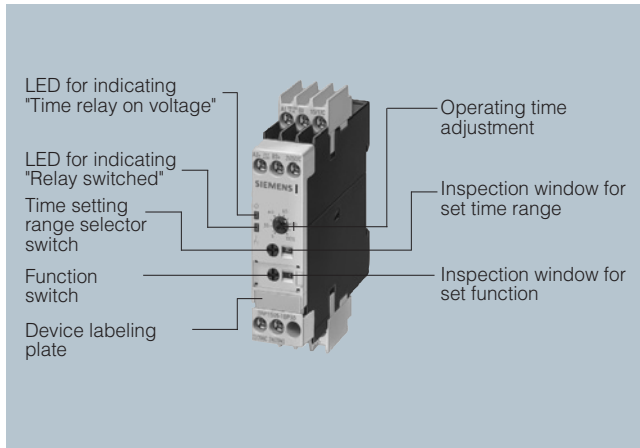


3RP, 3RT19 Timing Relays

3RP15 timing relays in industrial enclosure, 22.5 mm

Overview

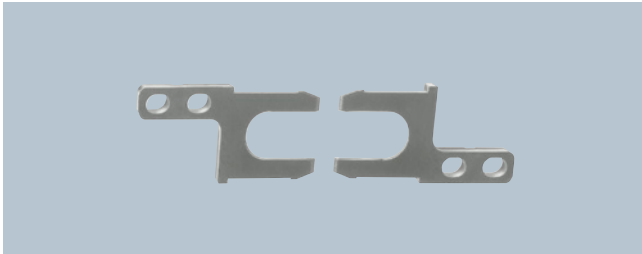


Standards

The timing relays comply with:

- EN 60721-3-3 "Environmental conditions"
- EN 61812-1 "Specified time relays for industrial use"
- EN 61000-6-2 and EN 61000-6-4 "Electromagnetic compatibility"
- EN 60947-5-1; "Low-voltage switchgear and controlgear – Electromechanical control circuit devices"

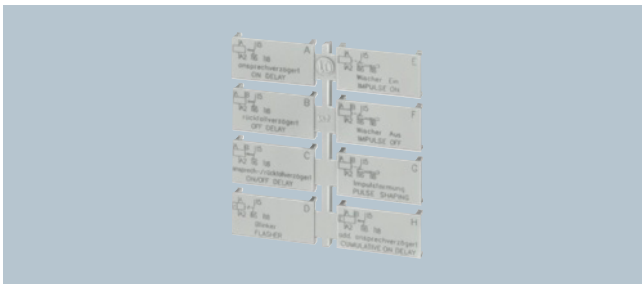
Accessories



Push-in lugs for screw fixing



Sealable cover



Label set for marking the multifunction relay

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.

Enclosure version


All timing relays are suitable for snap-on mounting onto TH 35 standard mounting rails according to EN 60715 or for screw fixing.

Selection and ordering data

Solid-state timing relays for general use in control systems and mechanical engineering with:

- 1 changeover contact or 2 changeover contacts

- Single or selectable time setting ranges
- Switch position indication by LED
- Voltage indication by LED

Version	Time setting range t adjustable by rotary switch to	Rated control supply voltage U_s	DT	Screw terminals 	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
		AC 50/60 Hz DC						
		V V		Order No.	Price per PU			kg

3RP15 05 timing relays, multifunction, 15 time setting ranges



3RP15 05-1BP30

The functions can be adjusted by means of rotary switches. Insert labels can be used to adjust different functions of the 3RP15 05 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 3RP19 01 label set, page 7/31.

With LED and

1 CO contact, 8 functions	0.05 ... 1 s	--	12	A	3RP15 05-1AA40	1	1 unit	101	0.125
	0.15 ... 3 s	24/100 ... 127	24	▶	3RP15 05-1AQ30	1	1 unit	101	0.140
	0.5 ... 10 s	24/200 ... 240	24	▶	3RP15 05-1AP30	1	1 unit	101	0.141
	1.5 ... 30 s	24 ... 240 ⁵⁾	24 ... 240 ²⁾	▶	3RP15 05-1AW30	1	1 unit	101	0.136
2 CO contacts, 16 functions	0.05 ... 1 min	24/100 ... 127	24	▶	3RP15 05-1BQ30	1	1 unit	101	0.162
	5 ... 100 s	24/200 ... 240	24	▶	3RP15 05-1BP30	1	1 unit	101	0.161
	0.15 ... 3 min	24 ... 240 ⁵⁾	24 ... 240 ²⁾	▶	3RP15 05-1BW30	1	1 unit	101	0.168
	0.5 ... 10 min	400 ... 440	-	A	3RP15 05-1BT20	1	1 unit	101	0.169
2 CO contacts, positively driven and hard gold-plated. 8 functions ³⁾⁴⁾	1.5 ... 30 min	24 ... 240	24 ... 240	▶	3RP15 05-1RW30	1	1 unit	101	0.169
	0.05 ... 1 h								
	5 ... 100 min								
	0.15 ... 3 h								
	0.5 ... 10 h								
	1.5 ... 30 h								
	5 ... 100 h								
	∞ ¹⁾								

3RP15 11 timing relays, ON-delay, 1 time setting range



3RP15 11-1AP30

With LED and 1 CO contact	0.5 ... 10 s	24/100 ... 127	24	▶	3RP15 11-1AQ30	1	1 unit	101	0.108
		24/200 ... 240	24	▶	3RP15 11-1AP30	1	1 unit	101	0.108
	1.5 ... 30 s	24/100 ... 127	24	▶	3RP15 12-1AQ30	1	1 unit	101	0.107
		24/200 ... 240	24	▶	3RP15 12-1AP30	1	1 unit	101	0.104
	5 ... 100 s	24/100 ... 127	24	▶	3RP15 13-1AQ30	1	1 unit	101	0.107
		24/200 ... 240	24	▶	3RP15 13-1AP30	1	1 unit	101	0.108

3RP15 25 timing relays, ON-delay, 15 time setting ranges



3RP15 25-1BW30

With LED and									
1 CO contact	0.05 ... 1 s	24/100 ... 127	24	▶	3RP15 25-1AQ30	1	1 unit	101	0.109
		24/200 ... 240	24	▶	3RP15 25-1AP30	1	1 unit	101	0.104
2 CO contacts	0.5 ... 10 s	42 ... 48/60	42 ... 48/60 ⁵⁾	A	3RP15 25-1BR30	1	1 unit	101	0.152
		1.5 ... 30 s							
	0.05 ... 1 min	24/100 ... 127	24	▶	3RP15 25-1BQ30	1	1 unit	101	0.152
		5 ... 100 s	24/200 ... 240	24	▶	3RP15 25-1BP30	1	1 unit	101
	0.15 ... 3 min	24 ... 240 ⁵⁾	24 ... 240 ²⁾	▶	3RP15 25-1BW30	1	1 unit	101	0.159
		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								
	∞ ¹⁾								

3RP15 27 timing relays, ON-delay, two-wire design, 4 time setting ranges



3RP15 27-1EM30

1 NO contact (semiconductor)	0.05 ... 1 s	24 ... 66	24...66 ⁵⁾	A	3RP15 27-1EC30	1	1 unit	101	0.099
	0.2 ... 4 s	90 ... 240	90...240 ⁵⁾	▶	3RP15 27-1EM30	1	1 unit	101	0.100
	1.5 ... 30 s								
	12 ... 240 s								

1) 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.

2) Operating range 0.7 to 1.1 x U_s .

3) Positively driven: NO and NC are never closed simultaneously; contact gap ≥ 0.5 mm is ensured, minimum make-break capacity 12 V, 3 mA.

4) The changeover contacts are actuated simultaneously, as a result of which only 8 functions are selectable (no wye-delta, no instantaneous contact).


5) Operating range 0.8 to 1.1 x U_s .

3RP, 3RT19 Timing Relays

3RP15 timing relays in industrial enclosure, 22.5 mm

Solid-state timing relays for general use in control systems and mechanical engineering with

- 1 changeover contact or 2 changeover contacts
- Single or selectable time setting ranges
- Switch position indication by LED
- Voltage indication by LED

Version	Time setting range t adjustable by rotary switch to	Rated control supply voltage U_s	DT	Spring-type terminals		PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
		AC 50/60 Hz	DC						
		V	V	Order No.	Price per PU				kg

3RP15 05 timing relays, multifunction, 15 time setting ranges



3RP15 05-2BP30

The functions can be adjusted by means of rotary switches. Insert labels can be used to adjust different functions of the 3RP15 05 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 3RP19 01 label set, page 7/31.

With LED and									
1 CO contact, 8 functions	0.05 ... 1 s	24/100 ... 127	24	C	3RP15 05-2AQ30	1	1 unit	101	0.125
	0.15 ... 3 s	24/200 ... 240	24	A	3RP15 05-2AP30	1	1 unit	101	0.126
	0.5 ... 10 s	24 ... 240 ⁵⁾	24 ... 240 ²⁾	A	3RP15 05-2AW30	1	1 unit	101	0.132
2 CO contacts, 16 functions	1.5 ... 30 s	24/100 ... 127	24	A	3RP15 05-2BQ30	1	1 unit	101	0.142
	0.05 ... 1 min	24/200 ... 240	24	A	3RP15 05-2BP30	1	1 unit	101	0.137
	5 ... 100 s	24 ... 240 ⁵⁾	24 ... 240 ²⁾	A	3RP15 05-2BW30	1	1 unit	101	0.143
2 CO contacts, positively driven and hard gold-plated. 8 functions ³⁾⁴⁾	0.15 ... 3 min	24 ... 240	24 ... 240	A	3RP15 05-2RW30	1	1 unit	101	0.143
	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								
	∞ ¹⁾								

3RP15 1. timing relays, ON-delay, 1 time setting range



3RP15 11-2AP30

With LED and 1 CO contact									
0.5 ... 10 s	24/100 ... 127	24	C	3RP15 11-2AQ30	1	1 unit	101	0.092	
	24/200 ... 240	24	A	3RP15 11-2AP30	1	1 unit	101	0.092	
1.5 ... 30 s	24/100 ... 127	24	C	3RP15 12-2AQ30	1	1 unit	101	0.092	
	24/200 ... 240	24	A	3RP15 12-2AP30	1	1 unit	101	0.097	
5 ... 100 s	24/100 ... 127	24	C	3RP15 13-2AQ30	1	1 unit	101	0.094	
	24/200 ... 240	24	A	3RP15 13-2AP30	1	1 unit	101	0.094	

3RP15 25 timing relays, ON-delay, 15 time setting ranges



3RP15 25-2BW30

With LED and									
1 CO contact	0.05 ... 1 s	24/100 ... 127	24	C	3RP15 25-2AQ30	1	1 unit	101	0.095
	0.15 ... 3 s	24/200 ... 240	24	A	3RP15 25-2AP30	1	1 unit	101	0.093
2 CO contacts	0.5 ... 10 s	24/100 ... 127	24	C	3RP15 25-2BQ30	1	1 unit	101	0.128
	1.5 ... 30 s	24/200 ... 240	24	A	3RP15 25-2BP30	1	1 unit	101	0.127
	0.05 ... 1 min	24 ... 240 ⁵⁾	24 ... 240 ²⁾	A	3RP15 25-2BW30	1	1 unit	101	0.134
	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								
	∞ ¹⁾								

3RP15 27 timing relays, ON-delay, two-wire design, 4 time setting ranges



3RP15 27-2EM30

1 NO contact (semiconductor)	0.05 ... 1 s	24 ... 66	24...66 ⁵⁾	C	3RP15 27-2EC30	1	1 unit	101	0.090
	0.2 ... 4 s	90 ... 240	90...240 ⁵⁾	C	3RP15 27-2EM30	1	1 unit	101	0.090
	1.5 ... 30 s								
	12 ... 240 s								

- 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.
- Operating range 0.7 to 1.1 x U_s .
- Positively driven: NO and NC are never closed simultaneously; contact gap ≥ 0.5 mm is ensured, minimum make-break capacity 12 V, 3 mA.

