory media and I/O ports) that can run in parallel with the RUGGEDCOM ROX II operating system.

Technical specifications

Article number	**6GK6014-0AM2.-....**
Product type designation	RUGGEDCOM RX1400
Transmission rate	
On Industrial Ethernet	Autosensing with 10/100 Mbps
Through WAN connection	Up to 100 Mbps
Through fiber-optic connection	1 Gbps
WAN connection	
EDGE/GPRS/GSM	850/900/1800/1900 MHz
UMTS/HSDPA+	850/900/1900/2100 MHz
LTE	B1, B2, B3, B4, B7, B8, B13, B17, B19, B20, B21, B25
Number of supported SIM cards	2
Interfaces	
Communication interfaces	LAN: 4 x RJ45 10/100, 2 x SFP slot 1000 LX SFP / Serial: 2 x DB9 connector/ Console: 1 x DB9 connector
WAN (Wide Area Network) interfaces	2 x SMA-type
GPS interface	1 x SMA-type
Permissible ambient conditions	
Operating temperature	-40 °C to +85 °C
Degree of protection	IP40
Design, dimensions and weight	
Dimensions (W x H x D) in mm	88 x 120 x 150
Weight	2.5 kg
Mounting	DIN rail, control panel, rack
Power consumption	< 15 W
Reliability	
MTBF (calculated in accordance with MIL-HDBK-217)	52 years (at 55 °C)

RUGGEDCOM RX1400

Selection and ordering data

Version	Article No.
RUGGEDCOM RX1400 The RUGGEDCCOM RX1400 is a rugged Industrial Ethernet switch and TCP/IP router in compact size with 4 Gigabit Ethernet copper ports, 2 serial ports (DB9) and 2 SFP slots. Optionally equipped with LTE modem, SFPs and GPS/GLONASS support.	**6GK6014-0AM2.-....**
RUGGEDCOM VPE1400 License License for activating the RUGGEDCOM VPE1400 virtual environment on the RX1400	**6GK6014-0AL50-0AA0**
RUGGEDCOM RX1400 Layer 3 Security License License for activating the Layer 3 security functions on the RX1400	**6GK6014-0AL53-0AA0**

More information

The RUGGEDCOM Selector assists you in selecting the right RUGGEDCOM products and in configuring variants and is available at:
http://www.siemens.com/ruggedcom-selector

Overview

RUGGEDCOM RX1500/RX1524

RUGGEDCOM RX1501/RX1536

RUGGEDCOM RX1510

The RUGGEDCOM RX1500 series is a multi-service platform for the power supply sector, available in different sizes for 19-inch rack mounting and DIN/panel mounting. The RUGGEDCOM RX1500 series has a modular, field-replaceable platform that allows customers to choose between various WAN options, serial options and Ethernet options and is thus extremely well-suited for rail and traffic control systems.

Characteristics

- General device characteristics
  - Field-replaceable line modules
- RUGGEDCOM RX1500/RX1524:
  - Up to 24x 100FX ports
  - Up to 24x 10/100TX ports
  - Up to 12x 10FL/100SX ports
  - Up to 8 Gigabit Ethernet ports
  - Up to 24 serial ports
- RUGGEDCOM RX1501/RX1536:
  - Up to 36 ports 100FX
  - Up to 36 ports 10/100TX
  - Up to 18 ports 10FL / 100SX
  - Up to 4 ports Gigabit Ethernet
  - Up to 36 Serial Ports
- RUGGEDCOM RX1510:
  - Up to 24x 100FX ports
  - Up to 24x 10/100TX ports
  - Up to 12x 10FL/100SX ports
  - Up to 8 Gigabit Ethernet ports
  - Up to 24 serial ports
- WAN port options
  - T1/E1 (channelized)
  - E1 75 ohms via BNC
  - Mobile wireless
  - DDS
- Power supply
  - RUGGEDCOM RX1500, RX1510:
    - Modular power supply that is replaceable during operation
    - Input voltage range 24 V DC, 48 V DC, 88-300 V DC and 85-264 V AC for worldwide operation
  - Fully integrated power supply (no external adapters)
  - Safety approval according to CSA/UL 60950 up to +85 °C
- Cyber security
  - Integrated router, firewall and VPN functionality
  - Stateful firewall with NAT
  - Complete IPsec Virtual Private Networking
  - VPN with support for 3DES, AES128, AES256
  - RUGGEDCOM CROSSBOW for cyber security conformity in accordance with NERC CIP
  - Central RADIUS password management
  - Multilevel passwords
  - SSH/SSL encryption
  - Enable/disable ports, MAC-based port security
  - VLAN (802.1Q) for separation and protection of network traffic
  - SNMPv3-encrypted authentication and access protection
  - Optional checkpoint firewall and IPS (see RUGGEDCOM APE module)
- WAN protocols
  - Frame relay RFC 1490 or RFC 1294
  - PPP RFC 1661, 1332, 1321, 1334, PAP, CHAP authentication
  - GOOSE message support
- IP
  - Routing: OSPF, BGP, RIPv1 and RIPv2
  - VRRP
  - Traffic control, NTP server
  - IP multicast routing
  - DHCP agent (option 82 possible)
  - MPLS
- Reliability in harsh environments
  - EMC and immunity from electrical interference in the high voltage range
  - Meets requirements of IEEE 1613 (electric power stations for power supply and distribution)
  - Exceeds requirements of IEEE 61850-3 (electric power stations for power supply and distribution)
  - Exceeds requirements of IEC 61800-3 (drive systems with variable speed)
  - Exceeds requirements of IEC 61000-6-2 (general industrial environment)
  - Exceeds requirements of NEMA TS-2 (traffic control systems)
  - Operating temperature -40°C to +85°C (operation without fan)
  - Fail-safe output relay: For signaling of critical failures or errors
  - Zinc-plated steel housing (18 AWG) and adapter for 19-inch rack mounting

Product versions

RUGGEDCOM RX1500/RX1524

- Modular, 19-inch rack-mounted Layer 2 and Layer 3 switch and router with optional redundant power supply

RUGGEDCOM RX1501/RX1536

- Modular, 19-inch rack-mounted Layer 2 and Layer 3 switch and router with single power supply

RUGGEDCOM RX1510

- Modular Layer 2 and Layer 3 switch and router in compact size

RUGGEDCOM RX1500 / RX1501 / RX1510 / RX1524 / RX1536

Technical specifications

Article number	6GK6015-0AM2.-....	6GK6015-0BM2.-....	6GK6015-1AM2.-....	6GK6015-0CM2.-....	6GK6015-0DM2.-....
Product type designation	RUGGEDCOM RX1500	RUGGEDCOM RX1501	RUGGEDCOM RX1510	RUGGEDCOM RX1524	RUGGEDCOM RX1536
Transfer rate					
Transfer rate	10/100/1000 Mbit/s	10/100/1000 Mbit/s	10/100/1000 Mbit/s	10/100/1000 Mbit/s	10/100/1000 Mbit/s
Interfaces other					
Number of electrical connections					
• for serial interfaces according to RS 232/RS 422/RS 485 maximum	24	36	24	24	36
• for operator console	1	1	1	1	1
• for management purposes	1	1	1	1	1
• for signaling contact				1	1
• for power supply				1	1
Type of electrical connection					
• for operator console	RS232	RS232	RS232	RS232	RS232
• for management purposes	RJ45	RJ45	RJ45	RJ45	RJ45
• for signaling contact	--	--		3-pole terminal block, screwable	3-pole terminal block, screwable
• for power supply	--	--		5-pole terminal block, screwable	5-pole terminal block, screwable
Signal inputs/outputs					
Relay design				Fully sealed contact relay with changeover contact (SPDT)	Fully sealed contact relay with changeover contact (SPDT)
Type of relay output	changeover contact (CO)	changeover contact (CO)	changeover contact (CO)	changeover contact (CO)	changeover contact (CO)
Number of relay outputs as CO contact				1	1
Supply voltage, current consumption, power loss					
Product options wide range power supply				Yes	Yes
Product component power supply for PoE				No	No
Product feature					
• modular power supply				Yes	Yes
• hot-swappable power supply				Yes	No
Type of voltage 1 of the supply voltage				DC	DC
• supply voltage 1 rated value				12 V	12 V
• supply voltage 1 rated value				9 ... 15 V	9 ... 15 V
Type of voltage 2 of the supply voltage				DC	DC
• supply voltage 2 rated value				24 V	24 V
• supply voltage 2 rated value				15 ... 36 V	15 ... 36 V
Type of voltage 3 of the supply voltage				DC	DC
• supply voltage 3 rated value				48 V	48 V
• supply voltage 3 rated value				36 ... 42 V	36 ... 42 V
Type of voltage 4 of the supply voltage				DC	DC
• supply voltage 4 rated value				88 ... 300 V	88 ... 300 V
Ambient conditions					
Operating condition fanless operation	Yes	Yes	Yes	Yes	Yes
Protection class IP	IP3X	IP3X	IP40	IP30	IP30
Ambient temperature					
• during operation	--	--		-40 ... +85 °C	-40 ... +85 °C
• note	--	--		A maximum operating temperature of +85 °C is permissible for a duration of 16 hours	A maximum operating temperature of +85 °C is permissible for a duration of 16 hours
Design, dimensions and weights					
Design	19" rack	19" rack	compact	19" rack	19" rack
Number of modular height units relating to 19-inch cabinet	1	1		1	1
Number of slots	4	6	4	4	6
Width	440.944 mm	440.944 mm	237.7 mm	440.944 mm	440.944 mm
Height	44.2 mm	44.2 mm	122.7 mm	44.2 mm	44.2 mm
Depth	302.26 mm	302.26 mm	194.6 mm	302.26 mm	302.26 mm
Net weight	5.13 kg; Weight is depending on the built in modules	5.13 kg; Weight is depending on the built in modules	Weight is depending on the built in modules	5.13 kg; Weight is depending on the built in modules	5.13 kg; Weight is depending on the built in modules
Product feature conformal coating	optional	optional	optional	optional	optional
Material of the enclosure	Aluminum	Aluminum	Aluminum	Aluminum	Aluminum

Article number	6GK6015-0AM2.-....	6GK6015-0BM2.-....	6GK6015-1AM2.-....	6GK6015-0CM2.-....	6GK6015-0DM2.-....
Product type designation	RUGGEDCOM RX1500	RUGGEDCOM RX1501	RUGGEDCOM RX1510	RUGGEDCOM RX1524	RUGGEDCOM RX1536
Fastening method					
• 19-inch installation	Yes	Yes	No	Yes	Yes
• 35 mm top hat DIN rail mounting	No	No	Yes	No	No
• wall mounting	Yes	Yes	Yes	Yes	Yes
Product functions management, configuration, engineering					
Product function					
• CLI	Yes	Yes	Yes	Yes	Yes
Product function switch-managed	Yes	Yes	Yes	Yes	Yes
Product function					
• for MIB support by BRIDGE-MIB	RFC1493	RFC1493	RFC1493	RFC1493	RFC1493
• for MIB support / by IF-MIB	RFC2863	RFC2863	RFC2863	RFC2863	RFC2863
• for MIB support / by RMON-MIB	RFC2819	RFC2819	RFC2819	RFC2819	RFC2819
• for MIB support / by RSTP-MIB	draft-ietf-bridge-bridgemib-smiv2-03-RSTP-MIB	draft-ietf-bridge-bridgemib-smiv2-03-RSTP-MIB	draft-ietf-bridge-bridgemib-smiv2-03-RSTP-MIB	draft-ietf-bridge-bridgemib-smiv2-03-RSTP-MIB	draft-ietf-bridge-bridgemib-smiv2-03-RSTP-MIB
• for MIB support / by SNMPv2-MIB	RFC1907	RFC1907	RFC1907	RFC1907	RFC1907
• for MIB support / by SNMPv2-SMI	RFC2578	RFC2578	RFC2578	RFC2578	RFC2578
• for MIB support / by SNMPv2-TC	RFC2579	RFC2579	RFC2579	RFC2579	RFC2579
• for MIB support / by TCP-MIB	RFC2012	RFC2012	RFC2012	RFC2012	RFC2012
• for MIB support / by UDP-MIB	RFC2013	RFC2013	RFC2013	RFC2013	RFC2013
Product functions routing					
Product function					
• dynamic IP routing	Yes	Yes	Yes	Yes	Yes
Standards, specifications, approvals					
Standard					
• for safety / from CSA and UL	cCSAus (Compliant with CSA C22.2 No. 60950, UL 60950, EN 60950)	cCSAus (Compliant with CSA C22.2 No. 60950, UL 60950, EN 60950)	cCSAus (Compliant with CSA C22.2 No. 60950, UL 60950, EN 60950)	cCSAus (Compliant with CSA C22.2 No. 60950, UL 60950, EN 60950)	cCSAus (Compliant with CSA C22.2 No. 60950, UL 60950, EN 60950)
Reference code					
• according to IEC 81346-2	KF	KF	KF	KF	KF
• according to IEC 81346-2:2019	KFE	KFE	KFE	KFE	KFE
Standards, specifications, approvals CE					
Certificate of suitability CE marking	Yes	Yes	Yes	Yes	Yes
Standard					
• for EMC	FCC Part 15 (Class A), EN55022 (CISPR22 Class A)	FCC Part 15 (Class A), EN55022 (CISPR22 Class A)	FCC Part 15 (Class A), EN55022 (CISPR22 Class A)	FCC Part 15 (Class A), EN55022 (CISPR22 Class A)	FCC Part 15 (Class A), EN55022 (CISPR22 Class A)
Standards, specifications, approvals other					
Laser protection class	Complies with 21 CFR chapter 1, subchapter J	Complies with 21 CFR chapter 1, subchapter J	Complies with 21 CFR chapter 1, subchapter	Complies with 21 CFR chapter 1, subchapter J	Complies with 21 CFR chapter 1, subchapter J
Certificate of suitability					
• IEC 61850-3	Yes	Yes	Yes	Yes	Yes
Standards, specifications, approvals / product conformity					
Product conformity					
• according to IEEE 802.3-10BaseT	Yes	Yes	Yes	Yes	Yes
• according to IEEE 802.3u-100BaseTX	Yes	Yes	Yes	Yes	Yes
• according to IEEE 802.3u-100BaseFX	Yes	Yes	Yes	Yes	Yes
• according to IEEE 802.3ab-1000BaseT	Yes	Yes	Yes	Yes	Yes
• according to IEEE 802.3z-1000BaseLX	Yes	Yes	Yes	Yes	Yes
• according to IEEE 802.3x-Flow Control	Yes	Yes	Yes	Yes	Yes
• according to IEEE 802.1d-MAC Bridges	Yes	Yes	Yes	Yes	Yes
• according to IEEE 802.1d-STP	Yes	Yes	Yes	Yes	Yes
• according to IEEE 802.1D-2004-RSTP	Yes	Yes	Yes	Yes	Yes
• according to IEEE 802.1p-class of service	Yes	Yes	Yes	Yes	Yes
• according to IEEE 802.1Q-VLAN tagging	Yes	Yes	Yes	Yes	Yes
• according to IEEE 802.1Q-2005 (formerly IEEE 802.1s) MSTP	Yes	Yes	Yes	Yes	Yes
• according to IEEE 802.1w-RRST	Yes	Yes	Yes	Yes	Yes
• according to IEEE 802.1x-port based Network Access Control	Yes	Yes	Yes	Yes	Yes
• RFC768-UDP	Yes	Yes	Yes	Yes	Yes
• RFC783-TFTP	Yes	Yes	Yes	Yes	Yes
• RFC791-IP	Yes	Yes	Yes	Yes	Yes
• RFC792-ICMP	Yes	Yes	Yes	Yes	Yes
• RFC793-TCP	Yes	Yes	Yes	Yes	Yes
• RFC826-ARP	Yes	Yes	Yes	Yes	Yes
• RFC854-Telnet	Yes	Yes	Yes	Yes	Yes
• RFC894-IP over Ethernet	Yes	Yes	Yes	Yes	Yes

RUGGEDCOM RX1500 / RX1501 / RX1510 / RX1524 / RX1536

Article number	6GK6015-0AM2.-....	6GK6015-0BM2.-....	6GK6015-1AM2.-....	6GK6015-0CM2.-....	6GK6015-0DM2.-....
Product type designation	RUGGEDCOM RX1500	RUGGEDCOM RX1501	RUGGEDCOM RX1510	RUGGEDCOM RX1524	RUGGEDCOM RX1536
• RFC1112-IGMPv1	Yes	Yes	Yes	Yes	Yes
• RFC1294-Frame Relay	Yes	Yes	Yes	No	Yes
• RFC1321-PPP (MD5)	Yes	Yes	Yes	Yes	Yes
• RFC1332-PPP (IPCP)	Yes	Yes	Yes	Yes	Yes
• RFC1334-PPP Authentication	Yes	Yes	Yes	Yes	Yes
• RFC1490-Frame Relay	Yes	Yes	Yes	No	Yes
• RFC1519-CIDR	Yes	Yes	Yes	Yes	Yes
• RFC1541-DHCP (client)	Yes	Yes	Yes	Yes	Yes
• RFC1661-PPP	Yes	Yes	Yes	Yes	Yes
• RFC2030-SNTP	Yes	Yes	Yes	Yes	Yes
• RFC2068-HTTP	Yes	Yes	Yes	Yes	Yes
• RFC2236-IGMPv2	Yes	Yes	Yes	Yes	Yes
• RFC2284-EAP	Yes	Yes	Yes	Yes	Yes
• RFC2338-VRRP	Yes	Yes	Yes	Yes	Yes
• RFC2475-Differentiated Service	Yes	Yes	Yes	Yes	Yes
• RFC2865-RADIUS	Yes	Yes	Yes	Yes	Yes
• RFC3414-SNMPv3-USM	Yes	Yes	Yes	Yes	Yes
• RFC3415-SNMPv3-VACM	Yes	Yes	Yes	Yes	Yes

Selection and ordering data

Version	Article No.
RUGGEDCOM RX1500 The RUGGEDCOM RX1500 series comprises Layer 2 and Layer 3 switches and routers. 2x power supplies (replaceable during operation); locally replaceable line modules; up to 24x 100FX ports; up to 24x 10/100TX ports; up to 8x Gigabit Ethernet ports; up to 12x 10FL/100SX ports - SC, ST, LC and MTRJ; pluggable fiber-optic connection (SFP); up to 4x T1/E1 ports; mobile wireless (EVDO / HSPA); DDS (56K masters/slaves, 64K slaves); up to 24x RS232/422/485 ports	**6GK6015-0AM2.-....**
RUGGEDCOM RX1501 The RUGGEDCOM RX1501 series is a utility grade Layer 2 and Layer 3 switch and router. 1x power supply Field replaceable line modules Up to 36-ports 100FX; up to 36-ports 10/100TX; up to 4-ports Gigabit Ethernet up to 18 ports 10FL/100SX SC, ST, LC and MTRJ; pluggable Optics (SFP); up to 4 T1/E1 ports cellular (EVDO / HSPA), DDS (56K master/slave, 64K slave); up to 24 RS232/422/485	**6GK6015-0BM2.-....**
RUGGEDCOM RX1510 The RUGGEDCOM RX1510 series comprises Layer 2 and Layer 3 switches and routers in compact size. 2x power supplies - redundant, load-dividing power supplies; locally replaceable line modules; up to 24x 100FX ports; up to 24x 10/100TX ports; up to 8x Gigabit Ethernet ports; up to 12x 10FL/100SX ports - SC, ST, LC and MTRJ; pluggable fiber-optic connection (SFP); up to 4x T1/E1 ports; mobile wireless (EVDO / HSPA); DDS (56K masters/slaves, 64K slaves); up to 24x RS232/422/485 ports	**6GK6015-1AM2.-....**
RUGGEDCOM RX1524 The RUGGEDCOM RX1524 is a rugged, modular layer 2 switch + layer 3 router that supports up to 2 load sharing, hot swappable power supplies. Field replaceable line module options include: Up to 24-ports 100FX; Up to 24-ports 10/100TX; Up to 8-ports Gigabit Ethernet; Up to 12 ports 10FL/100SX; ST, LC and M12 connector types on various modules; Up to 4 cellular ports (3G / LTE); Up to 24 RS232/422/485 serial interface ports; Up to 2 APE1808 application hosting modules.	**6GK6015-0CM2.-....**
RUGGEDCOM RX1536 The RUGGEDCOM RX1536 is a rugged, modular layer 2 switch + layer 3 router that supports 1 replaceable power supply. Field replaceable line module options include: Up to 36-ports 100FX; Up to 36-ports 10/100TX; Up to 8-ports Gigabit Ethernet; Up to 18 ports 10FL/100SX; ST, LC and M12 connector types on various modules; Up to 6 cellular ports (3G / LTE); Up to 36 RS232/422/485 serial interface ports; Up to 2 APE1808 application hosting modules.	**6GK6015-0DM2.-....**

More information

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Overview

The RUGGEDCOM RX5000 is an Ethernet routing and switching platform with high connection density for use in harsh environments. These integrated switches and routers can withstand strong electromagnetic interference and radio frequency interference as well as a wide temperature range from -40 °C to +85 °C. The platform was developed for demanding climatic and environmental conditions, such as in power generation and distribution grids as well as in the industrial and military sectors.

Characteristics

- RUGGEDCOM RX5000:
  - Up to two 10 Gigabit uplinks
  - Up to 26 Gigabit ports
  - Up to 96x 10/100TX copper ports
  - Up to 48x 100 FX optical ports
  - Long-distance fiber-optic connections enable distances up to 90 km
- Power supply
  - Modular, redundant power supplies
  - Universal high voltage ranges: 88-300 V DC or 85-264 V AC
- Reliability in harsh environments
  - EMC and immunity from electrical interference in the high voltage range
  - Exceeds requirements of NEMA TS-2 (traffic control systems)
- Operating temperature -40°C to +85°C (operation without fan)
- Printed-circuit boards with protective coating (optional)

Selection and ordering data

Version	Article No.
RUGGEDCOM RX5000 The RUGGEDCOM RX5000 is a routing and switching platform with high port density. Up to 96x 10/100TX copper ports + 2x 10/100/1000T copper ports; up to 48x 100FX fiber-optic ports; up to 2x Gigabit Ethernet ports; long-distance fiber-optic connections enable distances up to 90 km	**6GK6050-0AM2.-....**

More information

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RUGGEDCOM WIN7200

Overview

The RUGGEDCOM WIN7200 is a light-weight IEEE 802.16e-compliant wireless broadband base station that has been developed for use in unlicensed and "lightly" licensed or completely licensed frequency bands in harsh environments. The RUGGEDCOM WIN7200 is a light-weight base station with a sector antenna that can be easily mounted on masts, street lamps or walls. It supports subscribers in a stationary or mobile environment. The RUGGEDCOM Win7200, which is singly powered and connected via a single Power over Ethernet (PoE) connection, reduces operating costs and complexity. The RUGGEDCOM WIN7200 system is powered by OFDMA radio technology, which has proven to be robust in adverse channel conditions and enables non-line-of-sight (NLOS) operation. Algorithms for link adjustment, modulation and coding are continuously adapted to the prevailing link conditions for an optimal balance between robustness and efficiency.

Characteristics

- Mobile WiMAX-compliant in accordance with IEEE 802.16e and WiMAX Forum Wave 2 (MIMO) certification
- Support of worldwide WiMAX usage in the 2.X-GHz, 3.X-GHz, 4.9-GHz and 5.8-GHz bands
- Adaptive modulation: For optimization of throughput and improvement of performance
- Ecosystem compatibility with all RUGGEDCOM WIN products or 802.16e-compliant WiMAX network equipment
- Large range: Transmission and reception diversity in combination with high output power for improved range and NLOS performance
- High bandwidth: RUGGEDCOM WIN has two integrated wireless units that operate simultaneously on the same frequency (MIMO) for improving the bandwidth (up to 40 Mbps) and spectral efficiency.
- Efficient frequency use: Use of OFDMA technology and integrated GPS so that users can use a complete network on a single frequency channel.
- Usage models: Developed for support of long-distance connections to stationary, portable and mobile end points with simultaneous support of seamless mobility of vehicles and backhaul mode
- Quality of service (QoS): With RUGGEDCOM WIN, users can separate data traffic types by air as well as guarantee latency, minimal bandwidth and jitter according to application requirements.
- Rugged design: RUGGEDCOM WIN features a rugged design and can be used flexibly outdoors. The RUGGEDCOM products have been developed for use in harsh environments, such as are found in power stations, oil refineries, the military sector, roadside traffic control cabinets and metal and mineral processing plants.
- Standalone architecture: Commercial wireless broadband equipment requires the existence of a complete network infrastructure. This includes a special mobile router called an ASN gateway that acts as a central point for all network traffic. This infrastructure can be very costly and complicated to implement. Siemens has developed a mode that requires this comprehensive infrastructure but at the same time retains the interoperability and technological advantages of wireless broadband.
- Secure: RUGGEDCOM WIN is equipped with many integrated functions for assuring compliance with NERC CIP, such as mutual authentication, AES encryption and protection of integrity of messages using CMAC

Selection and ordering data

Version	Article No.
RUGGEDCOM WIN7225-5 The RUGGEDCOM WIN7225-5 base station in compact size for outside use includes a power supply, 2x antenna cables 1.6 m, GPS receiver, GPS antenna and mounting set - antenna and data cables must be ordered separately, from 2483 MHz to 2690 MHz	**RUM:WIN7225-5**
RUGGEDCOM WIN7233-5 The RUGGEDCOM WIN7233-5 base station in compact size for outside use includes a power supply, 2x antenna cables 1.6 m, GPS receiver, GPS antenna and mounting set - antenna and data cables must be ordered separately, from 3300 MHz to 3400 MHz	**RUM:WIN7233-5**
RUGGEDCOM WIN7235-5 The RUGGEDCOM WIN7235-5 base station in compact size for outside use includes a power supply, 2x antenna cables 1.6 m, GPS receiver, GPS antenna and mounting set - antenna and data cables must be ordered separately, from 3400 MHz to 3600 MHz	**RUM:WIN7235-5**
RUGGEDCOM WIN7237-5 The RUGGEDCOM WIN7237-5 base station in compact size for outside use includes a power supply, 2x antenna cables 1.6 m, GPS receiver, GPS antenna and mounting set - antenna and data cables must be ordered separately, from 3600 MHz to 3720 MHz	**RUM:WIN7237-5**
RUGGEDCOM WIN7249-5 The RUGGEDCOM WIN7249-5 base station in compact size for outside use includes a power supply, 2x antenna cables 1.6 m, GPS receiver, GPS antenna and mounting set - antenna and data cables must be ordered separately, from 4900 MHz to 5000 MHz	**RUM:WIN7249-5**
RUGGEDCOM WIN7251 The RUGGEDCOM WIN7251 base station in compact size for outside use includes a power supply, 2x antenna cables 1.6 m, GPS receiver, GPS antenna and mounting set - antenna and data cables must be ordered separately, from 5000 MHz to 5150 MHz	**RUM:WIN7251**
RUGGEDCOM WIN7258-5 The RUGGEDCOM WIN7258-5 base station in compact size for outside use includes a power supply, 2x antenna cables 1.6 m, GPS receiver, GPS antenna and mounting set - antenna and data cables must be ordered separately, from 5725 MHz to 5850 MHz	**RUM:WIN7258-5**

More information

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RUGGEDCOM WIN5100

Overview

The RUGGEDCOM WIN5100 is an IEEE 802.16e-compliant wireless broadband subscriber unit that is equipped with external radio frequency connections for stationary or mobile applications in harsh environments. The self-learning subscriber device automatically detects the base station using the best available signal and enables plug-and-play installation and maintenance-free operation. The RUGGEDCOM WIN5100 has external antenna ports and is available with optional 10-30 V DC power input.

Characteristics

- Mobile WiMAX-compliant in accordance with IEEE 802.16e and WiMAX Forum Wave 2 profiles
- 2 N-type antenna ports for connection of roof antennas
- Excellent performance in NLOS conditions – insensitive to multipath and deep fade, providing for an extended range and easy installation
- Automatic Transmit Power Control (ATPC) for optimal power system utilization, tight frequency reuse and interference prevention
- Numerous applications and services – guaranteed voice, video and data services based on enhanced quality of service (QoS)
- Rugged hardware supports an operating temperature range from -40 °C to +75 °C
- Developed for mast installation or installation in the vehicle or control cabinet

Selection and ordering data

Version	Article No.
RUGGEDCOM WIN5114-5-AC RUGGEDCOM WIN5114-5-AC vehicle subscriber unit with external antenna ports, radio frequency cable - 5 m, power cable - 5 m (use of power supply in the vehicle as well as external power supply), mounting set, from 1350 MHz to 1525 MHz, with commercially available AC power injector, power/data cables must be ordered separately	**RUM:WIN5114-5-AC**
RUGGEDCOM WIN5114-5-DC RUGGEDCOM WIN5114-5-DC vehicle subscriber unit with external antenna ports, radio frequency cable - 5 m, power cable - 5 m (use of power supply in the vehicle as well as external power supply), mounting set, from 1350 MHz to 1525 MHz, direct 10-30 V DC power input with separate Ethernet connection, equipped with DC power cable, data cables must be ordered separately	**RUM:WIN5114-5-DC**
RUGGEDCOM WIN5118-5-AC RUGGEDCOM WIN5118-5-AC vehicle subscriber unit with external antenna ports, radio frequency cable - 5 m, power cable - 5 m (use of power supply in the vehicle as well as external power supply), mounting set, from 1800 MHz to 1830 MHz, with commercially available AC power injector, power/data cables must be ordered separately	**RUM:WIN5118-5-AC**
RUGGEDCOM WIN5118-5-DC RUGGEDCOM WIN5118-5-DC vehicle subscriber unit with external antenna ports, radio frequency cable - 5 m, power cable - 5 m (use of power supply in the vehicle as well as external power supply), mounting set, from 1800 MHz to 1830 MHz, direct 10-30 V DC power input with separate Ethernet connection, equipped with DC power cable, data cables must be ordered separately	**RUM:WIN5118-5-DC**
RUGGEDCOM WIN5123-5-AC RUGGEDCOM WIN5123-5-AC vehicle subscriber unit with external antenna ports, radio frequency cable - 5 m, power cable - 5 m (use of power supply in the vehicle as well as external power supply), mounting set, from 2300 MHz to 2400 MHz, with commercially available AC power injector, power/data cables must be ordered separately	**RUM:WIN5123-5-AC**
RUGGEDCOM WIN5123-5-DC RUGGEDCOM WIN5123-5-DC vehicle subscriber unit with external antenna ports, radio frequency cable - 5 m, power cable - 5 m (use of power supply in the vehicle as well as external power supply), mounting set, from 2300 MHz to 2400 MHz, direct 10-30 V DC power input with separate Ethernet connection, equipped with DC power cable, data cables must be ordered separately	**RUM:WIN5123-5-DC**
RUGGEDCOM WIN5125-5-AC RUGGEDCOM WIN5125-5-AC vehicle subscriber unit with external antenna ports, radio frequency cable - 5 m, power cable - 5 m (use of power supply in the vehicle as well as external power supply), mounting set, from 2496 MHz to 2690 MHz, with commercially available AC power injector, power/data cables must be ordered separately	**RUM:WIN5125-5-AC**