- The changeover contacts are actuated simultaneously, as a result of which only 8 functions are selectable (no wye-delta, no instantaneous contact).
- Operating range 0.8 to 1.1 x U_s .







3RP, 3RT19 Timing Relays

3RP15 timing relays
in industrial enclosure, 22.5 mm

Solid-state timing relays for general use in control systems and mechanical engineering with

- 1 changeover contact or 2 changeover contacts

- Single or selectable time setting ranges
- Switch position indication by LED
- Voltage indication by LED

Version	Time setting range t adjustable by rotary switch to	Rated control supply voltage U_s		DT	Screw terminals 		PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
		AC 50/60 Hz V	DC V		Order No.	Price per PU				
3RP15 3. timing relays, OFF-delay, with auxiliary voltage, 1 time setting range										
	With LED and 1 CO contact	0.5 ... 10 s	24/100 ... 127 24/200 ... 240	24 24	A	3RP15 31-1AQ30 3RP15 31-1AP30	1 1	1 unit 1 unit	101 101	0.140 0.140
	The same potential must be applied to terminals A and B	1.5 ... 30 s	24/100 ... 127 24/200 ... 240	24 24	A	3RP15 32-1AQ30 3RP15 32-1AP30	1 1	1 unit 1 unit	101 101	0.138 0.139
		5 ... 100 s	24/100 ... 127 24/200 ... 240	24 24	A	3RP15 33-1AQ30 3RP15 33-1AP30	1 1	1 unit 1 unit	101 101	0.139 0.140
3RP15 40 timing relays, OFF-delay, without auxiliary voltage, 9 time setting ranges¹⁾										
	With LED and 1 CO contact	0.05 ... 1 s	24	24 ²⁾	▶	3RP15 40-1AB31	1	1 unit	101	0.116
		0.15 ... 3 s	100 ... 127	100...127 ³⁾	▶	3RP15 40-1AJ31	1	1 unit	101	0.119
		0.3 ... 6 s	200 ... 240	200...240 ³⁾	▶	3RP15 40-1AN31	1	1 unit	101	0.120
		0.5 ... 10 s	24 ... 240	24 ... 240 ³⁾	▶	3RP15 40-1AW31	1	1 unit	101	0.116
	2 CO contacts	1.5 ... 30 s	24	24 ²⁾	▶	3RP15 40-1BB31	1	1 unit	101	0.159
		3 ... 60 s	100 ... 127	100...127 ³⁾	A	3RP15 40-1BJ31	1	1 unit	101	0.161
		5 ... 100 s	200 ... 240	200...240 ³⁾	▶	3RP15 40-1BN31	1	1 unit	101	0.161
		15 ... 300 s	24 ... 240	24 ... 240 ³⁾	▶	3RP15 40-1BW31	1	1 unit	101	0.159
		30 ... 600 s								
3RP15 55 timing relays, clock-pulse relay, 15 time setting ranges										
	With LED and 1 CO contact	0.05 ... 1 s	42 ... 48/60	42...48/ 60 ⁵⁾	A	3RP15 55-1AR30	1	1 unit	101	0.111
		0.15 ... 3 s	24/100 ... 127	24	▶	3RP15 55-1AQ30	1	1 unit	101	0.111
		0.5 ... 10 s	24/200 ... 240	24	▶	3RP15 55-1AP30	1	1 unit	101	0.111
		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								
	∞ ⁴⁾									
3RP15 60 timing relays, wye-delta function, dead interval 50 ms and overtravel time, 1 time setting range										
	3 NO contacts ³⁾ (common contact root terminal 17)	Wye-delta	24/100 ... 127 24/200 ... 240	24 24	A	3RP15 60-1SQ30 3RP15 60-1SP30	1 1	1 unit 1 unit	101 101	0.172 0.175
		1 ... 20 s, overtravel time (idling) 30 ... 600 s								
3RP15 7. timing relays, wye-delta function⁶⁾, dead interval 50 ms, 1 time setting range										
	1 NO contact instantaneous and 1 NO contact delayed (common contact root terminal 17)	1 ... 20 s	24/100 ... 127 24/200 ... 240	24 24	▶	3RP15 74-1NQ30 3RP15 74-1NP30	1 1	1 unit 1 unit	101 101	0.113 0.113
			200 ... 240/ 380 ... 440	--	B	3RP15 74-1NM20	1	1 unit	101	0.113
		3 ... 60 s	24/100 ... 127 24/200 ... 240	24 24	▶	3RP15 76-1NQ30 3RP15 76-1NP30	1 1	1 unit 1 unit	101 101	0.112 0.113
			200 ... 240/ 380 ... 440	--	B	3RP15 76-1NM20	1	1 unit	101	0.113

¹⁾ Setting of output contacts in as-supplied state not defined (bistable relay). Application of the control voltage once results in contact changeover to the correct setting.

²⁾ Operating range 0.7 to 1.25 x U_s .

³⁾ Operating range 0.85 to 1.1 x U_s .

⁴⁾ With switch position ∞ , no timing. For test purposes (ON/OFF function) on site. For dead time "infinite", the relay is always off. For pulse time "infinite", the relay is always on.

⁵⁾ Operating range 0.8 to 1.1 x U_s .

⁶⁾ For example circuit see Technical Information LV 1 T, "Schematics".

* You can order this quantity or a multiple thereof.

3RP, 3RT19 Timing Relays

3RP15 timing relays in industrial enclosure, 22.5 mm

Solid-state timing relays for general use in control systems and mechanical engineering with

- 1 changeover contact or 2 changeover contacts
- Single or selectable time setting ranges
- Switch position indication by LED
- Voltage indication by LED

Version	Time setting range t adjustable by rotary switch to	Rated control supply voltage U_s	DT	Spring-type terminals		PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
		AC 50/60 Hz	DC	Order No.	Price per PU				kg
		V	V						

3RP15 3. timing relays, OFF-delay, with auxiliary voltage, 1 time setting range



With LED and 1 CO contact	0.5 ... 10 s	24/100 ... 127	24	C	3RP15 31-2AQ30	1	1 unit	101	0.124
		24/200 ... 240	24	C	3RP15 31-2AP30	1	1 unit	101	0.122
The same potential must be applied to terminals A and B	1.5 ... 30 s	24/100 ... 127	24	C	3RP15 32-2AQ30	1	1 unit	101	0.125
		24/200 ... 240	24	A	3RP15 32-2AP30	1	1 unit	101	0.121
	5 ... 100 s	24/100 ... 127	24	C	3RP15 33-2AQ30	1	1 unit	101	0.123
		24/200 ... 240	24	C	3RP15 33-2AP30	1	1 unit	101	0.125

3RP15 33-2AP30

3RP15 40 timing relays, OFF-delay, without auxiliary voltage, 9 time setting ranges¹⁾



With LED and 1 CO contact	0.05 ... 1 s	24	24 ²⁾	A	3RP15 40-2AB31	1	1 unit	101	0.105	
		100 ... 127	100...127 ³⁾	A	3RP15 40-2AJ31	1	1 unit	101	0.108	
		200 ... 240	200...240 ³⁾	A	3RP15 40-2AN31	1	1 unit	101	0.110	
		24 ... 240	24...240 ³⁾	A	3RP15 40-2AW31	1	1 unit	101	0.105	
		1.5 ... 30 s	24	24 ²⁾	A	3RP15 40-2BB31	1	1 unit	101	0.136
2 CO contacts	3 ... 60 s	100 ... 127	100...127 ³⁾	A	3RP15 40-2BJ31	1	1 unit	101	0.136	
		200 ... 240	200...240 ³⁾	C	3RP15 40-2BN31	1	1 unit	101	0.136	
		15 ... 300 s	24 ... 240	24...240 ³⁾	A	3RP15 40-2BW31	1	1 unit	101	0.136
		30 ... 600 s	24 ... 240	24...240 ³⁾	A	3RP15 40-2BW31	1	1 unit	101	0.136

3RP15 40-2BB31

3RP15 55 timing relays, clock-pulse relay, 15 time setting ranges



With LED and 1 changeover contact	0.05 ... 1 s	42 ... 48/60	42...48/60 ⁵⁾	C	3RP15 55-2AR30	1	1 unit	101	0.102	
		0.15 ... 3 s	24/100 ... 127	24	C	3RP15 55-2AQ30	1	1 unit	101	0.100
		0.5 ... 10 s	24/200 ... 240	24	A	3RP15 55-2AP30	1	1 unit	101	0.104
		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								
∞ ⁴⁾										

3RP15 55-2AP30

3RP15 60 timing relays, wye-delta function, dead interval 50 ms and overtravel time, 1 time setting range



3 NO contacts ³⁾ (common contact root terminal 17)	Wye-delta 1 ... 20 s, overtravel time (idling) 30 ... 600 s	24/200 ... 240	24	C	3RP15 60-2SP30	1	1 unit	101	0.152
---	---	----------------	----	---	-----------------------	---	--------	-----	-------

3RP15 60-2SP30

3RP15 7. timing relays, wye-delta function⁶⁾, dead interval 50 ms, 1 time setting range

1 NO contact instantaneous and 1 NO contact delayed (common contact root terminal 17)	1 ... 20 s	24/200 ... 240	24	A	3RP15 74-2NP30	1	1 unit	101	0.104
		200 ... 240/380 ... 440		B	3RP15 74-2NM20	1	1 unit	101	0.100
	3 ... 60 s	24/100 ... 127	24	A	3RP15 76-2NQ30	1	1 unit	101	0.102
		24/200 ... 240	24	A	3RP15 76-2NP30	1	1 unit	101	0.104
		200 ... 240/380 ... 440		B	3RP15 76-2NM20	1	1 unit	101	0.100

¹⁾ Setting of output contacts in as-supplied state not defined (bistable relay). Application of the control voltage once results in contact changeover to the correct setting.