Version	Article No.
RUGGEDCOM WIN5125-5-DC RUGGEDCOM WIN5125-5-DC vehicle subscriber unit with external antenna ports, radio frequency cable - 5 m, power cable - 5 m (use of power supply in the vehicle as well as external power supply), mounting set, from 2496 MHz to 2690 MHz, direct 10-30 V DC power input with separate Ethernet connection, equipped with DC power cable, data cables must be ordered separately	**RUM:WIN5125-5-DC**
RUGGEDCOM WIN5135-5-AC RUGGEDCOM WIN5135-5-AC vehicle subscriber unit with external antenna ports, radio frequency cable - 5 m, power cable - 5 m (use of power supply in the vehicle as well as external power supply), mounting set, from 3300 MHz to 3600 MHz, with commercially available AC power injector, power/data cables must be ordered separately	**RUM:WIN5135-5-AC**
RUGGEDCOM WIN5135-5-DC RUGGEDCOM WIN5135-5-DC vehicle subscriber unit with external antenna ports, radio frequency cable - 5 m, power cable - 5 m (use of power supply in the vehicle as well as external power supply), mounting set, from 3300 MHz to 3600 MHz, direct 10-30 V DC power input with separate Ethernet connection, equipped with DC power cable, data cables must be ordered separately	**RUM:WIN5135-5-DC**
RUGGEDCOM WIN5137-5-AC RUGGEDCOM WIN5137-5-AC vehicle subscriber unit with external antenna ports, radio frequency cable - 5 m, power cable - 5 m (use of power supply in the vehicle as well as external power supply), mounting set, from 3600 MHz to 3800 MHz, with commercially available AC power injector, power/data cables must be ordered separately	**RUM:WIN5137-5-AC**
RUGGEDCOM WIN5137-5-DC RUGGEDCOM WIN5137-5-DC vehicle subscriber unit with external antenna ports, radio frequency cable - 5 m, power cable - 5 m (use of power supply in the vehicle as well as external power supply), mounting set, from 3600 MHz to 3800 MHz, direct 10-30 V DC power input with separate Ethernet connection, equipped with DC power cable, data cables must be ordered separately	**RUM:WIN5137-5-DC**
RUGGEDCOM WIN5149-5-AC RUGGEDCOM WIN5149-5-AC vehicle subscriber unit with external antenna ports, radio frequency cable - 5 m, power cable - 5 m (use of power supply in the vehicle as well as external power supply), mounting set, from 4900 MHz to 5000 MHz, with commercially available AC power injector, power/data cables must be ordered separately	**RUM:WIN5149-5-AC**
RUGGEDCOM WIN5149-5-DC RUGGEDCOM WIN5149-5-DC vehicle subscriber unit with external antenna ports, radio frequency cable - 5 m, power cable - 5 m (use of power supply in the vehicle as well as external power supply), mounting set, from 4900 MHz to 5000 MHz, direct 10-30 V DC power input with separate Ethernet connection, equipped with DC power cable, data cables must be ordered separately	**RUM:WIN5149-5-DC**
RUGGEDCOM WIN5151-5-AC RUGGEDCOM WIN5151-5-AC vehicle subscriber unit with external antenna ports, radio frequency cable - 5 m, power cable - 5 m (use of power supply in the vehicle as well as external power supply), mounting set, from 4900 MHz to 5200 MHz, with commercially available AC power injector, power/data cables must be ordered separately This product is intended for the air transportation market and AeroMACS frequency bands.	**RUM:WIN5151-5-AC**
RUGGEDCOM WIN5151-5-DC RUGGEDCOM WIN5151-5-DC vehicle subscriber unit with external antenna ports, radio frequency cable - 5 m, power cable - 5 m (use of power supply in the vehicle as well as external power supply), mounting set, from 4900 MHz to 5250 MHz, direct 10-30 V DC power input with separate Ethernet connection, equipped with DC power cable, data cables must be ordered separately This product is intended for the air transportation market and AeroMACS frequency bands.	**RUM:WIN5151-5-DC**
RUGGEDCOM WIN5158-5-AC RUGGEDCOM WIN5158-5-AC vehicle subscriber unit with external antenna ports, radio frequency cable - 5 m, power cable - 5 m (use of power supply in the vehicle as well as external power supply), mounting set, from 5725 MHz to 5850 MHz, with commercially available AC power injector, power/data cables must be ordered separately	**RUM:WIN5158-5-AC**
RUGGEDCOM WIN5158-5-DC RUGGEDCOM WIN5158-5-DC vehicle subscriber unit with external antenna ports, radio frequency cable - 5 m, power cable - 5 m (use of power supply in the vehicle as well as external power supply), mounting set, from 5725 MHz to 5850 MHz, direct 10-30 V DC power input with separate Ethernet connection, equipped with DC power cable, data cables must be ordered separately	**RUM:WIN5158-5-DC**

More information

The RUGGEDCOM Selector assists you in selecting the right RUGGEDCOM products and in configuring variants and is available at:
http://www.siemens.com/ruggedcom-selector

RUGGEDCOM WIN5200

Overview

The RUGGEDCOM WIN5200 is an IEEE 802.16e-compliant wireless broadband subscriber unit that is equipped with an integrated dual-slant directional antenna for harsh environments. The RUGGEDCOM WIN5200 is much simpler to install thanks to LEDs for signal strength alignment, automatic connection to the strongest available base station and automatic service delivery based on authentication data. Specially developed for point-to-multipoint broadband applications with wireless access, the RUGGEDCOM WIN5200 enables efficient use of the wireless frequency spectrum and supports many different applications.

Characteristics

- Mobile WiMAX-compliant in accordance with IEEE 802.16e and WiMAX Forum Wave 2 profiles
- Integrated antenna with high strength
- Excellent performance in NLOS conditions – insensitive to multipath and deep fade, providing for an extended range and easy installation
- Automatic Transmit Power Control (ATPC) for optimal power system utilization, tight frequency reuse and interference prevention
- Numerous applications and services – guaranteed voice, video and data services based on enhanced quality of service (QoS)
- Low operating costs due to easy installation and needs-based expansion so that owners can quickly enter new market segments with minimum investment
- Rugged hardware supports an operating temperature range from -40 °C to +75 °C
- Mean time between failures (MTBF) of over 1 million hours
- A single Power over Ethernet (PoE) cable
- Broad frequency band supports worldwide use
- Subscriber unit for outside use

Selection and ordering data

Version	Article No.
RUGGEDCOM WIN5218-1-WR-AC RUGGEDCOM WIN5218-1-WR-AC vehicle subscriber unit with external antenna ports, radio frequency cable - 5 m, power cable - 5 m (use of power supply in the vehicle as well as external power supply), mounting set, from 1785 MHz to 1805 MHz, with commercially available AC power injector, power/data cables must be ordered separately. This article number can only be ordered for China	**RUM:WIN5218-1-WR-A**
RUGGEDCOM WIN5218-1-WR-DC RUGGEDCOM WIN5218-1-WR-DC vehicle subscriber unit with external antenna ports, radio frequency cable - 5 m, power cable - 5 m (use of power supply in the vehicle as well as external power supply), mounting set, from 1785 MHz to 1805 MHz, direct 10-30 V DC power input with separate Ethernet connection, equipped with DC power cable, data cables must be ordered separately. This article number can only be ordered for China	**RUM:WIN5218-1-WR-D**
RUGGEDCOM WIN5218-1-WR-OD RUGGEDCOM WIN5218-1-WR-OD subscriber unit for outside use with high strength and integrated dual-slant directional antenna, includes commercial-quality power supply, from 1785 MHz to 1805 MHz. This article number can only be ordered for China	**RUM:WIN5218-1-WR-O**
RUGGEDCOM WIN5218-5 RUGGEDCOM WIN5218-5 subscriber unit for outside use with high strength and integrated dual-slant directional antenna, includes commercial-quality power supply, from 1800 MHz to 1830 MHz	**RUM:WIN5218-5**
RUGGEDCOM WIN5223-5 RUGGEDCOM WIN5223-5 subscriber unit for outside use with high strength and integrated dual-slant directional antenna, includes commercial-quality power supply, from 2300 MHz to 2400 MHz	**RUM:WIN5223-5**
RUGGEDCOM WIN5225-5 RUGGEDCOM WIN5225-5 subscriber unit for outside use with high strength and integrated dual-slant directional antenna, includes commercial-quality power supply, from 2496 MHz to 2690 MHz	**RUM:WIN5225-5**
RUGGEDCOM WIN5235-5 RUGGEDCOM WIN5235-5 subscriber unit for outside use with high strength and integrated dual-slant directional antenna, includes commercial-quality power supply, from 3300 MHz to 3600 MHz	**RUM:WIN5235-5**
RUGGEDCOM WIN5237-5 RUGGEDCOM WIN5237-5 subscriber unit for outside use with high strength and integrated dual-slant directional antenna, includes commercial-quality power supply, from 3600 MHz to 3800 MHz	**RUM:WIN5237-5**
RUGGEDCOM WIN5249-5 RUGGEDCOM WIN5249-5 subscriber unit for outside use with high strength and integrated dual-slant directional antenna, includes commercial-quality power supply, from 4900 MHz to 5000 MHz	**RUM:WIN5249-5**
RUGGEDCOM WIN5251 RUGGEDCOM WIN5251 subscriber unit for outside use with high strength and integrated dual-slant directional antenna, includes commercial-quality power supply, from 4900 MHz to 5200 MHz This product is intended for the air transportation market and AeroMACS frequency bands.	**RUM:WIN5251**
RUGGEDCOM WIN5137-5-DC RUGGEDCOM WIN5258-5 subscriber unit for outside use with high strength and integrated dual-slant directional antenna, includes commercial-quality power supply, from 5725 MHz to 5850 MHz	**RUM:WIN5137-5-DC**
RUGGEDCOM WIN5258-5 RUGGEDCOM WIN5149-5-AC vehicle subscriber unit with external antenna ports, radio frequency cable - 5 m, power cable - 5 m (use of power supply in the vehicle as well as external power supply), mounting set, from 4900 MHz to 5000 MHz, with commercially available AC power injector, power/data cables must be ordered separately	**RUM:WIN5258-5**

More information

The RUGGEDCOM Selector assists you in selecting the right RUGGEDCOM products and in configuring variants and is available at:
http://www.siemens.com/ruggedcom-selector

Notes

Vacuum interrupters

Overview

Vacuum switching technology is the preferred technology for medium-voltage applications worldwide, and is therefore state-of-the-art.
Our experience in developing and manufacturing these challenging products dates back over 40 years. The major part relates to the special requirements for railway applications.
Over this period, more than 8 million Siemens interrupters have been installed worldwide.
Close cooperation with our customers enables us to continuously innovate the products and to maintain our quality requirements at the highest possible level.
For this reason, we manufacture the contact material in-house and subject the individual components as well as the complete interrupters to intensive tests before delivery.
We therefore offer:

- High reliability
- Maximum switching capacity
- Leading technology
- Excellent technical support

Selection and ordering data

Rated voltage kV	Rated frequency Hz	Rated short-circuit breaking current kA	Rated current A	Lightning impulse withstand voltage kV
up to 17.5	16.7/25/50/60	25/31.5/40/50	up to 2 500	95/125
25	50/60	up to 31.5	up to 2 500	145/170
27.5	50/60	up to 31.5	up to 2 500	170/200
36	50/60	up to 31.5	up to 2 500	200/250

- Mechanical operating cycles 30 000
- Temperature range: -40 °C to 120 °C
- Optionally available siliconized
- Dimensions and further details on request

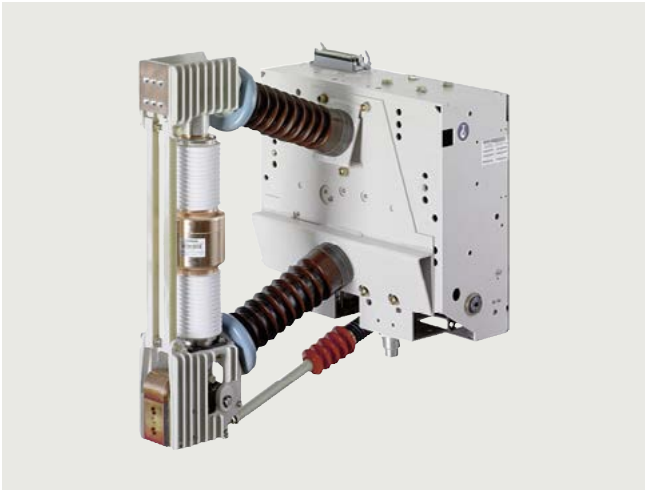
The vacuum interrupters are fully developed products which can be supplied with customized connection dimensions.

For further information, please contact:
Email: lino.garcia@siemens.com, or
Tel.: +49 (174) 1408934

Overview

The 3AH47 vacuum circuit breakers are based on the successful 3AH vacuum circuit breaker series which has been well proven in practice in over 500 000 installations.

The 3AH47 vacuum circuit breaker can control up to 60 000 operating cycles depending on the version. With minimum maintenance work, such as greasing of operating mechanisms after 10 000 operating cycles and replacing the interrupters after 30 000 operating cycles, the reliability of these circuit breakers is maintained throughout the entire service life.



Selection and ordering data

Rated voltage	Rated frequency	Rated short-circuit breaking current	Rated operational current (A)					
			1 250		2 000		2 500	
kV	Hz	kA	Single-pole	Two-pole	Single-pole	Two-pole	Single-pole	Two-pole
17.5	16.7	25			**3AH4754-4**			
		31.5			**3AH4755-4**			
		40					**3AH47 56/66-6**	
		50					**3AH4757-6**	
25	25	25[1)]	**3AH4714-2**	**3AH4714-2 "D31"**	**3AH4714-4**	**3AH4714-4 "D31"**	**3AH4714-6**	**3AH4714-6 "D31"**
27.5	50/60	25	**3AH4784-2**	**3AH4784-2 "D31"**	**3AH4784-4**	**3AH4784-4 "D31"**	**3AH4784-6**	
		31.5	**3AH4785-2**	**3AH4785-2 "D31"**	**3AH4785-4**		**3AH4785-6**	**3AH4785-6 "D31"**

1) Further values on request.

More information

For detailed information see Product Catalog HG 11.52, "3AH47 Vacuum Circuit Breakers for Traction Applications".

Notes

Surge Arresters for Railway Applications

Introduction

Overview

Siemens surge arresters for railway applications – particularly reliable, stable and safe overvoltage protection

Siemens has developed and manufactured medium and high-voltage surge arresters for standard and special applications since 1925. We have been producing surge arresters for railway systems for over 80 years. Continuous research and development, comprehensive know-how and worldwide experience give Siemens surge arresters a leading edge in overvoltage protection. Their uncompromising quality ensures a long service life and reliability in any application.

Siemens surge arresters are an indispensable aid to insulation coordination in electrical power supply systems.

Valuable equipment, such as traction units, is ideally protected against lightning and switching overvoltages.

Siemens surge arresters have been designed to meet the requirements of a wide range of common installation environments, from arctic cold to the heat of the desert and the dampness of tropical climates.

Definition of surge arresters

Surge arresters are used to protect electrical equipment, such as transformers, circuit breakers and bushings, against the effects of overvoltages caused by incoming surges. Such overvoltages can be caused by a direct or nearby lightning strike, electromagnetic discharges or switching operations in the power supply system as well as in devices. Some overvoltages are very high in energy. The current from the surge is diverted through the arrester, in most cases to ground. Effective overvoltage protection requires that different surge arrester types be used depending on the particular application.

Always the best solution for traction systems

Electrical power for traction systems is generally transmitted to traction substations of the (national) utility or the railway systems' own high-voltage network by high voltage transmission lines with rated voltages of 110 kV and above at frequencies of 16 2/3 Hz, 25 Hz, 50 Hz or 60 Hz. The voltage is then stepped down to the supply voltage of the traction system and converted into DC voltage where necessary. The high-voltage transmission lines, the traction substations, the catenary system and the traction units are exposed to lightning overvoltages that may result in huge damage to the insulation of the electrical equipment.

Siemens surge arresters for railway applications protect every part of a railway system, from railway substations through transmission lines, cable and catenary systems to rail vehicles for mass-transit, mainline and high-speed transportation up to 420 km/h. Siemens offers several surge arrester product families for AC and DC railway applications up to 45 kV:

- **3EB4** – silicone rubber surge arrester with composite hollow-core enclosure for use on traction units and for fixed installation in AC and DC systems.
- **3EB5** – silicone rubber surge arrester in a cage design for use on traction units and for fixed installation in AC and DC systems.

Siemens provides each of these types in several versions, making it possible to find the ideal surge arrester for any conceivable application and meet even specific demands, such as:

- high mechanical stability to withstand vibrations and high wind speeds,
- extremely reliable pressure relief behavior for use in areas requiring special protection,
- excellent pollution layer characteristics for use in coastal and desert regions or in areas with extreme air pollution.

All Siemens surge arresters feature a superior sealing system that reliably prevents moisture ingress to ensure the highest possible degree of overvoltage protection and decades of trouble-free service. Moreover, the choice of materials used in the production of Siemens surge arresters contributes to protection of the environment.

The best choice for every application

Whether it is high-speed, intercity trains between the major cities of the world, train shuttle services from train stations to airports that run every few minutes, or everyday mass transit, the requirements of rail transport vary from one extreme to the other.

Siemens supplies a complete portfolio of surge arresters that meets all the requirements for overvoltage protection of rail vehicles and rail electrification worldwide. Apart from the system voltage, the main criterion for the selection of the appropriate surge arrester is the type of application, which defines travel speed and resulting load.

The 3EB4 and 3EB5 surge arresters are highly suitable for every possible railway application, including:

- High-speed and intercity trains
- Mass transit and regional trains
- Urban public transport: Light rail vehicles, metros, trams, electric buses
- Locomotives
- Drive systems

And for every power supply system, such as:

- 12.5 kV, 25 Hz/60 Hz
- 15 kV, 16 2/3 Hz
- 25 kV, 50 Hz/60 Hz
- 750 V DC
- 1 500 V DC
- 3 000 V DC

Standards and tests – reliability you really can depend on

Siemens surge arresters have been designed and tested in compliance with the latest IEC 60099-4, IEEE C62.11 and GB 11032 standards. All type tests are performed by independent, PEHLA-certified laboratories; the test reports are available on request. Please contact your Siemens representative for details.

Moreover, every single surge arrester that leaves the Siemens factory undergoes a routine test and is delivered with a routine test certificate.

Siemens meets all requirements of ISO 9001:2008, ISO 14002:2004 and BS OHSAS 18001:2007. All Siemens suppliers have to be certified according to ISO standards or are audited by Siemens.

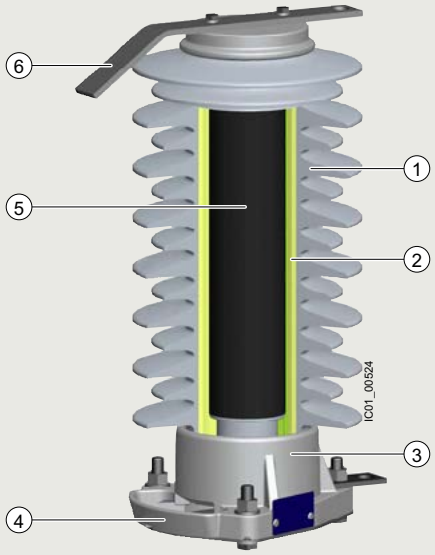
To maintain sustainable quality improvement, Siemens introduced corporate quality guidelines that contribute to each step of the quality process.

The 3EB4 and 3EB5 surge arresters comply with the following international standards:

- **IEC 60099-4**, Metal oxide surge arresters for AC systems
- **EN 50526-1**, Railway applications – Fixed installations – D.C. surge arresters and voltage limiting devices
- **EN 45545-2**, Railway applications – Fire protection on railway vehicles
- **IEC 61373**, Railway applications – Rolling stock equipment – Shock and vibration tests

Overview

3EB4 – silicone rubber surge arrester with composite hollow core design



1. Silicone rubber sheds directly molded on FRP tube
2. FRP tube
3. End fitting with directional pressure relief device and sealing system
4. Directional pressure relief device
5. Metal oxide blocks
6. Arcing horn

Reliable and safe – 3EB4 railway surge arresters

3RB4 type railway surge arresters have to withstand a great deal, including the influence of extreme weather conditions, temperatures from –40 °C to +70 °C and the effects of UV radiation and hydrophobicity. They have been designed for precisely this, and are effectively protected with suitable fault-tolerant technology and durable materials to ensure trouble-free operation under all conditions of use.

Within the composite housing, the arrester's enclosure materials consist of silicone and glass-fiber reinforced plastic (GFRP). The silicone, which is directly applied onto the GFRP tube in an injection molding process, ensures reliability and an excellent special seal at both ends of the surge arrester effectively prevents partial discharges and moisture ingress, guaranteeing decades of trouble-free operation. The combination of silicone and a glass-fiber-reinforced plastic tube also ensures excellent mechanical resilience of the design.

The 3EB4 surge arrester enclosure is designed for extreme mechanical loads and it is ideally suited for high speeds up to 420 km/h (260 mph).

The silicone arrestor with composite hollow core enclosure design provides a very high degree of safety: In the case of an overload or the extremely rare case of an arrester short circuit, the arc escapes directly through a directional pressure relief device. The surge arrester, therefore, can be installed in a way that will minimize the risk of any damage to the equipment and passengers nearby. Internal parts are not ejected and the shatterproof housing remains intact.

A reliable, rugged and economical choice

Siemens 3EB4 composite hollow core design surge arresters are virtually indestructible during transportation, installation, storms, and vandalism. While the composite hollow core enclosure design provides the highest possible mechanical strength, the silicone rubber insulation is ideal for outdoor applications in severe environmental conditions. No matter how tough environmental and operating conditions may be, 3EB4 arresters assure 100% reliable pressure relief performance and provide the ultimate in protection.

Technical specifications

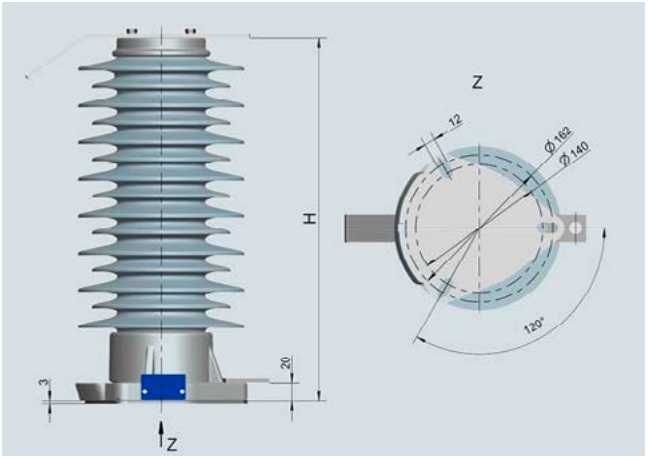
Electrical characteristics

Line voltage	Rated voltage	Continuous voltage	Arrester article number	Maximum travel speed	Arrester class	Rated discharge current	Discharge capacity	Thermal rated energy absorption capacity	Maximum residual voltages					
U_n	U_r	U_c				I_n	Q_{rs}	W_{th}	30/60 µs 500 A	30/60 µs 1000 A	30/60 µs 2000 A	8/20 µs 5 kA	8/20 µs 10 kA	8/20 µs 20 kA
kV	kV	kV		km/h		kA	C	kJ	kV	kV	kV	kV	kV	kV
AC														
15	23	18	3EB4 230 - 5 A L 3 2 - 0.	420	SL	10	1.2	115	45.2	46.9	49.3	54.6	58.7	65.7
	23	18	3EB4 230 - 6 A L 3 2 - 0.	420	SM	10	2.0	161	43.2	44.3	46.5	50.8	54.1	60.0
	23	18	3EB4 230 - 7 A L 3 2 - 0.	420	SH	20	2.8	230	42.8	43.9	46.0	49.7	52.9	58.2
25	37	30	3EB4 370 - 5 A X 3 2 - 0.	420	SL	10	1.2	185	72.7	75.5	79.3	87.8	94.4	106
	37	30	3EB4 370 - 6 A X 3 2 - 0.	420	SM	10	2.0	259	69.6	71.3	74.8	81.7	87.0	96.5
	37	30	3EB4 370 - 7 A X 3 2 - 0.	420	SH	20	2.8	370	68.9	70.6	74.0	80.0	85.1	93.6
	42	34	3EB4 420 - 5 A X 3 2 - 0.	420	SL	10	1.2	210	82.5	85.7	90.0	99.6	107	120
	42	34	3EB4 420 - 6 A X 3 2 - 0.	420	SM	10	2.0	297	79.0	80.9	84.9	92.8	98.7	110
	42	34	3EB4 420 - 7 A X 3 2 - 0.	420	SH	20	2.8	420	78.2	80.2	84.0	90.8	96.6	106
DC														
0.75	1.0	1.0	3EB4 010 - 7 D S 3 2 - 0.	420	DC-B	20	2.5	10	1.9	2.0	2.1	2.3	2.4	2.6
	1.0	1.0	3EB4 010 - 7 D M 3 2 - 0.	420	DC-B	20	2.5	10	1.9	2.0	2.1	2.3	2.4	2.6
1.5	2.0	2.0	3EB4 020 - 7 D S 3 2 - 0.	420	DC-B	20	2.5	20	3.9	4.0	4.2	4.5	4.8	5.3
	2.0	2.0	3EB4 020 - 7 D M 3 2 - 0.	420	DC-B	20	2.5	20	3.9	4.0	4.2	4.5	4.8	5.3
3.0	4.0	4.0	3EB4 040 - 7 D S 3 2 - 0.	420	DC-B	20	2.5	40	7.8	8.0	8.4	9.0	9.6	10.6
	4.0	4.0	3EB4 040 - 7 D M 3 2 - 0.	420	DC-B	20	2.5	40	7.8	8.0	8.4	9.0	9.6	10.6

Mechanical properties

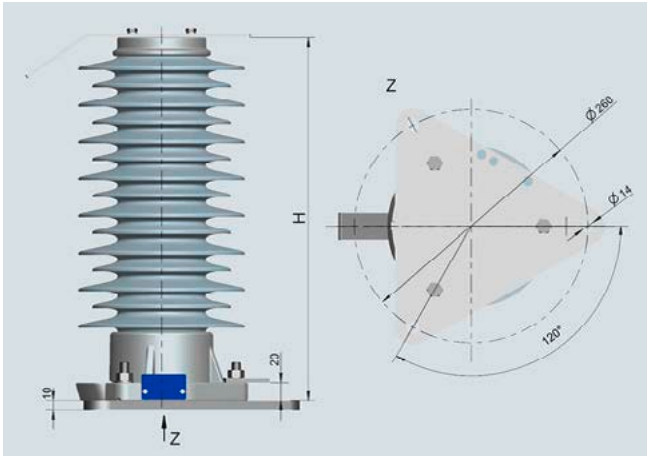
Line voltage	Height	Creepage path	Rated short-circuit current	Lighting impulse withstand voltage 1.2/50 µs	Power frequency withstand voltage, wet 1 min.	Defined short-time load SSL	Defined continuous load SLL	Weight	Flashover distance	Figure
U_n	H									
kV	mm	mm	kA	kV	kV	N	N	kg	mm	
AC										
15	275	710	50	110	45	9450	6610	6.8	238	A
	275	710	50	110	45	9450	6610	7.3	238	A
	275	710	50	110	45	9450	6610	8.3	238	A
25	395	1175	50	170	70	6580	4600	9.2	358	A
	395	1175	50	170	70	6580	4600	10.1	358	A
	395	1175	50	170	70	6580	4600	12.1	358	A
	395	1175	50	170	70	6580	4600	9.6	358	A
	395	1175	50	170	70	6580	4600	10.8	358	A
	395	1175	50	170	70	6580	4600	12.8	358	A
DC										
0.75	155	243	40	55	30	16770	11740	3.9	92	A
	195	399	40	70	40	13330	9330	4.1	124	A
1.5	155	243	40	55	30	16770	11740	4.1	92	A
	195	399	40	70	40	13330	9330	4.3	124	A
3.0	155	243	40	55	30	16770	11740	4.5	92	A
	195	399	40	70	40	13330	9330	4.6	124	A

Connections



3EB4 …-…..-.D

Figure A

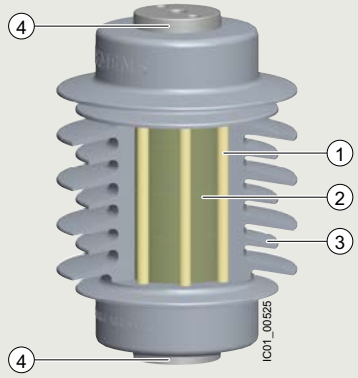


3EB4 …-…..-.E

Figure A

Overview

3EB5 silicone rubber surge arrester in a cage design



1. Cage of FRP rods
2. Metal oxide blocks
3. Silicone rubber sheds directly moulded on metal oxide blocks and on end-fittings
4. End-fittings

Siemens 3EB5 surge arresters in a cage design offer excellent protection from overvoltage in railway applications.

The metal oxide varistors (MOVs) are encased in a cage of rods made out of glass-fiber-reinforced plastic (FRP), which produces a rigid, reinforced construction.

Reliability is ensured by directly injecting the silicone onto the MO varistors and the FRP rods. This ensures complete embedding of all components without entrapment and gaps, and thus excellent sealing against partial discharges or the ingress of moisture.

In the extremely rare case of an MOV overload, arcing does not produce any critical pressure in the interior because the MOV elements are not situated in a sealed mechanical enclosure. The arc can escape directly through the soft silicone housing, without damaging the mechanical enclosure support. The ejection of internal parts that could damage other nearby equipment is prevented almost completely. The innovative cage design from Siemens ensures an excellent safety response.

The silicone is highly hydrophobic and retains its water and dirt-repellent effect throughout its use. This results in high tracking and erosion resistance The silicone enclosure is self-extinguishing and flame-retardant. These advantages ensure maintenance-free and reliable use of 3EB5 surge arresters.

Technical specifications

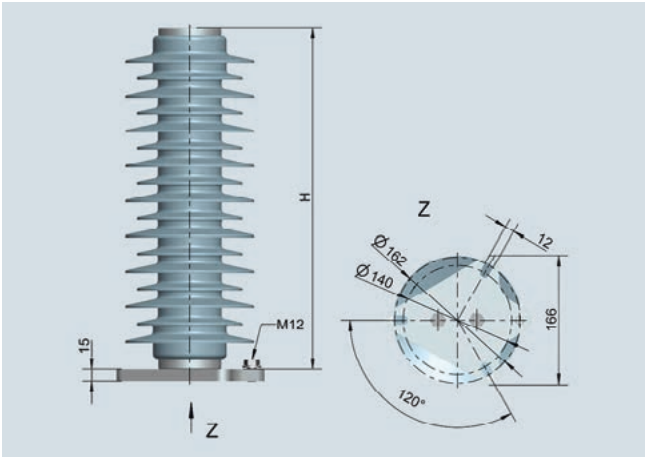
Electrical characteristics

Line voltage	Rated voltage	Continuous voltage	Arrester article number	Maximum travel speed	Arrester class	Rated discharge current	Discharge capacity	Thermal rated energy absorption capacity	Maximum residual voltages					
U_n	U_r	U_c				I_n	Q_{rs}	W_{th}	30/60 µs 500 A	30/60 µs 1000 A	30/60 µs 2000 A	8/20 µs 5 kA	8/20 µs 10 kA	8/20 µs 20 kA
kV	kV	k		km/h		kA	C	kJ	kV	kV	kV	kV	kV	kV
AC														
15	23	18	3EB5 230 - 6 A E 3 0 - 0.	200	SM	10	2.0	161	43.2	44.3	46.5	50.8	54.1	60.0
	23	18	3EB5 230 - 7 A E 3 0 - 0.	200	SH	20	2.8	230	43.0	44.3	45.5	48.9	51.8	56.4
	23	18	3EB5 230 - 8 A E 3 0 - 0.	200	SH	20	3.6	322	43.0	44.3	45.5	48.9	51.8	56.4
25	37	30	3EB5 370 - 6 A H 3 0 - 0.	200	SM	10	2.0	259	69.6	71.3	74.8	81.7	87.0	96.5
	37	30	3EB5 370 - 7 A H 3 0 - 0.	200	SH	20	2.8	370	69.1	71.2	73.3	78.7	83.3	90.8
	37	30	3EB5 370 - 8 A H 3 0 - 0.	200	SH	20	3.6	518	69.1	71.2	73.3	78.7	83.3	90.8
	42	34	3EB5 420 - 6 A J 3 0 - 0.	200	SM	10	2.0	294	79.0	80.9	84.9	92.8	98.7	110
	42	34	3EB5 420 - 7 A J 3 0 - 0.	200	SH	20	2.8	420	78.5	80.8	83.2	89.3	94.5	103
	42	34	3EB5 420 - 8 A J 3 0 - 0.	200	SH	20	3.6	588	78.5	80.8	83.2	89.3	94.5	103
	45	36	3EB5 450 - 6 A J 3 0 - 0.	200	SM	10	2.0	315	84.6	86.7	90.9	99.4	106	117
	45	36	3EB5 450 - 7 A J 3 0 - 0.	200	SH	20	2.8	450	84.1	86.6	89.1	95.7	101	110
	45	36	3EB5 450 - 8 A J 3 0 - 0.	200	SH	20	3.6	630	84.1	86.6	89.1	95.7	101	110
DC														
0.75	1.0	1.0	3EB5 010 - 8 D B 3 0 - 0.	200	DC-B	20	3.6	14	1.9	1.9	2.0	2.1	2.3	2.5
	1.5	1.5	3EB5 015 - 8 D B 3 0 - 0.	200	DC-B	20	3.6	21	2.8	2.9	3.0	3.2	3.4	3.7
1.5	2.0	2.0	3EB5 020 - 8 D B 3 0 - 0.	200	DC-B	20	3.6	28	3.7	3.8	4.0	4.3	4.5	4.9
	3.0	3.0	3EB5 030 - 8 D B 3 0 - 0.	200	DC-B	20	3.6	42	5.6	5.8	5.9	6.4	6.8	7.4
3.0	4.5	4.5	3EB5 045 - 8 D B 3 0 - 0.	200	DC-B	20	3.6	63	8.4	8.7	8.9	9.6	10.1	11.0
	4.8	4.8	3EB5 048 - 8 D B 3 0 - 0.	200	DC-B	20	3.6	67	9.0	9.2	9.5	10.2	10.8	11.8