²⁾ Operating range 0.7 to 1.25 x U_s .

³⁾ Operating range 0.85 to 1.1 x U_s .

⁴⁾ With switch position ∞ , no timing. For test purposes (ON/OFF function) on site. For dead time "infinite", the relay is always off. For pulse time "infinite", the relay is always on.

⁵⁾ Operating range 0.8 to 1.1 x U_s .

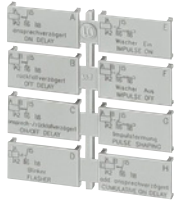
⁶⁾ For example circuit, see Technical Information LV 1 T, "Schematics".

Accessories

Version	Function	Iden- tifica- tion letter	Use	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
---------	----------	------------------------------------	-----	----	-----------	-----------------	----------------------------	-----	----	-----------------------------------

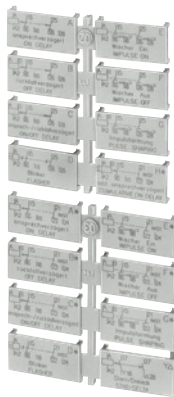
Label sets

Accessory for 3RP15 05 (not included in the scope of supply).
The label set offers the possibility of labeling timing relays with
the set function in English and German.



3RP19 01-0A

1 label set (1 unit) with 8 functions	With ON-delay OFF-delay with auxiliary voltage ON-delay and OFF-delay with auxiliary voltage Flashing, starting with interval Passing make contact Passing break contact with auxiliary voltage Pulse-forming with auxiliary voltage Additive ON-delay with auxiliary voltage	A B C D E F G H	for devices with 1 CO contact and 3RP15 05-.RW30	▶	3RP19 01-0A		1	5 units	101	0.003
---------------------------------------	--	--------------------------------------	--	---	--------------------	--	---	---------	-----	-------



3RP19 01-0B

1 label set (1 unit) with 16 functions	With ON-delay OFF-delay with auxiliary voltage ON-delay and OFF-delay with auxiliary voltage Flashing, starting with interval Passing make contact Passing break contact with auxiliary voltage Pulse-forming with auxiliary voltage Additive ON-delay with auxiliary voltage and instantaneous contact ON-delay and instantaneous contact OFF-delay with auxiliary voltage and instantaneous contact ON-delay and OFF-delay with auxiliary voltage and instantaneous contact Flashing, starting with interval, and instantaneous contact Passing make contact and instantaneous contact Passing break contact with auxiliary voltage and instantaneous contact Pulse-forming with auxiliary voltage and instantaneous contact Wye-delta function	A B C D E F G H• A• B• C• D• E• F• G• YΔ	for devices with 2 CO contacts	▶	3RP19 01-0B		1	5 units	101	0.006
--	--	---	--------------------------------	---	--------------------	--	---	---------	-----	-------

Blank labels

Blank labels, 20 mm x 7 mm, pastel turquoise ¹⁾		C			3RT19 00-1SB20		100	340 units	101	0.200
--	--	---	--	--	-----------------------	--	-----	-----------	-----	-------

Covers and push-in lugs



3RP19 03

Push-in lugs
For screw fixing,
2 units are required for each device

▶	3RP19 03		1	10 units	101	0.002
---	-----------------	--	---	----------	-----	-------



3RP19 02

Sealable covers
For securing against unauthorized adjustment of
setting knobs

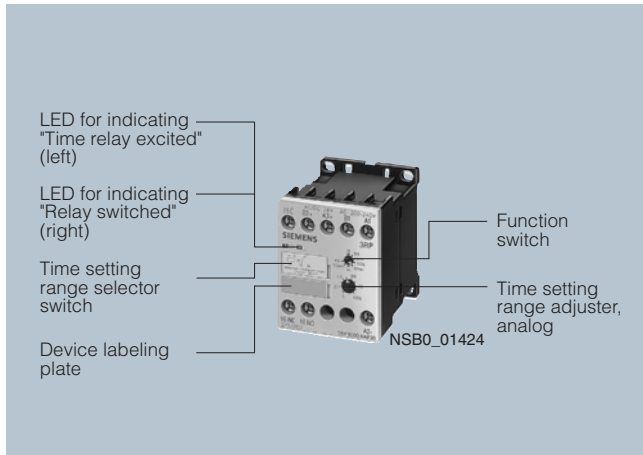
▶	3RP19 02		1	5 units	101	0.004
---	-----------------	--	---	---------	-----	-------

¹⁾ Computer labeling system for individual inscription of unit labeling plates
available from:
murrplastik Systemtechnik GmbH.
<http://www.murrplastik.com>

3RP, 3RT19 Timing Relays

3RP20 timing relays, 45 mm

Overview



Application

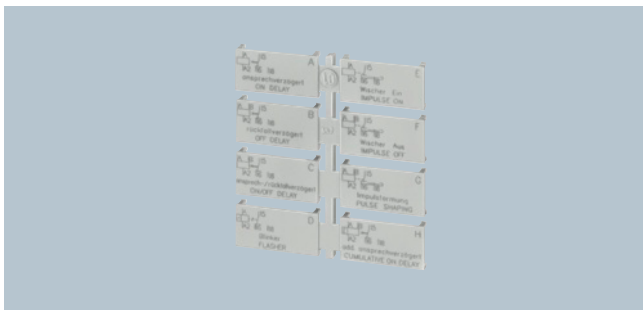
Timing relays are used in control, starting, and protective circuits for all switching operations involving time delays. They guarantee a high level of functionality and a high repeat accuracy of timer settings.

Standards

The timing relays comply with:

- EN 60721-3-3 "Environmental conditions"
- EN 61812-1 "Specified time relays for industrial use"
- EN 61000-6-2 and EN 61000-6-4 "Electromagnetic compatibility"
- EN 60947-5-1 "Low-voltage switchgear and controlgear – Electromechanical control circuit devices"
- EN 61140 "Electrical protective separation"

Accessories



Label set for marking the multifunction relay




Selection and ordering data

Multifunction

The functions can be adjusted by means of rotary switches. Insert labels can be used to adjust different functions of the 3RP20 05 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 3RP19 01 label set, page 7/35.

Version	Time setting range t	Rated control supply voltage U_s	DT	Screw terminals 	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.	
		AC 50/60 Hz DC		Order No.	Price per PU			kg	
3RP20 05 timing relays, multifunction, 15 time setting ranges									
	With LED and 1 CO contact, 8 functions	0.05 ... 1 s 0.15 ... 3 s 0.5 ... 10 s	24/100 ... 127 24 24/200 ... 240 24	▶ ▶	3RP20 05-1AQ30 3RP20 05-1AP30	1 1	1 unit 1 unit	101 101	0.118 0.119
	With LED and 2 CO contacts, 16 functions ¹⁾	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 ... 240 ³⁾ 24 ... 240 ⁴⁾	▶	3RP20 05-1BW30	1	1 unit	101	0.128
3RP20 25. 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	24/100 ... 127 24 24/200 ... 240 24	▶ ▶	3RP20 25-1AQ30 3RP20 25-1AP30	1 1	1 unit 1 unit	101 101	0.106 0.106
		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⁾							

¹⁾ Units with electrical 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 $0.8 \dots 1.1 \times U_s$.

⁴⁾ Operating range $0.7 \dots 1.1 \times U_s$.

3RP, 3RT19 Timing Relays




3RP20 timing relays, 45 mm

Multifunction

The functions can be adjusted by means of rotary switches. Insert labels can be used to adjust different functions of the 3RP20 05 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 3RP19 01 label set, page 7/35.

Version	Time setting range t	Rated control supply voltage U_s	DT	Spring-type terminals 	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.	
		AC 50/60 Hz DC		Order No.	Price per PU			kg	
		V V							
3RP20 05 timing relays, multifunction, 15 time setting ranges									
	With LED and 1 CO contact, 8 functions ¹⁾	0.05 ... 1 s 0.15 ... 3 s 0.5 ... 10 s	24/ 100 ... 127 24 24/ 200 ... 240 24	D	3RP20 05-2AQ30 3RP20 05-2AP30	1 1	1 unit 1 unit	101 101	0.120 0.121
	With LED and 2 CO contact, 16 functions	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 ... 240 ³⁾ 24 ... 240 ⁴⁾	D	3RP20 05-2BW30	1	1 unit	101	0.131
3RP20 25. 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 24/ 200 ... 240 24	▶ ▶	3RP20 25-2AQ30 3RP20 25-2AP30	1 1	1 unit 1 unit	101 101	0.110 0.108

1) Units with electrical 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 $\times U_s$.

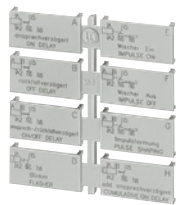
4) Operating range 0.7 to 1.1 $\times U_s$.

Accessories

Version	Function	Identification letter	Use	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
---------	----------	-----------------------	-----	----	-----------	--------------	-------------------	-----	----	-----------------------------

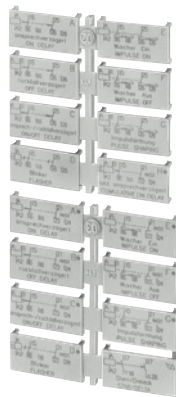
Label sets

Accessory for 3RP20 (not included in the scope of supply). The label set offers the possibility of labeling timing relays with the set function in English and German.



3RP19 01-0A

1 label set (1 unit) with 8 functions	With ON-delay OFF-delay with auxiliary voltage ON-delay and OFF-delay with auxiliary voltage Flashing, starting with interval Passing make contact Passing break contact with auxiliary voltage Pulse-forming with auxiliary voltage Additive ON-delay with auxiliary voltage	A B C D E F G H	for devices with 1 CO contact and 3RP15 05-.RW30	▶	3RP19 01-0A		1	5 units	101	0.003
---------------------------------------	--	--------------------------------------	--	---	--------------------	--	---	---------	-----	-------



3RP19 01-0B

1 label set (1 unit) with 16 functions	With ON-delay OFF-delay with auxiliary voltage ON-delay and OFF-delay with auxiliary voltage Flashing, starting with interval Passing make contact Passing break contact with auxiliary voltage Pulse-forming with auxiliary voltage Additive ON-delay with auxiliary voltage and instantaneous contact ON-delay and instantaneous contact OFF-delay with auxiliary voltage and instantaneous contact ON-delay and OFF-delay with auxiliary voltage and instantaneous contact Flashing, starting with interval, and instantaneous contact Passing make contact and instantaneous contact Passing break contact with auxiliary voltage and instantaneous contact Pulse-forming with auxiliary voltage and instantaneous contact Wye-delta function	A B C D E F G H• A• B• C• D• E• F• G• YΔ	for devices with 2 CO contacts	▶	3RP19 01-0B		1	5 units	101	0.006
--	--	---	--------------------------------	---	--------------------	--	---	---------	-----	-------

Blank labels




Blank labels, 20 mm x 7 mm, pastel turquoise ¹⁾		C			3RT19 00-1SB20		100	340 units	101	0.200
--	--	---	--	--	-----------------------	--	-----	-----------	-----	-------

¹⁾ Computer labeling system for individual inscription of unit labeling plates available from:
murrplastik Systemtechnik GmbH.
<http://www.murrplastik.com>

3RP, 3RT19 Timing Relays

3RT19 16, 3RT19 26 timing relays for mounting onto contactors

Selection and ordering data

For con- tactors	Version	Time setting range t	Rated control supply voltage U_s	DT	Screw terminals 	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.	
Type		s	V		Order No.	Price per PU			kg	
For size S00¹⁾										
Terminal designations acc. to EN 46199 Part 5										
• ON-delay (varistor integrated)										
 3RT19 16-2...	3RT10 1, 3RH11	1 NO + 1 NC	0.05 ... 1	24 AC/DC	▶	3RT19 16-2EJ11	1	1 unit	101	0.090
			0.5 ... 10		▶	3RT19 16-2EJ21	1	1 unit	101	0.090
			5 ... 100		▶	3RT19 16-2EJ31	1	1 unit	101	0.090
			0.05 ... 1	100 ... 127 AC	C	3RT19 16-2EC11	1	1 unit	101	0.090
			0.5 ... 10		▶	3RT19 16-2EC21	1	1 unit	101	0.090
			5 ... 100		▶	3RT19 16-2EC31	1	1 unit	101	0.090
			0.05 ... 1	200 ... 240 AC	D	3RT19 16-2ED11	1	1 unit	101	0.090
			0.5 ... 10		▶	3RT19 16-2ED21	1	1 unit	101	0.090
			5 ... 100		▶	3RT19 16-2ED31	1	1 unit	101	0.090
	• OFF-delay without auxiliary voltage (varistor integrated) ²⁾									
		1 NO + 1 NC	0.05 ... 1	24 AC/DC	▶	3RT19 16-2FJ11	1	1 unit	101	0.090
			0.5 ... 10		▶	3RT19 16-2FJ21	1	1 unit	101	0.090
			5 ... 100		▶	3RT19 16-2FJ31	1	1 unit	101	0.090
			0.05 ... 1	100 ... 127 AC	C	3RT19 16-2FK11	1	1 unit	101	0.090
			0.5 ... 10		▶	3RT19 16-2FK21	1	1 unit	101	0.090
		5 ... 100		B	3RT19 16-2FK31	1	1 unit	101	0.090	
		0.05 ... 1	200 ... 240 AC	D	3RT19 16-2FL11	1	1 unit	101	0.090	
		0.5 ... 10		▶	3RT19 16-2FL21	1	1 unit	101	0.090	
		5 ... 100		▶	3RT19 16-2FL31	1	1 unit	101	0.090	
• OFF-delay with auxiliary voltage										
	1 CO	0.5 ... 10	24 AC/DC	B	3RT19 16-2LJ21	1	1 unit	101	0.090	
			100 ... 127 AC	B	3RT19 16-2LC21	1	1 unit	101	0.090	
			200 ... 240 AC	C	3RT19 16-2LD21	1	1 unit	101	0.090	
• Wye-delta function (varistor integrated)										
	1 NO, delayed +	1.5 ... 30	24 AC/DC	▶	3RT19 16-2GJ51	1	1 unit	101	0.090	
	1 NO, instanta- neous,		100 ... 127 AC	D	3RT19 16-2GC51	1	1 unit	101	0.090	
	dead time 50 ms		200 ... 240 AC	▶	3RT19 16-2GD51	1	1 unit	101	0.090	
For sizes S0 to S12³⁾										
Terminal designations acc. to EN 46199 Part 5										
• ON-delay										
 3RT19 26-2...	3RT10 2, 3RT10 3, 3RT10 4	1 NO + 1 NC	0.05 ... 1	24 AC/DC	D	3RT19 26-2EJ11	1	1 unit	101	0.090
			0.5 ... 10		▶	3RT19 26-2EJ21	1	1 unit	101	0.090
			5 ... 100		▶	3RT19 26-2EJ31	1	1 unit	101	0.090
			0.05 ... 1	100 ... 127 AC	C	3RT19 26-2EC11	1	1 unit	101	0.090
			0.5 ... 10		▶	3RT19 26-2EC21	1	1 unit	101	0.090
			5 ... 100		D	3RT19 26-2EC31	1	1 unit	101	0.090
			0.05 ... 1	200 ... 240 AC	D	3RT19 26-2ED11	1	1 unit	101	0.090
			0.5 ... 10		▶	3RT19 26-2ED21	1	1 unit	101	0.090
			5 ... 100		B	3RT19 26-2ED31	1	1 unit	101	0.090
	• OFF-delay without auxiliary voltage ²⁾									
		1 NO + 1 NC	0.05 ... 1	24 AC/DC	▶	3RT19 26-2FJ11	1	1 unit	101	0.090
			0.5 ... 10		▶	3RT19 26-2FJ21	1	1 unit	101	0.090
			5 ... 100		▶	3RT19 26-2FJ31	1	1 unit	101	0.090
			0.05 ... 1	100 ... 127 AC	D	3RT19 26-2FK11	1	1 unit	101	0.090
			0.5 ... 10		▶	3RT19 26-2FK21	1	1 unit	101	0.090
		5 ... 100		C	3RT19 26-2FK31	1	1 unit	101	0.090	
		0.05 ... 1	200 ... 240 AC	D	3RT19 26-2FL11	1	1 unit	101	0.090	
		0.5 ... 10		A	3RT19 26-2FL21	1	1 unit	101	0.090	
		5 ... 100		A	3RT19 26-2FL31	1	1 unit	101	0.090	
• Wye-delta function (varistor integrated)										
	1 NO, delayed +	1.5 ... 30	24 AC/DC	▶	3RT19 26-2GJ51	1	1 unit	101	0.090	
	1 NO, instanta- neous,		100 ... 127 AC	▶	3RT19 26-2GC51	1	1 unit	101	0.090	
	dead time 50 ms		200 ... 240 AC	▶	3RT19 26-2GD51	1	1 unit	101	0.090	






¹⁾ The terminals for the rated control supply voltage are connected to the contactor beneath by the integrated spring-type contacts of the solid-state time-delay auxiliary switch block when mounting.

²⁾ Setting of output contacts in as-supplied state not defined (bistable relay). Application of the control voltage once results in contact changeover to the correct setting.

³⁾ The terminals A1 and A2 for the rated control supply voltage of the solid-state time-delay auxiliary switch block must be connected to the corresponding contactor by connecting cables.

3RP, 3RT19 Timing Relays

3RT19 16, 3RT19 26 timing relays
for mounting onto contactors

For con- tactors	Version	Time setting range t	Rated control supply voltage U_s	DT	Screw terminals 	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.	
Type	s	V			Order No.	Price per PU			kg	
For size S00, with semiconductor output										
For mounting onto the front of contactors The electrical connection between the timing relay block and the contactor beneath is established automatically when it is snapped on.										
 3RT19 16-2C...	3RT1. 1, 3RH11	• ON-delay, two-wire version (varistor integrated)								
		0.05 ... 1	24 ... 66 AC/DC	B	3RT19 16-2CG11		1	1 unit	101	0.050
		0.5 ... 10		B	3RT19 16-2CG21		1	1 unit	101	0.050
	5 ... 100		B	3RT19 16-2CG31		1	1 unit	101	0.050	
	0.05 ... 1	90 ... 240 AC/DC	D	3RT19 16-2CH11		1	1 unit	101	0.050	
	0.5 ... 10		D	3RT19 16-2CH21		1	1 unit	101	0.050	
5 ... 100		D	3RT19 16-2CH31		1	1 unit	101	0.050		
 3RT19 16-2D...	• OFF-delay with auxiliary voltage (varistor integrated)									
	0.05 ... 1	24 ... 66 AC/DC	C	3RT19 16-2DG11		1	1 unit	101	0.060	
	0.5 ... 10		B	3RT19 16-2DG21		1	1 unit	101	0.060	
	5 ... 100		B	3RT19 16-2DG31		1	1 unit	101	0.060	
	0.05 ... 1	90 ... 240 AC/DC	D	3RT19 16-2DH11		1	1 unit	101	0.060	
	0.5 ... 10		D	3RT19 16-2DH21		1	1 unit	101	0.060	
5 ... 100		B	3RT19 16-2DH31		1	1 unit	101	0.060		
For sizes S0 to S3, with semiconductor output										
For mounting onto coil terminals on top of the contactors The electrical connection between the relay block and the corresponding contactor is established by screwing the two connecting pins of the timing relay block to coil terminals A1/A2 on top of the contactor.										
 3RT19 26-2C...	3RT10 2, 3RT10 3, 3RT10 4 ¹⁾	• ON-delay, two-wire version (varistor integrated)								
		0.05 ... 1	24 ... 66 AC/DC	D	3RT19 26-2CG11		1	1 unit	101	0.050
		0.5 ... 10		B	3RT19 26-2CG21		1	1 unit	101	0.050
	5 ... 100		D	3RT19 26-2CG31		1	1 unit	101	0.050	
	0.05 ... 1	90 ... 240 AC/DC	D	3RT19 26-2CH11		1	1 unit	101	0.050	
	0.5 ... 10		D	3RT19 26-2CH21		1	1 unit	101	0.050	
5 ... 100		D	3RT19 26-2CH31		1	1 unit	101	0.050		
 3RT19 26-2D...	• OFF-delay with auxiliary voltage (varistor integrated)									
	0.05 ... 1	24 ... 66 AC/DC	D	3RT19 26-2DG11		1	1 unit	101	0.050	
	0.5 ... 10		D	3RT19 26-2DG21		1	1 unit	101	0.050	
	5 ... 100		D	3RT19 26-2DG31		1	1 unit	101	0.050	
	0.05 ... 1	90 ... 240 AC/DC	C	3RT19 26-2DH11		1	1 unit	101	0.050	
	0.5 ... 10		D	3RT19 26-2DH21		1	1 unit	101	0.050	
5 ... 100		C	3RT19 26-2DH31		1	1 unit	101	0.050		

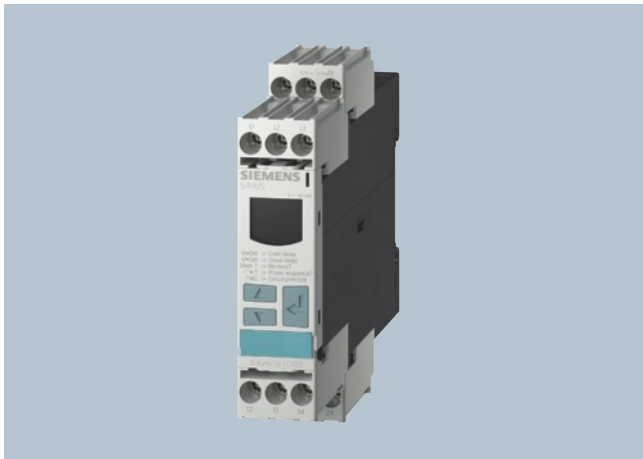
¹⁾ Not for 3RT10 4 contactor with 24 ... 42 V rated control supply voltage.