Mechanical properties

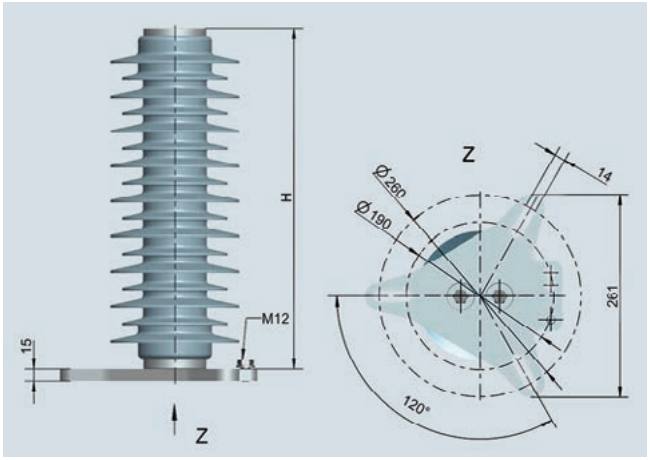
Line voltage	Height	Creepage path	Rated short-circuit current	Lighting impulse withstand voltage 1.2/50 µs	Power frequency withstand voltage, wet 1 min.	Defined short-time load SSL	Defined continuous load SLL	Weight	Flashover distance	Figure
U_n	H									
kV	mm	mm	kA	kV	kV	N	N	kg	mm	
AC										
15	301	920	50	175	80	3320	2320	6.4	306	B
	281	860	65	165	75	5330	3730	10.1	288	C
	281	860	65	165	75	5330	3730	10.1	288	C
25	436	1420	50	250	120	2290	1600	8.7	438	B
	389	1330	65	230	105	3850	2690	13.6	395	C
	389	1330	65	230	105	3850	2690	14.1	395	C
	481	1580	50	275	130	2070	1450	9.6	482	B
	425	1480	65	250	115	3520	2470	15.1	430	C
	425	1480	65	250	115	3520	2470	15.6	430	C
	481	1580	50	275	130	2070	1450	9.9	482	B
	425	1480	65	250	115	3520	2470	15.6	430	C
	425	1480	65	250	115	3520	2470	16.0	430	C
DC										
0.75	172	390	65	105	50	8720	6100	4.9	182	C
	172	390	65	105	50	8720	6100	5.0	182	C
1.5	172	390	65	105	50	8720	6100	5.1	182	C
	172	390	65	105	50	8720	6100	5.2	182	C
3.0	172	390	65	105	50	8720	6100	5.5	182	C
	172	390	65	105	50	8720	6100	5.5	182	C

Connections



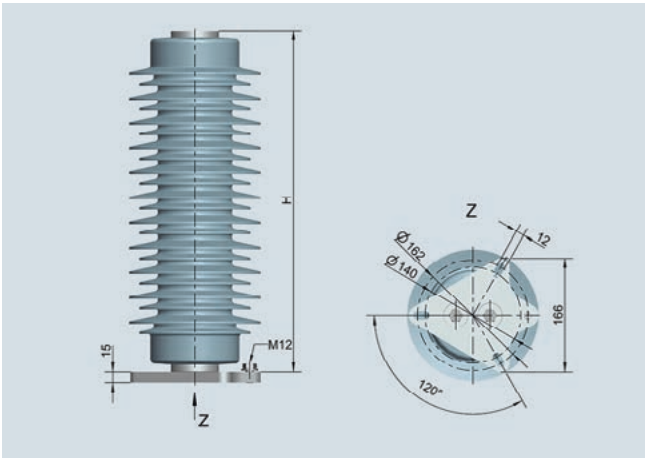
3EB5 ...-.....-.D

Figure B



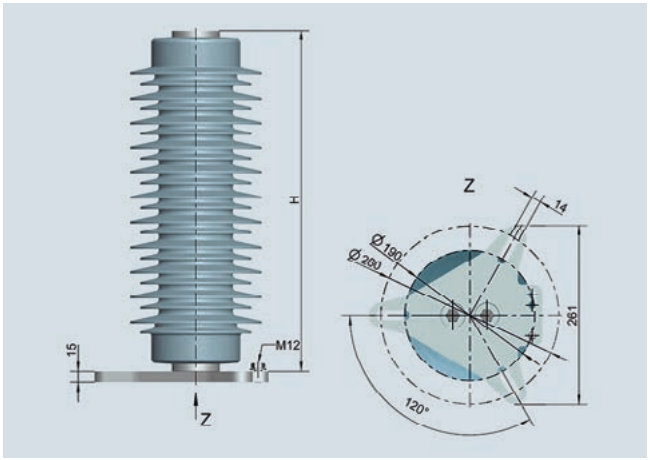
3EB5 ...-.....-.E

Figure B



3EB5 ...-.....-.D

Figure C



3EB5 ...-.....-.E

Figure C

Notes

Appendix

SITRAIN – Digital Industry Academy

Introduction

The Future of Learning starts now

Globalization, digitalization, new work, Internet of Things, new business models – our way of working, living and learning is changing rapidly. With SITRAIN, the future of learning begins today: SITRAIN stands for a modern learning culture that focuses on the needs of learners and the demands of innovative companies.
With SITRAIN – Digital Industry Academy, the future of learning is yours.

Face-to-face training or digital training, location-independent, 24/7, on-demand or learning at fixed dates and course times? With a personal learning consultant, in a team, or on your own responsibility? Everything is possible. SITRAIN offers a wide range of different learning options with the "Learning Journey", "Learning Membership" and "Learning Event".

The three learning formats of SITRAIN – Digital Industry Academy

Learning Journey

The combination for sustainable learning success

- The optimal mix of self-study units and guided live modules
- Includes a Learning Membership to work through the self-study modules and access on-demand content
- The SITRAIN learning consultant is available for questions and one-on-one consultations
- Ideal integration into the daily work routine and adaptation to one's own learning pace.

Learning Membership

Securing knowledge through continuous learning on your own responsibility

- With access to the comprehensive and constantly growing range of self-study units on SITRAIN access, the digital learning platform
- Search and find specific learning content or simply have a look around – anytime and anywhere
- A modern learning culture through continuous learning on your own responsibility and transparency about your learning success in the team or company.

Learning Event

Acquire theoretical and practical knowledge in a compact and guided format

- You achieve a defined learning goal in the shortest possible time
- The learning consultant guides you through the practical exercises and is also exclusively available to you during the theoretical sessions for the entire duration
- Focused learning, outside of the daily work routine, in a protected learning environment – virtually, in the training center, or at your company.

Introduction

Expand your knowledge, apply what you have learned, develop future skills

The SITRAIN Digital Industry Academy combines didactically effective methods and modular options.

The four building blocks of SITRAIN – Digital Industry Academy

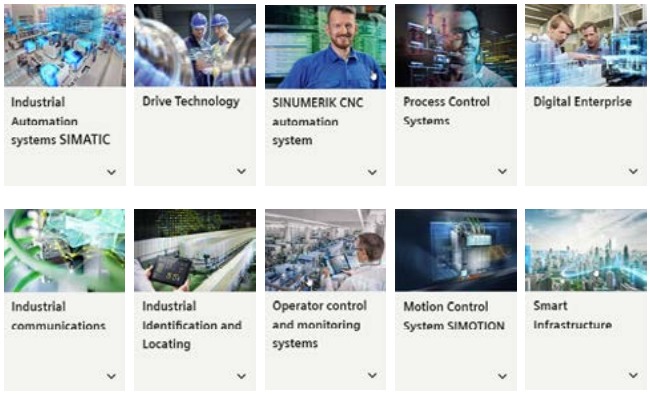
Different methods for maximum learning success:

- Live
- On your own responsibility
- On demand
- Individual

Learn the way you want to learn. For learning success that takes you further.

Education and training directly from the manufacturer

For individual knowledge building, the following topics concerning the industrial product and solution portfolio of Siemens are available. Experience the new learning culture with SITRAIN.



Training cases catalog

https://www.siemens.com/sitrain-catalog-training-cases

Find your local offer here

SITRAIN – Digital Industry Academy worldwide

You will find the regional knowledge offer in the country selection. One click will take you to the corresponding website.

SITRAIN – Digital Industry Academy

www.siemens.com/sitrain

- SITRAIN Learning Journey: www.siemens.com/sitrain-learning-journey
- SITRAIN Learning Membership: www.siemens.com/sitrain-learning-membership
- SITRAIN Learning Event: www.siemens.com/sitrain-learning-event

Overview

General

With regard to delivery service, communications and environmental protection, our logistics service ensures "quality from the moment of ordering right through to delivery". By designing our infrastructure according to customer requirements and implementing electronic order processing, we have successfully optimized our logistics processes.

Our delivery processes are designed such that, as a rule, a confirmed deadline is not generally exceeded. In fact, wherever possible, we aim to deliver up to three working days ahead of schedule to optimize the overall delivery situation (e.g. in anticipation of holidays and peak order periods).

We are proud of our personal consulting service, on-time deliveries and one-day delivery within Germany.

To achieve this, we supply the preferred types marked with ► ex warehouse.

We regard the ISO 9001 certification and consistent quality checks as an integral part of our services.

Electronic order processing is fast, cost-efficient and error-free. Please contact us if you want to benefit from these advantages.

Packaging, packing units

The packaging in which our equipment is dispatched provides protection against dust and mechanical damage during transport, thus ensuring that you receive our products in a perfect state.

We select our packaging for maximum environmental compatibility and reusability (e.g. crumpled paper for protection during transport in packages up to 32 kg) and, in particular, with a view to reducing waste.

With our multi-unit packaging and reusable packaging, we offer you specific types of packaging that are both kind to the environment and tailored to your requirements.

Your advantages at a glance:

- Lower order costs
- Cost savings through uniform-type packaging: low/no disposal costs
- Reduced time and cost thanks to short unpacking times
- "Just-in-time" delivery directly to the production line helps reduce stock: cost savings through reduction of storage area
- Fast assembly thanks to supply in sets
- Standard Euro boxes – corresponding to the Euro pallet modular system – suitable for most conveyor systems
- Active contribution to environmental protection

Unless stated otherwise in the "Selection and ordering data" of this catalog, our products are supplied individually packed.

For small parts/accessories, we offer you economical packing units as standard packs containing more than one item, e.g. 5, 10, 50 or 100 units. It is essential that whole number multiples of these quantities be ordered to ensure satisfactory quality of the products and problem-free order processing.

The products are delivered in a neutral carton. The label includes warning notices, the CE mark and product description information in English and German.

In addition to the Article No. (MLFB) and the packed number of items in the packaging the Instr. Order No. is also specified for the operating instructions. It can be obtained from your local Siemens representative (you will find a list of your local Siemens contacts at www.siemens.com/automation-contact).

The device Article No. of most devices can also be acquired through the EAN barcode to simplify ordering and storage logistics.

The related master data are available from your local Siemens representative.

Multi-unit and reusable packaging

The devices listed in the tables from page 11/6 onwards can be ordered in multi-unit or reusable packaging (further versions on request).

If ordering multi-unit or reusable packaging for the first time, please first consult your local Siemens representative with regard to pack type, quantity, delivery time and the precise order designation. Use of the reusable packaging is reserved solely for customers that have signed a packaging return agreement with their Siemens representative in advance.

Multi-unit and reusable packaging is not available as a pack type for all products. Some products are unsuited for this pack type and would only involve an increased risk of damage in transit.

For both pack types, the quantity of devices ordered (per Article No.) must be divisible by the pack quantity. If this is not the case, the electronic order processing system rounds up to the next integer multiple of packaging.

Multi-unit packaging

Products in a quantity sufficient to fill a multi-unit packaging: 1/2 (W96) and 1/4 (W97) ENK

As standard, multi-unit packs contain uniform-type, unpacked individual products (one device type) in an appropriately sized carton made of recyclable cardboard. The products of the SIRIUS range can be ordered in units of 1/1, 1/2, 1/4 and 1/8 standard Euro boxes (ENK).

Reusable packaging (uniform type)

Standard Euro box (ENK) made of durable molded plastic with foam inserts

Standard reusable packaging contains uniform-type, non-packed individual products (one device type) in a reusable standard Euro box (ENK) made of durable molded plastic with foam inserts for protection during transport.

The standard Euro box (ENK) also serves as transport packaging. The reusable packaging (ENK) plus foam inserts are returned by the customer (free of charge) to the supply base.

Please contact your Siemens representative to clarify the delivery details or conditions for set supply or delivery in reusable packaging (ENK) (to find Siemens representatives, see www.siemens.com/automation-contact). Suitable arrangements will then be agreed with you.

Set deliveries (reusable, different devices)

On request, we also deliver order-related packs of larger quantities of different types of devices in a standard Euro box (ENK).

Please contact your Siemens representative to clarify the delivery details or conditions for set supply or delivery in reusable packaging. Suitable arrangements will then be agreed with you.

Packaging dimensions

Packing material	Length mm	Height mm	Width mm
ENK	596	219	396
W95	575	190	375
W96	375	190	290
W97	290	190	195
W98	290	100	195

Logistics

Multi-unit and reusable packaging, quantity in units, supplied in indivisible pack quantities with delivery time on request

SIRIUS

Devices	Size	Reusable	Multi-unit			
		X95 (1/1 ENK)	**W95** (1/1 ENK)	**W96** (1/2 ENK)	**W97** (1/4 ENK)	**W98** (1/8 ENK)
Contactors						
3RT201.–1A..1/2	S00	144	--	72	40	--
3RT201.–1B..1/2	S00	72	--	72	40	--
3RT201.–2A/B...	S00	120	--	60	32	--
3RT202.–1A/B..0	S0	48	--	24	12	--
3RT202.–2A/B..0	S0	40	--	18	8	--
3RT203.–....0	S2	30	--	15	6	--
3RT203.–....4	S2	30	--	15	--	--
Snap-on auxiliary switches						
3RH2911–1F./GA/HA..	--	351	--	240	120	60
3RH2911–2F./G./H./N./X...	--	321	--	196	100	50
Contactor relays						
3RH21..–1A..0	S00	144	--	72	40	--
3RH21..–1B..0	S00	72	--	72	40	--
3RH21..–2A/B..0	S00	120	--	60	32	--
Motor starter protectors						
3RV2011–...1/0/5	S00	43	--	24	12	--
3RV2011–...2/0/5	S00	40	--	16	8	--
3RV2021–...1/0/5	S0	43	--	24	12	--
3RV2021–...2/0/5	S0	35	--	16	8	--
3RV2031–...0/5	S2	24	--	12	5	--
Thermally delayed overload relays						
3RU2116–..B0	S00	64	--	32	16	--
3RU2116–..C0	S00	56	--	24	12	--
3RU2126–..B0	S0	56	--	32	16	--
3RU2126–..C0	S0	48	--	24	12	--
3RU2136–..B0	S2	36	--	18	9	--
3RP25 electronic timing relays	On request					

When ordering products in multi-unit packaging for devices from the SIRIUS range, the Article No. of the product concerned must be supplemented with **"–Z"** and, in addition, the order code **W9**.

Ordering example:
3RT2015-1AB02-Z W97 ➔ Packed number of items: 40

For products packed in reusable packaging, the Article No. must be supplemented with **"–Z"** and the order code **X95**.

Ordering example:
3RT2018-1AB01-Z X95 ➔ Packed number of items: 144

SIRIUS ACT

Multi-unit packaging with order code X90

Pushbuttons and indicator lights	Multi-unit or quantity per pack X90
Complete units (3SU11)	20
Compact units (3SU12)	
• Acoustic signaling devices, pushbuttons with extended stroke, potentiometers	50
Actuating and signaling elements (3SU10)	
• Pushbuttons, illuminated pushbuttons, indicator lights	100
• Stop switches, twin pushbuttons, mushroom pushbuttons 30/40 mm, EMERGENCY STOP mushroom pushbuttons 30/40 mm, toggle switches, selector switches, key-operated switches, ID key-operated switches, coordinate switches	50
• Mushroom pushbuttons 60 mm, EMERGENCY STOP mushroom pushbuttons 60 mm	40
Holders without module (3SU15)	100
Modules for actuators and indicators (3SU14)	
• Contact modules	150
• LED modules	50
Enclosures (3SU18)	
• Empty plastic enclosures	
- 3SU1801-0AA00-0AA2, 3SU1801-0AA00-0AB1	24
- 3SU1801-0AA00-0AC2	18
Accessories (3SU19)	
• Sealing plugs, label holders, EMERGENCY STOP backing plates, labeling plates for potentiometers, EMERGENCY STOP labeling plates for enclosures without recesses and without inscription, single frames, dust caps for key-operated switches, adapters for mounting on standard rails, protective collars for EMERGENCY STOP mushroom pushbuttons (40 mm, for 5 padlocks, yellow)	100
• Labeling plates	150

When ordering products in multi-unit packaging for devices from the SIRIUS ACT range, the Article No. of the product concerned must be supplemented with **"–Z"** and, in addition, the order code **X90**.