Monitoring Relays

3UG Monitoring Relays for Electrical and Additional Measurements

Line monitoring

Overview



Solid-state line monitoring relays provide maximum protection for mobile machines and plants or for unstable networks. Network and voltage faults can 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 unbalance, undervoltage or overvoltage.

Phase unbalance 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 3UG46 17 or 3UG46 18 relay, a wrong direction of rotation can also be corrected automatically.

Benefits

- Can be used without auxiliary voltage in any network from 160 ... 600 V AC worldwide thanks to wide voltage range
- Variably adjustable to overvoltage, undervoltage or range monitoring
- Freely configurable delay times and reset response
- Width 22.5 mm
- Permanent display of ACTUAL value and network 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 terminals or alternatively with spring-type 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	<ul style="list-style-type: none"> • Direction of rotation of the drive
Phase failure	<ul style="list-style-type: none"> • A fuse has tripped • Failure of the control supply voltage • Broken cable
Phase unbalance	<ul style="list-style-type: none"> • Overheating of the motor due to asymmetrical voltage • Detection of asymmetrically loaded networks
Undervoltage	<ul style="list-style-type: none"> • Increased current on a motor with corresponding overheating • Unintentional resetting of a device • Network collapse, particularly with battery power
Overvoltage	<ul style="list-style-type: none"> • Protection of a plant against destruction due to overvoltage

Monitoring Relays

3UG Monitoring Relays for Electrical and Additional Measurements

Line monitoring

Selection and ordering data



Hysteresis	Under-voltage detection	Over-voltage detection	ON-delay	Tripping delay	Version of auxiliary contacts	Rated control supply voltage $U_s^{1)}$	DT	Screw terminals	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.	
			s	s	CO	V		Order No.	Price per PU			kg	
Monitoring of phase sequence													
Auto-RESET													
--	No	No	--	--	1	160 ... 260 AC	A	3UG45 11-1AN20		1	1 unit	101	0.147
					2		A			3UG45 11-1BN20	1	1 unit	101
					1	320 ... 500 AC	A	3UG45 11-1AP20		1	1 unit	101	0.147
					2		A			3UG45 11-1BP20	1	1 unit	101
					1	420 ... 690 AC	B	3UG45 11-1AQ20		1	1 unit	101	0.147
					2		B			3UG45 11-1BQ20	1	1 unit	101
Monitoring of phase sequence, phase failure and phase unbalance													
Auto-RESET, closed-circuit principle, unbalance threshold 10 %													
--	No	No	--	--	1	160 ... 690 AC	A	3UG45 12-1AR20		1	1 unit	101	0.147
					2		A			3UG45 12-1BR20	1	1 unit	101
Monitoring of phase sequence, phase failure, unbalance and undervoltage													
Analog adjustable, Auto-RESET, closed-circuit principle, fixed unbalance threshold 20 %													
5 % of set value	Yes	No	--	0.1 ... 20	2	160 ... 690 AC	A	3UG45 13-1BR20		1	1 unit	101	0.147
Digitally adjustable, Auto or manual RESET, open-circuit or closed-circuit principle, unbalance threshold 0 or 5 ... 20 %													
Adjustable	Yes	No	0.1 ... 20	0.1 ... 20	2	160 ... 690 AC	A	3UG46 14-1BR20		1	1 unit	101	0.147
1 ... 20 V													
Monitoring of phase sequence, phase failure, overvoltage and undervoltage													
Digitally adjustable, Auto-RESET or manual RESET, open-circuit or closed-circuit principle													
Adjustable	Yes	Yes	--	0.1 ... 20 ²⁾ 2 ²⁾		160 ... 690 AC	A	3UG46 15-1CR20		1	1 unit	101	0.147
1 ... 20 V													
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	Yes	Yes	--	0.1 ... 20 ²⁾ 2 ²⁾		90... 400 AC	A	3UG46 16-1CR20		1	1 unit	101	0.147
1 ... 20 V						against N							
Automatic correction of the direction of rotation in case of wrong phase sequence, phase failure, phase unbalance, overvoltage and undervoltage													
Digitally adjustable, Auto or manual RESET, open-circuit or closed-circuit principle, unbalance threshold 0 or 5 ... 20 %													
Adjustable	Yes	Yes	--	0.1 ... 20	2 ³⁾	160 ... 690 AC	A	3UG46 17-1CR20		1	1 unit	101	0.147
1 ... 20 V													
Automatic correction of the direction of rotation in case of wrong phase sequence, phase and N conductor failure, phase unbalance, overvoltage and undervoltage													
Digitally adjustable, Auto or manual RESET, open-circuit or closed-circuit principle, unbalance threshold 0 or 5 ... 20 %													
Adjustable	Yes	Yes	--	0.1 ... 20	2 ³⁾	90... 400 AC	A	3UG46 18-1CR20		1	1 unit	101	0.147
1 ... 20 V						against N							

1) Absolute limit values.

2) 1 CO contact each and 1 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.

Monitoring Relays

3UG Monitoring Relays for Electrical and Additional Measurements

Line monitoring



3UG45 11-2BP20



3UG45 12-2BR20

Hysteresis	Under-voltage detection	Over-voltage detection	ON-delay	Tripping delay	Version of auxiliary contacts	Rated control supply voltage U_s ¹⁾	DT	Spring-type terminals		PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
			s	s	CO	V		Order No.	Price per PU				kg
Monitoring of phase sequence													
Auto-RESET													
--	No	No	--	--	1	160 ... 260 AC	B	3UG45 11-2AN20		1	1 unit	101	0.147
					2		B	3UG45 11-2BN20		1	1 unit	101	0.147
					1	320 ... 500 AC	A	3UG45 11-2AP20		1	1 unit	101	0.147
					2		B	3UG45 11-2BP20		1	1 unit	101	0.147
					1	420 ... 690 AC	B	3UG45 11-2AQ20		1	1 unit	101	0.147
					2		B	3UG45 11-2BQ20		1	1 unit	101	0.147
Monitoring of phase sequence, phase failure and phase unbalance													
Auto-RESET, closed-circuit principle, unbalance threshold 10 %													
--	No	No	--	--	1	160 ... 690 AC	A	3UG45 12-2AR20		1	1 unit	101	0.147
					2		A	3UG45 12-2BR20		1	1 unit	101	0.147
Monitoring of phase sequence, phase failure, unbalance and undervoltage													
Analogically adjustable, Auto-RESET, closed-circuit principle, unbalance threshold 20 %													
5 % of set value	Yes	No	--	0.1 ... 20	2	160 ... 690 AC	A	3UG45 13-2BR20		1	1 unit	101	0.147
Digitally adjustable, Auto or manual RESET, open-circuit or closed-circuit principle, unbalance threshold 0 or 5 ... 20 %													
Adjustable	Yes	No	0 ... 20	0.1 ... 20	2	160 ... 690 AC	A	3UG46 14-2BR20		1	1 unit	101	0.147
1 ... 20 V													
Monitoring of phase sequence, phase failure, overvoltage and undervoltage													
Digitally adjustable, Auto-RESET or manual RESET, open-circuit or closed-circuit principle													
Adjustable	Yes	Yes	--	0.1 ... 20 ²⁾ 2 ²⁾		160 ... 690 AC	A	3UG46 15-2CR20		1	1 unit	101	0.140
1 ... 20 V													
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	Yes	Yes	--	0.1 ... 20 ²⁾ 2 ²⁾		90... 400 AC against N	A	3UG46 16-2CR20		1	1 unit	101	0.147
1 ... 20 V													
Automatic correction of the direction of rotation in case of wrong phase sequence, phase failure, phase unbalance, overvoltage and undervoltage													
Digitally adjustable, Auto or manual RESET, open-circuit or closed-circuit principle, unbalance threshold 0 or 5 ... 20 %													
Adjustable	Yes	Yes	--	0.1 ... 20	2 ³⁾	160 ... 690 AC	B	3UG46 17-2CR20		1	1 unit	101	0.147
1 ... 20 V													
Automatic correction of the direction of rotation in case of wrong phase sequence, phase and N conductor failure, phase unbalance, overvoltage and undervoltage													
Digitally adjustable, Auto or manual RESET, open-circuit or closed-circuit principle, unbalance threshold 0 or 5 ... 20 %													
Adjustable	Yes	Yes	--	0.1 ... 20	2 ³⁾	90... 400 AC against N	B	3UG46 18-2CR20		1	1 unit	101	0.147
1 ... 20 V													

1) Absolute limit values.

2) 1 CO contact each and 1 tripping delay time each for U_{min} and U_{max} .



3) 1 CO contact each for power system fault and phase sequence correction.

Monitoring Relays

3UG Monitoring Relays for Electrical and Additional Measurements

Line monitoring

Accessories

Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg	
Blank labels								
Blank labels, 20 mm x 7 mm, pastel turquoise ¹⁾	C	3RT19 00-1SB20		100	340 units	101	0.200	
Push-in lugs and covers								
 3RP19 03		Push-in lugs For screw fixing, 2 units are required for each device	▶	3RP19 03	1	10 units	101	0.002
 3RP19 02		Sealable covers For securing against unauthorized adjustment of setting knobs	▶	3RP19 02	1	5 units	101	0.004

¹⁾ Computer labeling system for individual inscription of unit labeling plates available from:
murrplastik Systemtechnik GmbH.
<http://www.murrplastik.com>

Monitoring Relays

3UG Monitoring Relays for Electrical and Additional Measurements

Voltage monitoring

Overview



The relays monitor single-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).

Application

- Protection of a plant against destruction due to overvoltage
- Switch-on of a plant at a defined voltage and higher
- Protection against overloaded supply voltages, particularly with battery power
- Threshold switch for analog signals from 0.1 ... 10 V


Benefits

- Versions with wide voltage supply range
- Variably adjustable to overvoltage, undervoltage 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 terminals or alternatively with spring-type terminals

Monitoring Relays for Electrical and Additional Measurements

Voltage monitoring

Selection and ordering data

Measuring range	Hysteresis	Rated control supply voltage U_s	DT	Screw terminals 	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
V	V	V		Order No.	Price per PU			kg

Internal power supply without auxiliary voltage, ON-delay and tripping delay can be adjusted separately 0.1 ... 20 s


Digitally adjustable, LCD, Auto-RESET or manual RESET, open-circuit or closed-circuit principle, 1 CO contact								
17 ... 275 AC/DC	0.1...150	17 ... 275 AC/DC ¹⁾	A	3UG46 33-1AL30		1	1 unit	101 0.147

Supplied from an external auxiliary voltage, tripping delay adjustable 0.1 ... 20 s



3UG46 31-1AA30

Digitally adjustable, LCD, Auto-RESET or manual RESET, open-circuit or closed-circuit principle, 1 CO contact								
0.1 ... 60 AC/DC	0.1...30	24 AC/DC	A	3UG46 31-1AA30		1	1 unit	101 0.147
10 ... 600 AC/DC	0.1...300		A	3UG46 32-1AA30		1	1 unit	101 0.147
0.1 ... 60 AC/DC	0.1...30	24 ... 240 AC/DC	A	3UG46 31-1AW30		1	1 unit	101 0.147
10 ... 600 AC/DC	0.1...300		A	3UG46 32-1AW30		1	1 unit	101 0.147

Measuring range	Hysteresis	Rated control supply voltage U_s ¹⁾	DT	Spring-type terminals 	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
V	V	V		Order No.	Price per PU			kg

Internal power supply without auxiliary voltage, ON-delay and tripping delay can be adjusted separately 0.1 ... 20 s



3UG46 33-2AL30

Digitally adjustable, LCD, Auto-RESET or manual RESET, open-circuit or closed-circuit principle, 1 CO contact								
17 ... 275 AC/DC	0.1 ... 150	17 ... 275 AC/DC ¹⁾	A	3UG46 33-2AL30		1	1 unit	101 0.147

Supplied from an external auxiliary voltage, tripping delay adjustable 0.1 ... 20 s

Digitally adjustable, LCD, Auto-RESET or manual RESET, open-circuit or closed-circuit principle, 1 CO contact								
0.1 ... 60 AC/DC	0.1 ... 30	24 AC/DC	B	3UG46 31-2AA30		1	1 unit	101 0.147
10 ... 600 AC/DC	0.1 ... 300		B	3UG46 32-2AA30		1	1 unit	101 0.147
0.1 ... 60 AC/DC	0.1 ... 30	24 ... 240 AC/DC	B	3UG46 31-2AW30		1	1 unit	101 0.147
10 ... 600 AC/DC	0.1 ... 300		B	3UG46 32-2AW30		1	1 unit	101 0.147

¹⁾ Absolute limit values.

Accessories

Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
							kg

Blank labels

Blank labels, 20 mm x 7 mm, pastel turquoise ¹⁾	C	3RT19 00-1SB20		100	340 units	101	0.200
--	---	-----------------------	--	-----	-----------	-----	-------

Push-in lugs and covers



3RP19 03

Push-in lugs For screw fixing, 2 units are required for each device	▶	3RP19 03		1	10 units	101	0.002
--	---	-----------------	--	---	----------	-----	-------



3RP19 02

Sealable covers For securing against unauthorized adjustment of setting knobs	▶	3RP19 02		1	5 units	101	0.004
---	---	-----------------	--	---	---------	-----	-------

¹⁾ Computer labeling system for individual inscription of unit labeling plates available from:

murrplastik Systemtechnik GmbH.
<http://www.murrplastik.com>

* You can order this quantity or a multiple thereof.

Monitoring Relays

3UG Monitoring Relays for Electrical and Additional Measurements

Current monitoring

Overview



The relays monitor single-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 supply voltage types.

Application

- Overcurrent and undercurrent monitoring
- Monitoring the functionality of electrical loads
- Open-circuit monitoring
- Threshold switch for analog signals from 4 ... 20 mA

Benefits


- Versions with wide voltage supply range
- Variably adjustable to overvoltage, undervoltage 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 terminals or alternatively with spring-type terminals

Monitoring Relays

3UG Monitoring Relays for Electrical and Additional Measurements

Current monitoring

Selection and ordering data


Measuring range	Hysteresis	Rated control supply voltage U_s	DT	Screw terminals 	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
		V		Order No.	Price per PU			kg

Monitoring of undercurrent and overcurrent, ON-delay and tripping delay can be adjusted separately 0.1 ... 20 s



3UG46 21-1AA30

Digitally adjustable, LCD, Auto-RESET or manual RESET, open-circuit or closed-circuit principle, 1 CO contact								
AC/DC 3 ... 500 mA	0.1 ... 250 mA	24 AC/DC ¹⁾	A	3UG46 21-1AA30	1	1 unit	101	0.147
AC/DC 0.05 ... 10 A	0.01 ... 5 A		A	3UG46 22-1AA30	1	1 unit	101	0.147
AC/DC 3 ... 500 mA	0.1 ... 250 mA	24 ... 240 AC/DC ²⁾	A	3UG46 21-1AW30	1	1 unit	101	0.147
AC/DC 0.05 ... 10 A	0.01 ... 5 A		A	3UG46 22-1AW30	1	1 unit	101	0.147

Measuring range	Hysteresis	Rated control supply voltage U_s	DT	Spring-type terminals 	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
		V		Order No.	Price per PU			kg

Monitoring of undercurrent and overcurrent, ON-delay and tripping delay can be adjusted separately 0.1 ... 20 s



3UG46 22-2AW30

Digitally adjustable, LCD, Auto-RESET or manual RESET, open-circuit or closed-circuit principle, 1 CO contact								
AC/DC 3 ... 500 mA	0.1 ... 250 mA	24 AC/DC ¹⁾	B	3UG46 21-2AA30	1	1 unit	101	0.147
AC/DC 0.05 ... 10 A	0.01 ... 5 A		B	3UG46 22-2AA30	1	1 unit	101	0.147
AC/DC 3 ... 500 mA	0.1 ... 250 mA	24 ... 240 AC/DC ²⁾	B	3UG46 21-2AW30	1	1 unit	101	0.147
AC/DC 0.05 ... 10 A	0.01 ... 5 A		A	3UG46 22-2AW30	1	1 unit	101	0.147

¹⁾ No electrical isolation. Load supply voltage 24 V.

²⁾ Electrical isolation between control circuit and measuring circuit. Load supply voltage for safe isolation max. 300 V, for simple isolation max. 500 V.

Accessories

Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
							kg

Blank labels

Blank labels, 20 mm x 7 mm, pastel turquoise ¹⁾	C	3RT19 00-1SB20		100	340 units	101	0.200
--	---	-----------------------	--	-----	-----------	-----	-------

Push-in lugs and covers



3RP19 03

Push-in lugs For screw fixing, 2 units are required for each device	▶	3RP19 03		1	10 units	101	0.002
--	---	-----------------	--	---	----------	-----	-------



3RP19 02

Sealable covers For securing against unauthorized adjustment of setting knobs	▶	3RP19 02		1	5 units	101	0.004
---	---	-----------------	--	---	---------	-----	-------

¹⁾ Computer labeling system for individual inscription of unit labeling plates available from:
murrplastik Systemtechnik GmbH.
<http://www.murrplastik.com>

Monitoring Relays

3UG Monitoring Relays for Electrical and Additional Measurements

Power factor and active current monitoring

Overview



The 3UG46 41 power factor and active current monitoring device enables the load monitoring of motors.

Whereas power factor 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.

Application

- No-load monitoring and load shedding, such as in the event of a V-belt tear
- Underload monitoring in the low 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 networks for control of correction equipment
- Broken cable between control cabinet and motor

Benefits

- Can be used world-wide thanks to wide voltage range from 90 ... 690 V¹⁾
- Monitoring of even small single-phase motors with a no-load supply current below 0.5 A
- Simple determination of threshold values through the direct collection of measured variables on 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 or active current can be selected as measurement principle

¹⁾ Absolute limit values.


Monitoring Relays


3UG Monitoring Relays for Electrical and Additional Measurements

Power factor and active current monitoring

Selection and ordering data



- Relay for monitoring the power factor and the active current $I_{res} (p.f. \times I)$
- Suitable for single- and three-phase currents
- Digital adjustable, with illuminated LCD
- Overshoot, undershoot or range monitoring
- Upper and lower threshold value can be adjusted separately
- Permanent display of actual value and tripping state
- 1 changeover contact each for undershoot/overshoot
- All terminals are removable
- Width 22.5 mm

Measuring range		Hysteresis		ON-delay	OFF-delay	Rated control supply voltage $U_s^{1)}$	DT	Screw terminals 	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.	
For power factor	For active current	For power factor	For active current			V							
p.f.	A	p.f.	A	s	s	V		Order No.	Price per PU			kg	
0.10 ... 0.99	0.2 ... 10.0	0.1	0.1 ... 2.0	0 ... 99	0.1 ... 20.0	90 ... 690	A	3UG46 41-1CS20		1	1 unit	101	0.147

Measuring range		Hysteresis		ON-delay	OFF-delay	Rated control supply voltage $U_s^{1)}$	DT	Spring-type terminals 	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.	
For power factor	For active current	For power factor	For active current			V							
p.f.	A	p.f.	A	s	s	V		Order No.	Price per PU			kg	
0.10 ... 0.99	0.2 ... 10.0	0.1	0.1 ... 2.0	0 ... 99	0.1 ... 20.0	90 ... 690	B	3UG46 41-2CS20		1	1 unit	101	0.147

1) Absolute limit values.

Accessories

Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.	
Blank labels								
Blank labels, 20 mm x 7 mm, pastel turquoise ¹⁾	C	3RT19 00-1SB20		100	340 units	101	0.200	
Push-in lugs and covers								
 3RP19 03		Push-in lugs For screw fixing, 2 units are required for each device	▶	3RP19 03	1	10 units	101	0.002
 3RP19 02		Sealable covers For securing against unauthorized adjustment of setting knobs	▶	3RP19 02	1	5 units	101	0.004

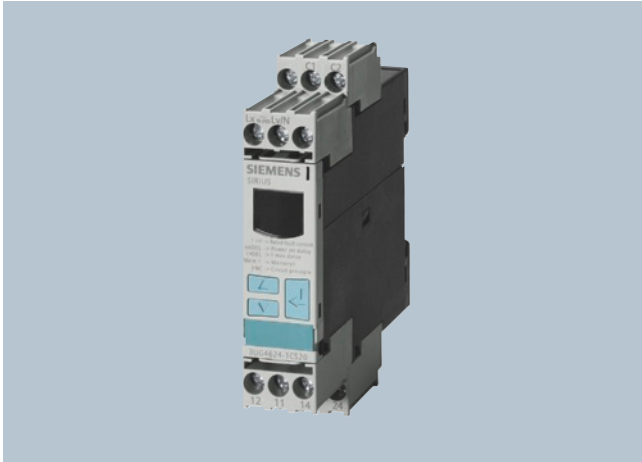
1) Computer labeling system for individual inscription of unit labeling plates available from:
murrplastik Systemtechnik GmbH.
<http://www.murrplastik.com>

Monitoring Relays

3UG Monitoring Relays for Electrical and Additional Measurements

Residual current monitoring: Residual-current monitoring relays

Overview



The 3UG46 24 residual current monitoring relay is used together with the 3UL22 summation current transformer for plant monitoring.