Ordering example:
3SU1000-0AB20-0AA0-Z X90;
pack of 100 (1 pack = 100 units)

Multi-unit packaging with order code X05

Pushbuttons and indicator lights	Multi-unit or quantity per pack X05
Holders without module (3SU15)	
• Plastic: 3SU1500-0AA10-0AA0	5
• Metal: 3SU1510-0AA10-0AA0	5
• Universal for plastic and metal: 3SU1550-0AA10-0AA0	5
Modules for actuators and indicators (3SU14)	
• Contact modules for front plate mounting	5
- Screw terminals: 3SU1400-1AA10-1BA0, 3SU1400-1AA10-1CA0	
- Spring-loaded terminals: 3SU1400-1AA10-3BA0, 3SU1400-1AA10-3CA0	
• LED modules for front plate mounting	5
- Screw terminals: 3SU1401-1BB00-1AA0, 3SU1401-1BB20-1AA0, 3SU1401-1BB30-1AA0, 3SU1401-1BB40-1AA0, 3SU1401-1BB50-1AA0, 3SU1401-1BB60-1AA0	
- Spring-loaded terminals: 3SU1401-1BB00-3AA0, 3SU1401-1BB20-3AA0, 3SU1401-1BB30-3AA0, 3SU1401-1BB40-3AA0, 3SU1401-1BB50-3AA0, 3SU1401-1BB60-3AA0	
• LED modules for base mounting	5
- Screw terminals: 3SU1401-2BB00-1AA0, 3SU1401-2BB20-1AA0, 3SU1401-2BB30-1AA0, 3SU1401-2BB40-1AA0, 3SU1401-2BB50-1AA0, 3SU1401-2BB60-1AA0	
- Spring-loaded terminals: 3SU1401-2BB00-3AA0, 3SU1401-2BB20-3AA0, 3SU1401-2BB30-3AA0, 3SU1401-2BB40-3AA0, 3SU1401-2BB50-3AA0, 3SU1401-2BB60-3AA0	

When ordering products in multi-unit packaging for devices from the SIRIUS ACT range, the Article No. of the product concerned must be supplemented with **"–Z"** and, in addition, the order code **X05** must be specified.

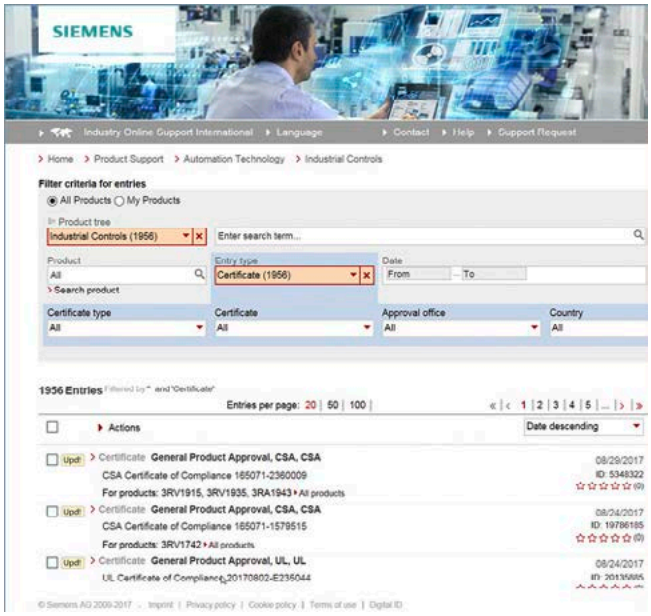
Ordering example:
3SU1500-0AA10-0AA0-Z X05;
pack of 5 (1 pack = 5 units)

Standards and approvals

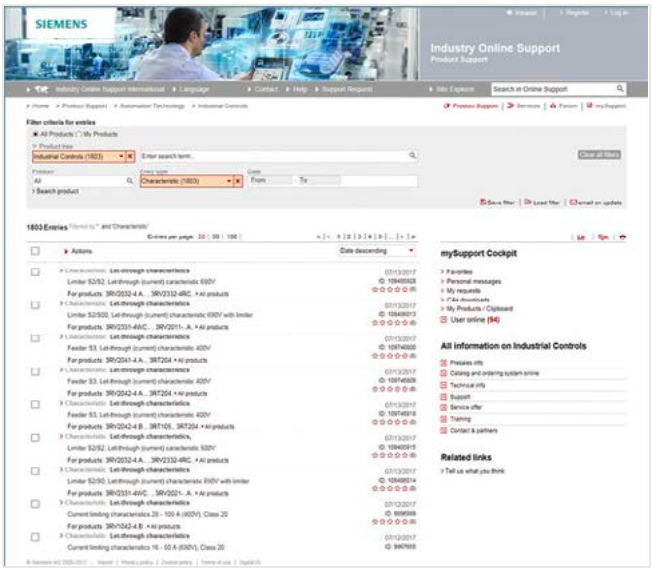
Approvals, test certificates, characteristic curves

An overview of the certificates available for Industrial Control products along with more technical documentation can be consulted daily on the internet at:

www.siemens.com/sirius/approvals



Product support: Approvals/certificates



Product support: Characteristics

Safety characteristics

In the following standards, the so-called B10 values for calculating the safety integrity or safety integrity level (SIL) in functional safety at a high or continuous demand rate are required also for electromechanical switchgear:

- IEC 62061 "Safety of machines – Functional safety of safety-related electrical, electronic and programmable electronic control systems",
- ISO 13849-1 "Safety of machines – Safety-related components of controls – Part 1: General principles".

Failure rates of electromechanical components are required for calculating the safety integrity or safety integrity level (SIL) in functional safety:
- in the manufacturing industry at a high demand rate
- in the process industry at a low demand rate

Further requirements are laid down in IEC 61511-1 "Functional safety – Safety instrumented systems for the process industry sector – Part 1: Framework, definitions, system, hardware and software requirements".

The German versions of the above standards are:
- DIN EN 62061
- DIN EN ISO 13849
- DIN EN 61511-1

The Safety Evaluation in the TIA Selection Tool assists in calculating the safety functions as verification for the machine documentation. It is available free of charge at www.siemens.com/safety-evaluation.

More information such as notes on trainings and Safety Consulting as well as application examples with calculations are available at www.siemens.com/safety-integrated.

Definitions

$\lambda\,(t)\,dt$ is the probability that a unit which has not failed by a certain time t will fail in the following interval $(t;\ t+dt)$.
Failure rates have the dimension 1/time unit, e.g. 1/h.
Failure rates for components are often specified in FIT (failures in time unit): 1 FIT equals 10^{-9}/h.
From the failure rate it is possible to derive a (mathematical) distribution function of the failure probability:

$F(t) = 1 - \exp(-\lambda t)$, with λ as constant failure rate

- The mean value of this exponential distribution is also referred to as:
  - Mean Time To Failure (MTTF) in the case of irreparable components; 63.2% of components fail by the MTTF.
  - Mean Operating Time Between Failures (MTBF) in the case of reparable components.
- $MTTF = 1/\lambda$
  (MTTF is a statistical mean value but no guarantee for endurance).

Electromechanical components are often irreparable components. In general, the failure rate of monitored units changes with age.

The B10 value for devices subject to wear is expressed in number of operating cycles:

- It is the number of operating cycles after which 10% of the test specimens fail in the course of an endurance test (or: The number of operating cycles after which 10% of the devices have failed).

For low demand rates (mainly in the process industry), the failure rate and not the B10 value is used to determine the failure probability.

The safety characteristics of electromechanical SIRIUS products can be found at https://support.industry.siemens.com/cs/ww/en/view/109739348 or in the SIEMENS Industry Online Support Portal (www.siemens.com/online-support) under the Entry ID: 109739348.

Standards

IEC	EN/ EN IEC	Title
60947-1 60947-2 60947-3	60947-1 60947-2 60947-3	Low-voltage switchgear and controlgear: General rules • Circuit-breakers • Switches, disconnectors, switch-disconnectors and fuse-combination units
60947-4-1 60947-4-2 60947-4-3	60947-4-1 60947-4-2 60947-4-3	• Contactors and motor starters: Electromechanical contactors and motor starters • Contactors and motor starters: AC semiconductor motor controllers and starters, soft starters • AC semiconductor controllers and contactors for non-motor loads
60947-5-1 60947-5-2 60947-5-3 60947-5-5 60947-5-6 60947-5-7 60947-5-8 60947-5-9	60947-5-1 60947-5-2 60947-5-3 60947-5-5 60947-5-6 60947-5-7 60947-5-8 60947-5-9	• Control circuit devices and switching elements - Electromechanical control circuit devices • Control circuit devices and switching elements - Proximity switches • Requirements for proximity devices with defined behaviour under fault conditions • Electrical emergency stop device with mechanical latching function • Control devices and switching elements - DC interface for proximity sensors and switching amplifier (NAMUR) • Requirements for proximity devices with analogue output • Three-position enabling switches • Flow rate switches
60947-6-1 60947-6-2	60947-6-1 60947-6-2	• Multiple function equipment - Transfer switching equipment • Multiple function equipment - Control and protective switching devices (or equipment) (CPS)
60947-7-1 60947-7-2 60947-7-3 60947-7-4	60947-7-1 60947-7-2 60947-7-3 60947-7-4	• Ancillary equipment - Terminal blocks for copper conductors • Ancillary equipment - Protective conductor terminal blocks for copper conductors • Ancillary equipment - Safety requirements for fuse terminal blocks • Ancillary equipment - PCB terminal blocks for copper conductors
60947-8	60947-8	• Control units for built-in thermal protection (PTC) for rotating electrical machines
60947-9-1	60947-9-1	• Low-voltage switchgear and controlgear - Active arc-fault mitigation systems - Part 9-1: Arc quenching devices
62026-2	62026-2	• Actuator sensor interface (AS-i)
60269-1 60269-4	60269-1 60269-4	Low-voltage fuses: General requirements Low-voltage fuses: Supplementary requirements for fuse-links for the protection of semiconductor devices
60050-441	--	International Electrotechnical Vocabulary. Switchgear, controlgear and fuses
61439-1 61439-2 61439-3 61439-4 61439-5 61439-6 61439-7 -- 61140	61439-1 61439-2 61439-3 61439-4 61439-5 61439-6 -- 50274 61140	Low-voltage switchgear and controlgear assemblies: General rules Low-voltage switchgear and controlgear assemblies: Power switchgear and controlgear assemblies Low-voltage switchgear and controlgear assemblies: Distribution boards intended to be operated by ordinary persons (DBO) Low-voltage switchgear and controlgear assemblies: Particular requirements for assemblies for construction sites (ACS) Low-voltage switchgear and controlgear assemblies: Assemblies for power distribution in public networks Low-voltage switchgear and controlgear assemblies - Part 6: Busbar trunking systems (busways) Low-voltage switchgear and controlgear assemblies - Part 7: Assemblies for specific applications such as marinas, camping sites, market squares, electric vehicle charging stations Low-voltage switchgear and controlgear assemblies - Protection against electric shock - Protection against unintentional direct contact with hazardous live parts Protection against electric shock - Common aspects for installation and equipment
60664-1	60664-1	Insulation coordination for electrical equipment in low-voltage systems; Principles, requirements and tests
60204-1 60079-0 60079-14	60204-1 60079-0 60079-14	Electrical equipment of machines: General requirements Explosive atmospheres - Part 0: Equipment - General requirements Explosive atmospheres - Part 14: Electrical installations design, selection and erection
61810-1 61812-1	61810-1 61812-1	Electromechanical elementary relays; General requirements Time relays for industrial and residential use - Part 1: Requirements and tests
60999-1 60999-2	60999-1 60999-2	Connecting devices - Electrical copper conductors - Safety requirements for screw-type and screwless-type clamping units - Part 1: General requirements and particular requirements for clamping units for conductors from 0.2 mm^2 up to 35 mm^2 (included) Connecting devices - Electrical copper conductors - Safety requirements for screw-type and screwless-type clamping units: Particular requirements for clamping units for conductors above 35 mm^2 up to 300 mm^2 (included)
IEC/TR 61000-4-1	61000-4-1	Electromagnetic compatibility (EMC) - Part 4-1: Testing and measuring techniques - Overview of IEC 61000-4 series
61000-6-2 61000-6-3 61000-6-4	61000-6-2 61000-6-3 61000-6-4	Electromagnetic compatibility (EMC); Generic standards - Immunity for industrial environments Electromagnetic compatibility (EMC); Generic standards - Emission standard for residential, commercial and light-industrial environments Electromagnetic compatibility (EMC); Generic standards - Emission standard for industrial environments
61869-1	61869-1	Instrument transformers: General requirements
61869-2	61869-2	Instrument transformers: Additional requirements for current transformers

Appendix

Standards and approvals

UL	CSA C22.2	ASME	JIS	Title
508	--	--	--	Industrial control equipment
60947-1	No. 60947-1	--	--	Low-voltage switchgear and controlgear - Part 1: General rules
60947-4-1	No. 60947-4-1	--	--	Low-voltage switchgear and controlgear - Part 4-1: Contactor and motor starters - Electromechanical contactors and motor starters
60947-4-2	No. 60947-4-2	--	--	Low-voltage switchgear and controlgear - Part 4-2: Contactors and motor-starters - AC semiconductor motor controllers and starters
60947-5-1	No. 60947-5-1	--	--	Low-voltage switchgear and controlgear - Part 5-1: Control circuit devices and switching elements - Electromechanical control circuit devices
60947-5-5	60947-5-5	--	--	Low-voltage switchgear and controlgear - Part 5-5: Control circuit devices and switching elements - Electrical emergency stop device with mechanical latching function
489	No. 5	--	--	Molded case circuit breakers, molded case switches, and circuit breaker enclosures
1012	--	--	--	Power units other than CLASS 2
1059	--	--	--	Terminal blocks
486A-486B	No. 65	--	--	Wire connectors
486E	--	--	--	Equipment wiring terminals for use with aluminum and/or copper conductors
50	No. 94.1	--	--	Enclosures for electrical equipment - Non-environmental considerations
50E	No. 94.2	--	--	Enclosures for electrical equipment - Environmental considerations
--	No. 14	--	--	Industrial control equipment
--	No. 107.1	--	--	General use power supplies
--	--	A17.5 / CSA B 44.1	--	Elevator and escalator electrical equipment
--	--	--	C 8201-4-1	Low-voltage switchgear and controlgear; Contactors and motor-starters

Approval requirements valid in different countries

Siemens low-voltage switchgear and controlgear are designed, manufactured and tested according to the relevant German standards (DIN and VDE), IEC publications and European standards (EN) as well as CSA and UL standards. The standards assigned to the single devices are stated in the relevant parts of this catalog.

As far as is economically viable, the requirements of the various standards valid in other countries are also taken into account in the design of the equipment.

In some countries an approval is required for certain low-voltage switchgear and controlgear components (see table below). Depending on the market requirements, these components have been submitted for approval to the authorized testing institutes.

In some cases, CSA for Canada and UL for the USA only approve special switchgear versions. Such special versions are listed separately from the standard versions in the individual parts of this catalog.

For this equipment, partial limitations of the maximum permissible voltages, currents and ratings can be imposed, or special approval and, in some cases, special identification is required.

For use on board ship, the specifications of the marine classification societies must be observed (see table on page page 11/11). In some cases, they require type tests of the components to be approved.

The Chinese certification system has changed. As of November 1, 2020, the self-declaration by Siemens (Self-Declaration of Compliance (SDOC)) forms the basis of CCC and the import to China. The CCC scope, product labeling, certification procedures, implementation rules in manufacturing and regulations regarding the import to China have remained unchanged. All CCC certificates issued by CQC have been transferred to SDOCs and all CCC certificates issued by CQC are invalid as of November 1, 2020.

UKCA: As of January 1, 2023, all devices to be marketed in Great Britain require a manufacturer's declaration (UK Declaration of Conformity) and must be supplied with a UKCA mark. The declaration is based on UK regulations and the underlying British standards (BS). Alternatively, EN standards can also be applied. Otherwise, the same requirements apply as for the EU Declaration of Conformity.

Testing bodies, approval identification and approval requirements

Country	Canada	USA	China	Russia/Belarus/Kazakhstan/...
Government-appointed or private, officially recognized testing bodies	CSA UL (USA)	UL	Self-Declaration of Compliance (Siemens)	Official national regulation/TR
Mark of conformity	c UL c FL c FL us c UL us	UL FL c FL us c UL us	CCC	EAC
Approval requirement	+	+	+	+
Remarks	UL and CSA are authorized to grant approval certificates in accordance with Canadian and North American regulations. Please note: These approvals are not recognized in many cases and must be covered by additional approvals issued by the national testing agency.		--	Eurasian customs union

For more information about the approval marks, see page page 11/13.

Marine classification societies

Country	Germany Norway	United Kingdom	France	CIS	Italy	Poland	USA
Name	DNV	Lloyds Register of Shipping	Bureau Veritas	Russian Maritime Register of Shipping	Registro Italiano Navale	Polski Rejestre Statków	American Bureau of Shipping
Codes	DNV	LR	BV	RS	RINA	PRS	ABS

CE marking

Manufacturers of products which fall within the subject area to which EU directives apply must identify their products, operating instructions or packaging with a CE mark of conformity.

By attaching the CE marking, the manufacturer confirms that the product conforms to the relevant basic requirements of all directives applicable to the product. The mark of conformity is a mandatory requirement for putting products into circulation throughout the EU.