Application

- Plant monitoring

Selection and ordering data

- Relay for monitoring residual currents $I_{\Delta n}$ 0.3 ... 40 A
- For 3UL22 summation current transformers with feed-through opening 40 ... 120 mm
- Digital adjustable, with illuminated LCD
- Separately adjustable limit value and warning threshold
- Permanent display of actual value and tripping state
- 1 CO contact each for limit violation and warning threshold
- All terminals are removable
- Width 22.5 mm

Display range	Setting range	Hysteresis		ON/tripping delay time	Rated control supply voltage $U_s^{(2)}$	DT	Screw terminals		PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
		Limit value	Warning value				Price per PU	Order No.				
A	A	A	A	s	V	A						kg
10 ... 120 % of $I_{\Delta n}$	10 ... 100 % of $I_{\Delta n}$	LSB ¹⁾ up to 50 % of $I_{\Delta n}$	5 % of $I_{\Delta n}$	0.1 ... 20	90 ... 690	A	3UG46 24-1CS20		1	1 unit	101	0.147

Display range	Setting range	Hysteresis		ON/tripping delay time	Rated control supply voltage $U_s^{(2)}$	DT	Spring-type terminals		PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
		Limit value	Warning value				Price per PU	Order No.				
A	A	A	A	s	V	B						kg
10 ... 120 % of $I_{\Delta n}$	10 ... 100 % of $I_{\Delta n}$	LSB ¹⁾ up to 50 % of $I_{\Delta n}$	5 % of $I_{\Delta n}$	0.1 ... 20	90 ... 690	B	3UG46 24-2CS20		1	1 unit	101	0.130

For 3UL22 summation current transformers see page 7/50.

¹⁾ LSB: Smallest adjustable value, transformer-dependent, $\leq 1\%$ of $I_{\Delta n}$.



²⁾ Absolute limit values.

Monitoring Relays

3UG Monitoring Relays for Electrical and Additional Measurements

Residual current monitoring:
Residual-current monitoring relays

Accessories

Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg	
Blank labels								
Blank labels, 20 mm x 7 mm, pastel turquoise ¹⁾	C	3RT19 00-1SB20		100	340 units	101	0.200	
Push-in lugs and covers								
 3RP19 03		Push-in lugs For screw fixing, 2 units are required for each device	▶	3RP19 03	1	10 units	101	0.002
 3RP19 02		Sealable covers For securing against unauthorized adjustment of setting knobs	▶	3RP19 02	1	5 units	101	0.004

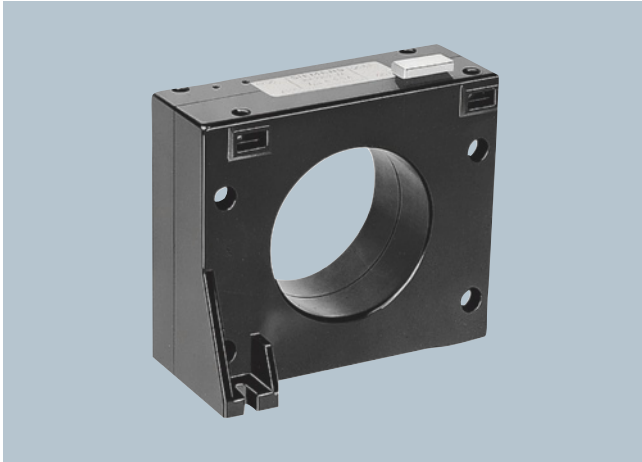
¹⁾ Computer labeling system for individual inscription of unit labeling plates available from:
murrplastik Systemtechnik GmbH.
<http://www.murrplastik.com>

Monitoring Relays

3UG Monitoring Relays for Electrical and Additional Measurements

Residual current monitoring: Summation current transformers

Overview



The 3UL22 summation current transformers sense fault currents in machines and plants. Together with the 3UG46 24 residual current monitoring relay or the SIMOCODE 3UF motor management and control device they enable residual-current and ground-fault monitoring.

Application

- Plant monitoring

Selection and ordering data

Feed-through opening diameter	Rated insulation voltage U_i	Rated fault current $I_{\Delta n}$	DT	Screw terminals	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
				Order No.				
mm	V	A						kg
Summation current transformers (essential accessory for 3UG46 24 or SIMOCODE 3UF)								
40	690	0.3	B	3UL22 01-1A	1	1 unit	101	0.571
		0.5	B	3UL22 01-2A	1	1 unit	101	0.408
		1	B	3UL22 01-3A	1	1 unit	101	0.324
65	690	0.3	B	3UL22 02-1A	1	1 unit	101	0.900
		0.5	B	3UL22 02-2A	1	1 unit	101	0.713
		1	B	3UL22 02-3A	1	1 unit	101	0.568
		6	C	3UL22 02-1B	1	1 unit	101	0.561
		10	C	3UL22 02-2B	1	1 unit	101	0.563
		16	C	3UL22 02-3B	1	1 unit	101	0.573
		25	C	3UL22 02-4B	1	1 unit	101	0.575
		40	C	3UL22 02-5B	1	1 unit	101	0.564
120	1000	0.3	B	3UL22 03-1A	1	1 unit	101	3.435
		0.5	B	3UL22 03-2A	1	1 unit	101	2.810
		1	B	3UL22 03-3A	1	1 unit	101	1.965
		6	C	3UL22 03-1B	1	1 unit	101	1.955
		10	C	3UL22 03-2B	1	1 unit	101	1.990
		16	C	3UL22 03-3B	1	1 unit	101	1.917
		25	C	3UL22 03-4B	1	1 unit	101	1.851
		40	C	3UL22 03-5B	1	1 unit	101	1.905



3UL22

3UG Monitoring Relays for Electrical and Additional Measurements

**Insulation monitoring
for ungrounded AC networks**

Overview



Relay for monitoring the insulation resistance between the ungrounded single or three-phase AC supply and a protective conductor

- Measuring principle with superimposed DC voltage
- Two selectable measuring ranges of 1 ... 110 kΩ
- Stepless setting within the measuring range
- Selectable:
 - Auto reset function with fixed hysteresis or
 - Storage of the tripping operation
- Test function with test button and terminal connections on the front
- Switching output: 1 CO contact
- Insulation fault indication with a red LED
- Supply voltage indication with a green LED
- Electro-magnetically compatible according to EN 61000-6-2 and -6-4

Application

The 3UG30 81 monitoring device is suitable for insulation monitoring of AC systems with one or three phases in ungrounded networks (IT networks).

Supply voltage

The 3UG30 81-1AK20 has alternative voltage terminals. Only one supply voltage is permitted to be connected to it! Terminals A1 and A2 are used to connect 230 V AC and terminals A1 and B2 are used to connect 115 V AC.

The 3UG30 81-1AW30 has a wide-range input of 24 ... 240 V AC/DC on terminals A1 and A2.

Selection and ordering data

Measuring range U_e	Rated control supply voltage U_s	DT	Screw terminals	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
kΩ	V		Order No.	Price per PU			kg

Insulation monitors for ungrounded AC networks



3UG30 81-1AK20

1 ... 110	115/230 AC	A	3UG30 81-1AK20		1	1 unit	101	0.327
	24 ... 240 AC/DC	B	3UG30 81-1AW30		1	1 unit	101	0.242

Accessories

Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
							kg

Covers

Sealable, transparent covers	C	3UG32 08-1A			1	1 unit	101	0.010
-------------------------------------	---	--------------------	--	--	---	--------	-----	-------

* You can order this quantity or a multiple thereof.

Monitoring Relays

3UG Monitoring Relays for Electrical and Additional Measurements

Insulation monitoring for ungrounded DC networks

Overview



Relay for monitoring the insulation resistance between ungrounded pure DC networks and a protective conductor

- Measuring principle for residual current measurement
- Response value can be adjusted steplessly from 10 ... 110 kΩ
- Selectable
 - Auto reset function with hysteresis or
 - Storage of the tripping operation
- Front selector switch for open-circuit and closed-circuit principle for the output relay
- Test function with test buttons on the front for L+ and L- and over terminal connections
- Switching output: 1 CO contact
- Insulation fault indicator for L+ and L- through two red LEDs
- Supply voltage indication with a green LED
- Electro-magnetically compatible according to EN 61000-6-2 and -6-4

Application

The 3UG30 82 monitoring relay has been designed for insulation monitoring in ungrounded, purely DC networks with or without filtering.

It is mainly used to monitor ungrounded DC voltage networks as well as to monitor battery-powered systems.

Supply voltage

Due to the electrical isolation of the supply voltage and the measuring circuit, the relay can be used for DC networks in which the auxiliary voltage is either supplied externally or where the network to be monitored also serves as the power supply.

Note:

If the monitoring relay is supplied with an external voltage, then the terminals A1 and L+ as well as A2 and L- must not be connected with each other!

Selection and ordering data

Measuring range U_e	Rated control supply voltage U_s	DT	Screw terminals	⊕	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
kΩ	V		Order No.	Price per PU				kg

Insulation monitors for ungrounded DC networks



3UG30 82-1AW30

10 ... 110	24 ... 240 AC/DC	B	3UG30 82-1AW30		1	1 unit	101	0.233
------------	------------------	---	-----------------------	--	---	--------	-----	-------

Accessories

Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
							kg

Covers

Sealable, transparent covers	C	3UG32 08-1A		1	1 unit	101	0.010
-------------------------------------	---	--------------------	--	---	--------	-----	-------

Monitoring Relays

3UG Monitoring Relays for Electrical and Additional Measurements

Level monitoring:
Level monitoring relays

Overview



The 3UG45 01 level monitoring relay is used together with 2- or 3-pole sensors to monitor the levels of conductive liquids.