All the products in this catalog are in conformance with the relevant specific EU directives and bear the CE mark of conformity CE.

- Low-voltage directive
- EMC directive
- Machinery directive
- ATEX directive
- RED directive
- RoHS directive

Accident prevention

Test certificates and approvals from DGUV, SUVA (Swiss institute for accident prevention), TÜV or VDE are available for some devices in safety control systems. For details, see the respective product descriptions.

Ex protection certificates for SIRIUS controls

Controls that are installed in a potentially explosive atmosphere or motor protection devices that protect a motor installed in a potentially explosive atmosphere against overloading or a pump in said atmosphere from dry running must comply with certain special requirements. These requirements are laid down in the following standards:

- EN 50495
- EN 60079-0
- EN 60079-1
- EN 60079-7
- EN 60079-11
- EN 60079-14
- EN 60079-17
- EN 60079-31
- EN 60947-1
- EN 60947-4-1
- EN 60947-4-2
- EN 60947-5-1
- EN 60947-8
- EN ISO/IEC 80079-34
- EN ISO 80079-36
- EN ISO 80079-37

Certification

Controls and motor protection devices that are brought into circulation within the member states of the EU in accordance with EU directive 2014/34/EU must have been constructed and tested according to the above-mentioned standards and must have a declaration of conformity from the manufacturer based on a prototype test certificate.

The quality management (QM) system of the manufacturer is subject to certain requirements and a "QM certificate" must be obtained for the manufacturer from a recognized authority.

Certification of the QM system

A certificate of approval for quality assurance production has been issued by DEKRA Testing and Certification GmbH[1)] under the number BVS 20 ATEX ZQS/E111 according to Directive 2014/34/EU. The quality management (QM) system is also checked within the scope of the IECEx Scheme. Conformity with the requirements is confirmed using document DE/BVS/QAR15.0002/08.

These certificates are valid for equipment groups I and II and categories M2 and 2: Safety and control devices for electrical equipment.

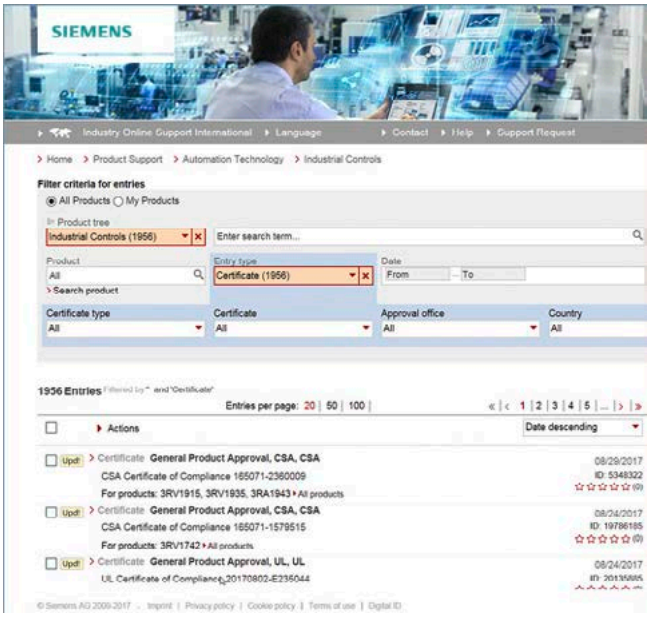
Certificates

Declarations of conformity and prototype test certificates are available at www.siemens.com/online-support for viewing and downloading. As far as explosion protection is concerned, these are available for the following products:

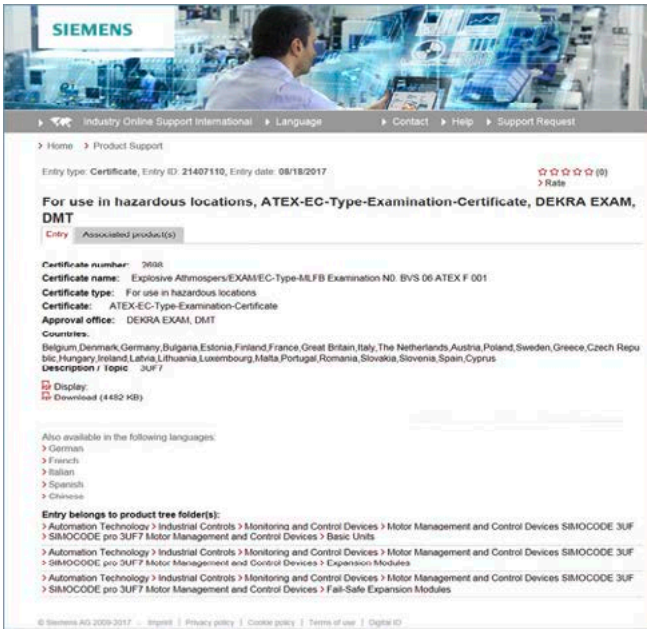
- 3RB, 3RM, 3RN, 3RU, 3RV, 3RW, 3UF motor protection devices
- 3RS2 temperature monitoring relays
- 3SU1 LED modules

You can find more information about industrial controls for applications in explosion-protected areas at www.siemens.com/sirius/atex.

1) DEKRA Testing and Certification GmbH
The certification authority of "DEKRA Testing and Certification GmbH" with authority number 0158 according to Article 13 of Directive 2014/34/EU of the European Parliament and Council certifies that Siemens Amberg, Cham, Suzhou and Trutnov maintains a quality assurance system for production that satisfies Appendices IV and VII of this Directive.



Selection box



Description of certificate with view and download option

Identifying markings

All equipment must be marked according to the ATEX guideline. The ATEX identification code contains the equipment group, the approved environment, the number of the certification authority and other technical data that was determined from the type test.

Certificate of the AS-International Association for AS-Interface products

AS-Interface products are tested and certified by the AS-International Association. The products have been tested in an accredited test laboratory according to testing guidelines.

Special standards for the USA and Canada

In the USA and Canada, for machine tools and processing machines in particular, supply lines are laid using rubber insulated cable enclosed in heavy-duty steel piping similar to that used for gas or water pipe systems.

The tubing system must be completely watertight and electrically conductive (especially sleeving and elbows). Since the tubing system can also be grounded, the cable entries of enclosed units equipped with heavy-gauge or metric threads must be fitted with metal adapters between these threads and the tube thread. The necessary adapters are specified for the switchgear as accessories; they should be ordered separately unless otherwise specified.

Low-voltage switchgear and controlgear for auxiliary circuits (e.g. contactor relays, commanding and signaling devices and auxiliary switches/auxiliary contacts in general) are generally only approved by CSA and UL for **"Heavy Duty"** or **"Standard Duty"** and are identified either with these specifications in addition to the maximum permissible voltage or by using an abbreviation.

The abbreviations are harmonized with IEC 60947-5-1 Annex 1 Table A.1 and correspond to the stated utilization categories.

For various switching devices detailed in the catalog, a note has been included to the effect that, above a certain voltage, the auxiliary switches/auxiliary contacts can only be used if they have the same polarity. This means that the input terminals can only be connected to the same pole of the control voltage, e.g. "600 V AC above 300 V AC same polarity".

Distinguishing features of UL approvals (for USA and Canada)

Recognized Component	Listed Product
Devices are identified on the rating plate using the "UL recognition mark": USA: , c us Canada: c, c us	Devices are identified using the "UL listing mark" on the rating plate e.g. USA: LISTED XXX IND. CONT. EQ. Canada: c LISTED XXX IND. CONT. EQ. (XXX stands for: UL Code Classification Number)
Devices are approved as modules for "factory wiring" or other conditions of acceptability, i.e.: As devices for installation in control systems, which are selected, installed, wired and tested entirely by trained personnel in factories, workshops or elsewhere, **according to the operating conditions**.	Devices are approved for "field wiring", i.e.: • As devices for installation in control systems, which are completely wired by trained personnel in factories, workshops or elsewhere. • As single devices for sale in retail outlets in the USA/Canada.
If devices are or c approved as "listed products", they are also approved as or c "recognized components".	

For more information about UL and CSA, see page page 11/10.

Special standards for Russia, Australia and China

EAC approval for Russia/Belarus/Kazakhstan/...

EAC mark

Since February 15, 2013, Russia, Kazakhstan, Belarus and other countries have been united in the Eurasian EAC customs union. An EAC approval as replacement for the GOST mark is required for all products that are to be sold in Russia.

All devices delivered to the customs union must have these customs certifications.

RCM approval for Australia

RCM mark

The RCM mark is required for marketing Siemens electronic devices in Australia. Electronic devices must provide proof of EMC clearance in Australia, similar to the CE mark of conformity laid down by the EMC directive applicable in the EU and bear the "RCM" mark.

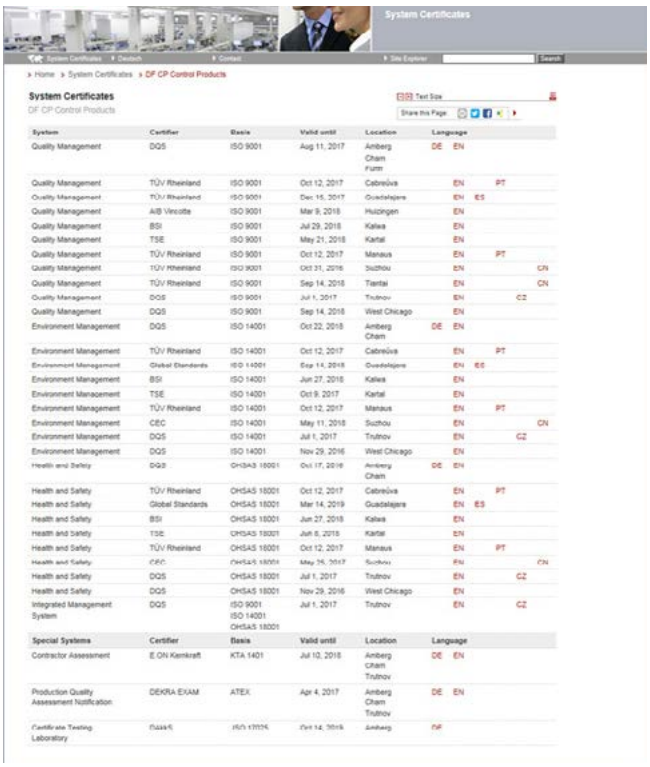
Quality management

The quality management system of our "Electrical Products" Business Unit in the "Smart Infrastructure" business complies with the international standard EN ISO 9001.

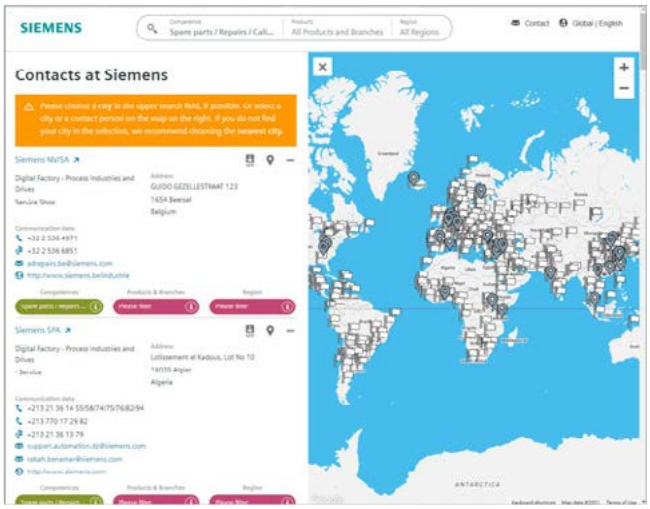
The products and systems described in this catalog are developed, manufactured and sold under application of a certified quality management system according to ISO 9001.

Certificates

For information about available certifications of the quality management system for Industrial Controls products, please visit website address:
https://new.siemens.com/global/en/general/system-certificates/si-ep.html



Overview



At your service locally, around the globe for consulting, sales, training, service, support, spare parts on the entire portfolio of Siemens.

Your partner can be found in our Personal Contacts Database at:
www.siemens.com/automation-contact

You start by selecting

- the required competence,
- products and branches,
- a country and a city

or by a

- location search or free text search.

Siemens Partner Program

Overview

Siemens Solution and Approved Partner – Partners for your success

Highest competence in automation and drive technology

Siemens works closely together with selected partner companies around the world in order to ensure that customer requirements for all aspects of automation and drives are fulfilled as best as possible – wherever you are, and whatever the time.

We place great value on our customers acting in accordance with the same ideals which characterize Siemens as a whole: Competence, professionalism and quality. That is why continuous development through qualification and certification measures in line with global standards is a central aspect of our Partner Program. This means that with our partners, you benefit from the same high quality standards all over the world.
The partner emblem is the symbol for tried and tested quality.

The partner network for industry

The Siemens Partner Program offers you expertise and experience close at hand.

Within our global network, we distinguish between Solution Partners and Approved Partners. We currently work with more than 1,500 Solution Partners around the world. Our network of over 150 Approved Partners continues to grow. In more than 80 countries worldwide.

Siemens Solution Partner – Automation Drives

At present we are working with more than 1,500 Solution Partners worldwide. They are characterized by extensive application, system and sector knowledge, as well as proven project experience, and are able to implement future-proof tailored solutions of the highest quality, based on our product and system portfolio.

Siemens Approved Partner – Value Added Reseller

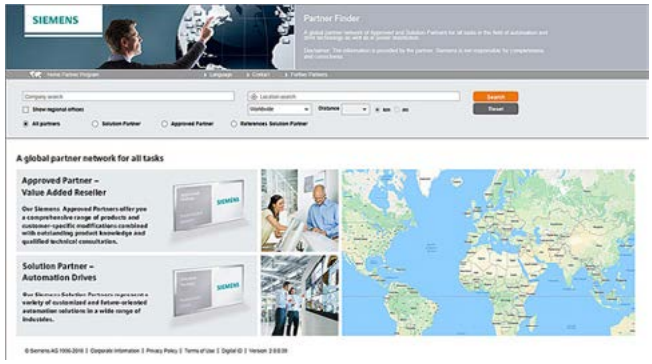
With their detailed technical knowledge, Siemens Approved Partners – Value Added Resellers offer a combination of products and services that range from specialist technologies and customized modifications to the provision of high-quality system and product packages. They also provide qualified technical support and assistance.

Siemens Approved Partner – Industry Services

Siemens Approved Partner – Industry Services put their unique expertise entirely at the service of enhancing your productivity and can be instrumental in ensuring the availability of your plants.

Partner Finder

The ideal partner for your task is just a mouse click away!



In the Siemens global Solution Partner Program, customers are certain to find the optimum partner for their specific requirements – with no great effort. The Partner Finder is basically a comprehensive database that showcases the profiles of all our partners.

Easy selection:
Set filters in the search screen form according to the criteria that are relevant to you. You can also directly enter the name of an existing partner.

Skills at a glance:
Gain a quick insight into the specific competencies of any particular partner with the reference reports.

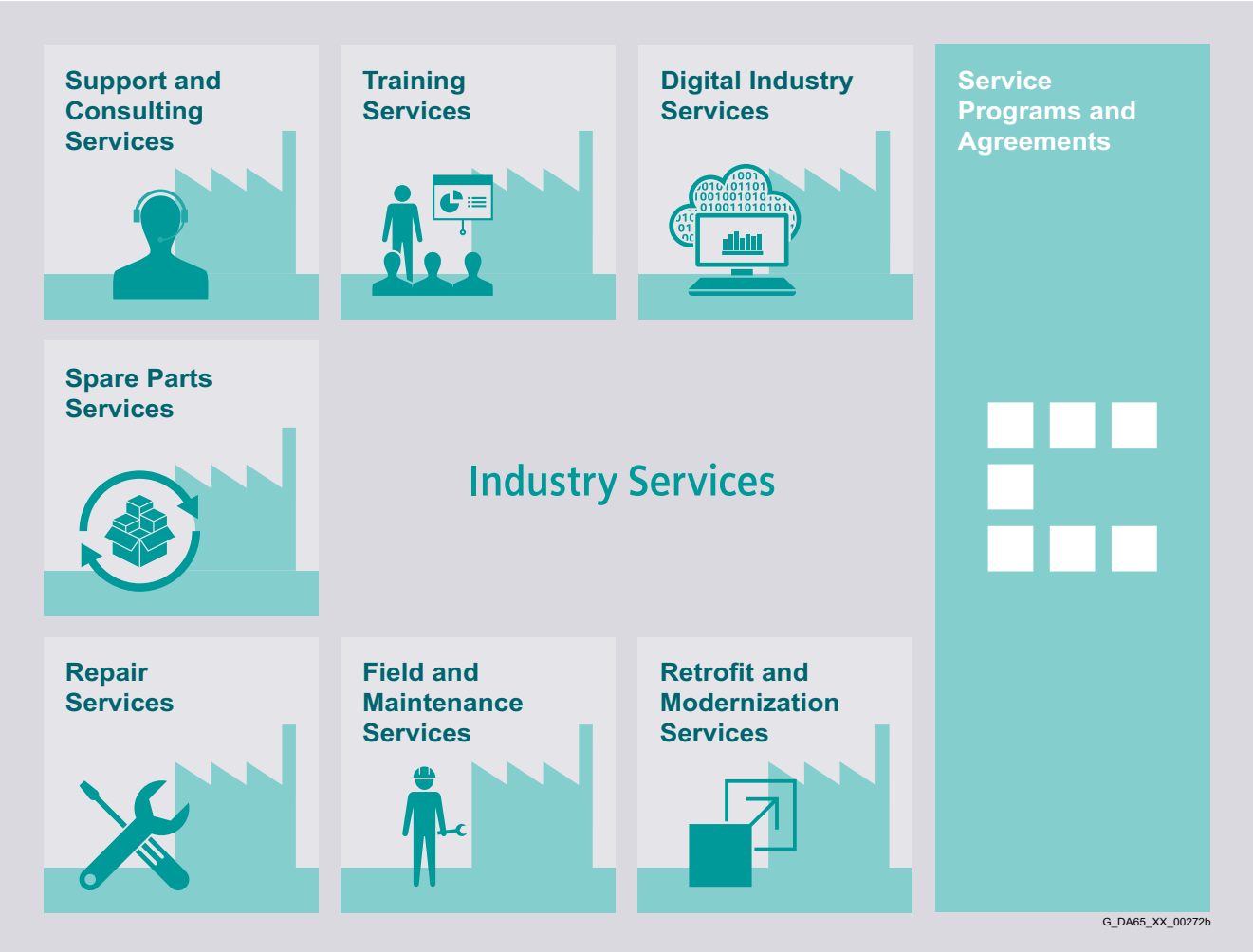
Direct contact option:
Use our electronic query form:

www.siemens.com/partnerfinder

Additional information of the Siemens Parners for industry is available online at:

www.siemens.com/partnerprogram

Overview



Keep your business running and shaping your digital future – with Industry Services

Optimizing the productivity of your equipment and operations can be a challenge, especially with constantly changing market conditions. Working with our service experts makes it easier. We understand your industry's unique processes and provide the services needed so that you can better achieve your business goals.

You can count on us to maximize your uptime and minimize your downtime, increasing your operations' productivity and reliability. When your operations have to be changed quickly to meet a new demand or business opportunity, our services give you the flexibility to adapt. Of course, we take care that your production is protected against cyber threats. We assist in keeping your operations as energy and resource efficient as possible and reducing your total cost of ownership. As a trendsetter, we ensure that you can capitalize on the opportunities of digitalization and by applying data analytics to enhance decision making: You can be sure that your plant reaches its full potential and retains this over the longer lifespan.

You can rely on our highly dedicated team of engineers, technicians and specialists to deliver the services you need – safely, professionally and in compliance with all regulations. We are there for you, where you need us, when you need us.

www.siemens.com/industryservices

Industry Services – Portfolio overview

Overview

Digital Industry Services

Digital Industry Services make your industrial processes transparent to gain improvements in productivity, asset availability, and energy efficiency.

Production data is generated, filtered and translated with intelligent analytics to enhance decision-making.

This is done whilst taking data security into consideration and with continuous protection against cyber-attack threats.
www.siemens.com/global/en/products/services/industry/digital-industry-services.html

Training Services

From the basics and advanced to specialist skills, SITRAIN courses provide expertise right from the manufacturer – and encompass the entire spectrum of Siemens products and systems for the industry.

Worldwide, SITRAIN courses are available wherever you need a training course in more than 170 locations in over 60 countries.
https://support.industry.siemens.com/cs/ww/en/sc/2226

Support and Consulting Services

Industry Online Support site for comprehensive information, application examples, FAQs and support requests.

Technical and Engineering Support for advice and answers for all inquiries about functionality, handling, and fault clearance. The Service Card as prepaid support for value added services such as Priority Call Back or Extended Support offers the clear advantage of quick and easy purchasing.

Information & Consulting Services, e.g. SIMATIC System Audit; clarity about the state and service capability of your automation system or Lifecycle Information Services; transparency on the lifecycle of the products in your plants.
https://support.industry.siemens.com/cs/ww/en/sc/2235

Spare Parts

Spare Parts Services are available worldwide for smooth and fast supply of spare parts – and thus optimal plant availability. Genuine spare parts are available for up to ten years. Logistic experts take care of procurement, transport, custom clearance, storage and order management. Reliable logistics processes ensure that components reach their destination as needed.

Since not all spare parts can be kept in stock at all times, Siemens offers a preventive measure for spare parts provisioning on the customer's premises with optimized **Spare Parts Packages** for individual products, custom-assembled drive components and entire integrated drive trains – including risk consulting.

Asset Optimization Services help you design a strategy for parts supply where your investment and carrying costs are reduced and the risk of obsolescence is avoided.
https://support.industry.siemens.com/cs/ww/en/sc/2110

Repair Services

Repair Services are offered on-site and in regional repair centers for fast restoration of faulty devices' functionality.

Also available are extended repair services, which include additional diagnostic and repair measures, as well as emergency services.
https://support.industry.siemens.com/cs/ww/en/sc/2154

Field and Maintenance Services

Siemens specialists are available globally to provide expert field and maintenance services, including commissioning, functional testing, preventive maintenance and fault clearance.

All services can be included in customized service agreements with defined reaction times or fixed maintenance intervals.
https://support.industry.siemens.com/cs/ww/en/sc/2265

Retrofit and Modernization Services

Provide a cost-effective solution for the expansion of entire plants, optimization of systems or upgrading existing products to the latest technology and software, e.g. migration services for automation systems.

Service experts support projects from planning through commissioning and, if desired over the entire extended lifespan, e.g. Retrofit for Integrated Drive Systems for an extended lifetime of your machines and plants.
https://support.industry.siemens.com/cs/ww/en/sc/2286

Service Programs and Agreements

A technical Service Program or Agreement enables you to easily bundle a wide range of services into a single annual or multi-year agreement.

You pick the services you need to match your unique requirements or fill gaps in your organization's maintenance capabilities.

Programs and agreements can be customized as KPI-based and/or performance-based contracts.
https://support.industry.siemens.com/cs/ww/en/sc/2275

Overview

Siemens Industry and Online Support with some 1.7 million visitors per month is one of the most popular web services provided by Siemens. It is the central access point for comprehensive technical know-how about products, systems and services for automation and drives applications as well as for process industries.

In connection with the challenges and opportunities related to digitalization you can look forward to continued support with innovative offerings.

Software licenses

Overview

Software types

Software requiring a license is categorized into types.
The following software types have been defined:

- Engineering software
- Runtime software

Engineering software

This includes all software products for creating (engineering) user software, e.g. for configuring, programming, parameterizing, testing, commissioning or servicing.

Data generated with engineering software and executable programs can be duplicated for your own use or for use by third-parties free-of-charge.

Runtime software

This includes all software products required for plant/machine operation, e.g. operating system, basic system, system expansions, drivers, etc.

The duplication of the runtime software and executable programs created with the runtime software for your own use or for use by third-parties is subject to a charge.

You can find information about license fees according to use in the ordering data (e.g. in the catalog). Examples of categories of use include per CPU, per installation, per channel, per instance, per axis, per control loop, per variable, etc.

Information about extended rights of use for parameterization/configuration tools supplied as integral components of the scope of supply can be found in the readme file supplied with the relevant product(s).

License types

Siemens Industry Automation & Drive Technologies offers various types of software license:

- Floating license
- Single license
- Rental license
- Rental floating license
- Trial license
- Demo license
- Demo floating license

Floating license

The software may be installed for internal use on any number of devices by the licensee. Only the concurrent user is licensed. The concurrent user is the person using the program. Use begins when the software is started.
A license is required for each concurrent user.

Single license

Unlike the floating license, a single license permits only one installation of the software per license.

The type of use licensed is specified in the ordering data and in the Certificate of License (CoL). Types of use include for example per instance, per axis, per channel, etc.

One single license is required for each type of use defined.

Rental license

A rental license supports the "sporadic use" of engineering software. Once the license key has been installed, the software can be used for a specific period of time (the operating hours do not have to be consecutive).
One license is required for each installation of the software.

Rental floating license

The rental floating license corresponds to the rental license, except that a license is not required for each installation of the software. Rather, one license is required per object (for example, user or device).

Trial license

A trial license supports "short-term use" of the software in a non-productive context, e.g. for testing and evaluation purposes. It can be transferred to another license.

Demo license

The demo license support the "sporadic use" of engineering software in a non-productive context, for example, use for testing and evaluation purposes. It can be transferred to another license. After the installation of the license key, the software can be operated for a specific period of time, whereby usage can be interrupted as often as required.

One license is required per installation of the software.

Demo floating license

The demo floating license corresponds to the demo license, except that a license is not required for each installation of the software. Rather, one license is required per object (for example, user or device).

Certificate of License (CoL)

The CoL is the licensee's proof that the use of the software has been licensed by Siemens. A CoL is required for every type of use and must be kept in a safe place.

Downgrading

The licensee is permitted to use the software or an earlier version/release of the software, provided that the licensee owns such a version/release and its use is technically feasible.

Delivery versions

Software is constantly being updated.
The following delivery versions

- PowerPack
- Upgrade

can be used to access updates.

Existing bug fixes are supplied with the ServicePack version.

PowerPack

PowerPacks can be used to upgrade to more powerful software. The licensee receives a new license agreement and CoL (Certificate of License) with the PowerPack. This CoL, together with the CoL for the original product, proves that the new software is licensed.
A separate PowerPack must be purchased for each original license of the software to be replaced.

Upgrade

An upgrade permits the use of a new version of the software on the condition that a license for a previous version of the product is already held.
The licensee receives a new license agreement and CoL with the upgrade. This CoL, together with the CoL for the previous product, proves that the new version is licensed.
A separate upgrade must be purchased for each original license of the software to be upgraded.

Overview

ServicePack

ServicePacks are used to debug existing products. ServicePacks may be duplicated for use as prescribed according to the number of existing original licenses.

License key

Siemens Industry Automation & Drive Technologies supplies software products with and without license keys.

The license key serves as an electronic license stamp and is also the "switch" for activating the software (floating license, rental license, etc.).

The complete installation of software products requiring license keys includes the program to be licensed (the software) and the license key (which represents the license).

Software Update Service (SUS)

As part of the SUS contract, all software updates for the respective product are made available to you free of charge for a period of one year from the invoice date. The contract will automatically be extended for one year if it is not canceled three months before it expires.

The possession of the current version of the respective software is a basic condition for entering into an SUS contract.

You can download explanations concerning license conditions from https://mall.industry.siemens.com/legal/ww/en/terms_of_trade_en.pdf

Conditions of sale and delivery

1. General Provisions

By using this catalog you can purchase products (hardware, software and services) described therein from Siemens Aktiengesellschaft subject to the following Terms and Conditions of Sale and Delivery (hereinafter referred to as "T&C"). Please note that the scope, the quality and the conditions for supplies and services, including software products, by any Siemens entity having a registered office outside Germany, shall be subject exclusively to the General Terms and Conditions of the respective Siemens entity. The following T&C apply exclusively for orders placed with Siemens Aktiengesellschaft, Germany.

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For customers with a seat or registered office in European Union, the following terms and conditions apply subordinate to T&C:

- for products, which include specific terms and conditions in the description text, these specific terms and conditions shall apply and subordinate thereto,
- for stand-alone software products and software products forming a part of a product or project, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or registered Office in Germany"[1)] and/or
- for consulting services the “Allgemeine Geschäftsbedingungen für Beratungsleistungen der Division DF – Deutschland” (available only in German) and/or
- for other services, the „Supplementary Terms and Conditions for Services (“BL”)[1)] and/or
- for other supplies the "General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry"[1)].
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For customers with a seat or registered office outside European Union, the following terms and conditions apply subordinate to T&C:

- for products, which include specific terms and conditions in the description text, these specific terms and conditions shall apply and subordinate thereto,
- for consulting services the "Standard Terms and Conditions for Consulting Services of the Division DF for Customers with a Seat or Registered Office Outside of Germany"[1)] and/or
- for other services the "International Terms & Conditions for Services"[1)] supplemented by "Software Licensing Conditions"[1)] and/or
- for other supplies of hard- and software the "International Terms & Conditions for Products"[1)] supplemented by "Software Licensing Conditions"[1)]

1.3 For customers with master or framework agreement

To the extent our supplies and/or services offered are covered by an existing master or framework agreement, the terms and conditions of that agreement shall apply instead of T&C.

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The prices are in € (Euro) ex point of delivery, exclusive of packaging.

The sales tax (value added tax) is not included in the prices. It shall be charged separately at the respective rate according to the applicable statutory legal regulations.

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The metal factor of a product indicates the basic official price (for those raw materials concerned) as of which the surcharges on the price of the product are applied, and with what method of calculation.

An exact explanation of the metal factor can be downloaded at:

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To calculate the surcharge (except in the cases of dysprosium and neodym), the official price from the day prior to that on which the order was received or the release order was effected is used.

To calculate the surcharge applicable to dysprosium and neodym ("rare earths"), the corresponding three-month basic average price in the quarter prior to that in which the order was received or the release order was effected is used with a one-month buffer (details on the calculation can be found in the explanation of the metal factor).

3. Additional Terms and Conditions

The dimensions are in mm. In Germany, according to the German law on units in measuring technology, data in inches apply only to devices for export.

Illustrations are not binding.

Insofar as there are no remarks on the individual pages of this catalog – especially with regard to data, dimensions and weights given – these are subject to change without prior notice.

[1)] The text of the Terms and Conditions of Siemens AG can be downloaded at https://mall.industry.siemens.com/legal/ww/en/terms_of_trade_en.pdf

4. Export Regulations

We shall not be obligated to fulfill any agreement if such fulfillment is prevented by any impediments arising out of national or international foreign trade or customs requirements or any embargoes and/or other sanctions.

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Our products are controlled by the U.S. Government (when labeled with "ECCN" unequal "N") and authorized for export only to the country of ultimate destination for use by the ultimate consignee or end-user(s) herein identified. They may not be resold, transferred, or otherwise disposed of, to any other country or to any person other than the authorized ultimate consignee or end-user(s), either in their original form or after being incorporated into other items, without first obtaining approval from the U.S. Government or as otherwise authorized by U.S. law and regulations. Products labeled with "AL" unequal "N" are subject to European / national export authorization.

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The products listed in this catalog may be subject to European/German and/or US export regulations. Any export requiring approval is therefore subject to authorization by the relevant authorities.

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Notes

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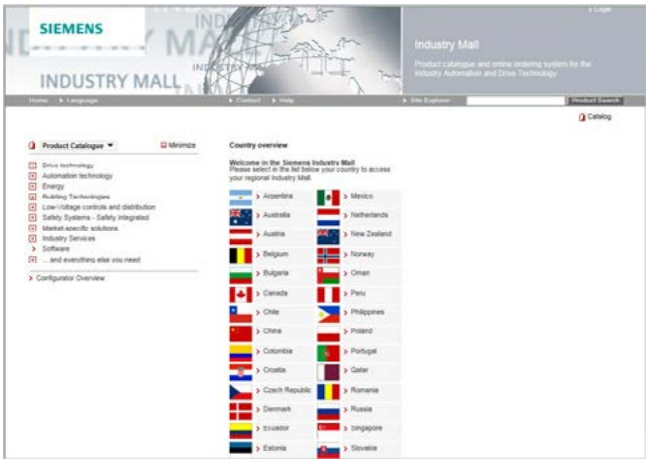

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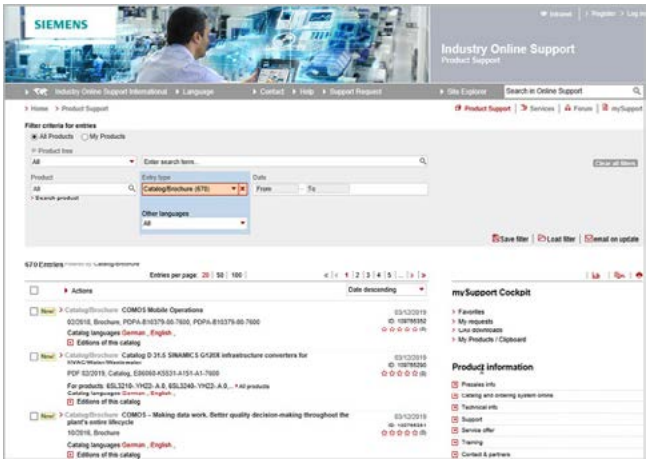

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Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions constitute one element of such a concept.

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