Application

- Single-point and two-point level monitoring
- Overflow protection
- Dry run protection
- Leak monitoring

Selection and ordering data

- Level monitoring relay for conductive liquids
- Control principle: inlet or outlet control per rotary switch
- Single-point and two-point control possible
- Analog adjustable sensitivity (specific resistance of the liquid)
- Analog adjustable tripping delay time
- 1 yellow LED for indicating the relay state
- 1 green LED for indicating the applied control supply voltage
- 1 CO contact
- All terminals are removable
- Width 22.5 mm

Sensitivity	Tripping delay time	Rated control supply voltage U_s	DT	Screw terminals	⊕	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
k Ω	s	V AC/DC		Order No.	Price per PU				kg
2 ... 200	0.5 ... 10	24 ¹⁾ 24 ... 240	A	3UG45 01-1AA30		1	1 unit	101	0.110
			A	3UG45 01-1AW30		1	1 unit	101	0.120

Sensitivity	Tripping delay time	Rated control supply voltage U_s	DT	Spring-type terminals	∞	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
k Ω	s	V AC/DC		Order No.	Price per PU				kg
2 ... 200	0.5 ... 10	24 ¹⁾ 24 ... 240	A	3UG45 01-2AA30		1	1 unit	101	0.110
			A	3UG45 01-2AW30		1	1 unit	101	0.120

For level monitoring sensors see page 7/55.



¹⁾ The rated control supply voltage and the measuring circuit are not electrically isolated.

Monitoring Relays

3UG Monitoring Relays for Electrical and Additional Measurements

Level monitoring: Level monitoring relays

Accessories





Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg	
Blank labels								
Blank labels, 20 mm x 7 mm, pastel turquoise ¹⁾	C	3RT19 00-1SB20		100	340 units	101	0.200	
Push-in lugs and covers								
 P19 03 3R		Push-in lugs For screw fixing, 2 units are required for each device	▶	3RP19 03	1	10 units	101	0.002
 3RP19 02		Sealable covers For securing against unauthorized adjustment of setting knobs	▶	3RP19 02	1	5 units	101	0.004

¹⁾ Computer labeling system for individual inscription of unit labeling plates available from:
murrplastik Systemtechnik GmbH.
<http://www.murrplastik.com>

3UG Monitoring Relays for Electrical and Additional Measurements

Level monitoring:
Level monitoring sensors

Selection and ordering data

Version	Assignment		Application	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
	Cable	Electrode								
Level monitoring sensors (essential accessory)										
 3UG32 07-3A	Three-pole wire electrodes 500 mm long, with Teflon insulation (PTFE), screw-in gland width A/F 22, 3/8 inch thread, PVC connecting cable, 3 x 0.5 mm ² , 2 m long, max. operating temperature 90 °C, max. operating pressure 10 bar	Brown White Green	Center electrode Not assignable	The electrodes can be cut or bent to the required length before or after installation. The Teflon insulation must be removed over a length of approx. 5 mm. Applications: For 2-point liquid level control in an insulating tank. One electrode each for the min. and max. value and a common reference electrode.	▶	3UG32 07-3A	1	1 unit	101	0.254
 3UG32 07-2A	Two-pole wire electrodes 500 mm long, with Teflon insulation (PTFE), screw-in gland width A/F 22, 3/8 inch thread, PVC connecting cable, 3 x 0.5 mm ² , 2 m long, max. operating temperature 90 °C, max. operating pressure 10 bar	Brown White	Not assignable	For installation see 3UG32 07-3A Application: For alarm indication in the event of overflow or low level and for 2-point liquid level control, when the conductive tank is used as the reference electrode.	▶	3UG32 07-2A	1	1 unit	101	0.230
 3UG32 07-2B	Two-pole bow electrodes with Teflon insulation (PTFE), screw-in gland width A/F 22, 3/8 inch thread, PVC connecting cable, 3 x 0.5 mm ² , 2 m long, max. operating temperature 90 °C, max. operating pressure 10 bar	Brown White Green	Gland Not assignable	Thanks to the small space requirements due to lateral fitting, ideal for use in small containers and pipes, as a leak monitor and level monitor or for warning of water entering an enclosure.	▶	3UG32 07-2B	1	1 unit	101	0.128
 3UG32 07-1B	Single-pole bow electrodes for lateral fitting with Teflon insulation (PTFE), screw-in gland width A/F 22, 3/8 inch thread, PVC connecting cable, 3 x 0.5 mm ² , 2 m long, max. operating temperature 90 °C, max. operating pressure 10 bar	Brown White	Gland Electrode	As a max. value electrode for lateral fitting or for alarm indication in conductive tanks or pipes.	▶	3UG32 07-1B	1	1 unit	101	0.122
 3UG32 07-1C	Single-pole rod electrodes for lateral fitting with Teflon insulation (PTFE), screw-in gland width A/F 22, 3/8 inch thread, PVC connecting cable, 3 x 0.5 mm ² , 2 m long, max. operating temperature 90 °C, max. operating pressure 10 bar	Brown White	Gland Electrode	For high flow velocities or for intensively sparkling fluids.	C	3UG32 07-1C	1	1 unit	101	0.144

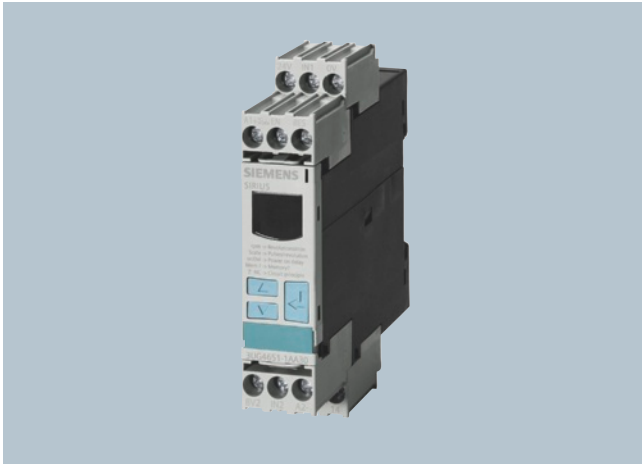
* You can order this quantity or a multiple thereof.

Monitoring Relays

3UG Monitoring Relays for Electrical and Additional Measurements

Speed monitoring

Overview



The 3UG46 51 monitoring relay is used together with a sensor to monitor drives for overspeed and/or underspeed.

Furthermore, this 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).


Application


- Slip or tear of a belt drive
- Overload monitoring
- Transport monitoring for completeness

Selection and ordering data

- Relay for speed monitoring in min^{-1} (rpm)
- Two- or three-wire sensor with mechanical or electronic switching output can be connected
- Two-wire NAMUR sensor can be connected
- Integrated sensor supply 24 V DC/50 mA
- Input frequency 0.1 ... 2200 pulses min^{-1} (0.0017 ... 36.7 Hz)
- With or without enable signal for the drive to be monitored

- Digital adjustable, with illuminated LCD
- Overshoot, undershoot or range monitoring
- 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
- All terminals are removable
- Width 22.5 mm

Measuring range	Hysteresis	ON-delay time	Tripping delay time	Pulses per revolution	Rated control supply voltage U_s AC/DC	DT	Screw terminals 	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.	
rpm	rpm	s	s		V		Order No.	Price per PU			kg	
0.1 ... 2200	OFF, 0.1 ... 99.9	0 ... 900	0.1 ... 99.9	1 ... 10	24 ¹⁾ 24 ... 240	A	3UG46 51-1AA30 3UG46 51-1AW30		1 1	1 unit 1 unit	101 101	0.120 0.130

Measuring range	Hysteresis	ON-delay time	Tripping delay time	Pulses per revolution	Rated control supply voltage U_s AC/DC	DT	Spring-type terminals 	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.	
rpm	rpm	s	s		V		Order No.	Price per PU			kg	
0.1 ... 2200	OFF, 0.1 ... 99.9	0 ... 900	0.1 ... 99.9	1 ... 10	24 ¹⁾ 24 ... 240	A	3UG46 51-2AA30 3UG46 51-2AW30		1 1	1 unit 1 unit	101 101	0.120 0.130



¹⁾ The rated control supply voltage and the measuring circuit are not electrically isolated.

Monitoring Relays

3UG Monitoring Relays for Electrical and Additional Measurements

Speed monitoring

Accessories

Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
Blank labels							
Blank labels, 20 mm x 7 mm, pastel turquoise ¹⁾	C	3RT19 00-1SB20		100	340 units	101	0.200
Push-in lugs and covers							
 3RP19 03		3RP19 03		1	10 units	101	0.002
 3RP19 02		3RP19 02		1	5 units	101	0.004

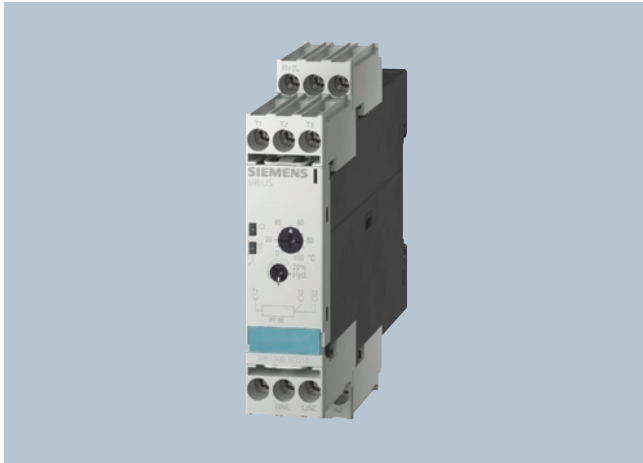
¹⁾ Computer labeling system for individual inscription of unit labeling plates available from:
murrplastik Systemtechnik GmbH.
<http://www.murrplastik.com>

Monitoring Relays

3RS10, 3RS11 Temperature Monitoring Relays

Relays, analogically adjustable, for 1 sensor

Overview



The 3RS10/3RS11 analog temperature monitoring relays can be used for measuring temperatures in solid, liquid and gas media. The temperature is detected by the sensors in the medium, evaluated by the device and monitored for overshoot or undershoot. When the threshold values are reached, the output relay switches on or off depending on the parameterization.

Benefits

- All devices except for 24 V AC/DC feature electrical isolation
- Extremely easy operation using a rotary potentiometer
- Variable hysteresis
- Adjustable working principle for devices with 2 threshold values
- All versions with removable terminals
- All versions with screw terminals, many versions alternatively with spring-type connections

Application

The analogically adjustable SIRIUS 3RS10/3RS11 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:

- 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






Monitoring Relays

3RS10, 3RS11 Temperature Monitoring Relays

Relays, analogically adjustable, for 1 sensor

Selection and ordering data

- Temperature monitoring relays with resistance sensors or thermoelements
- Temperature range -55 °C ... +1000 °C, depending on sensor type
- Wide-range voltage versions are electrically isolated.
- Analog adjustable, setting accuracy ±5 %
- Versions with 2 separately adjustable threshold values and adjustable open/closed-circuit principle
- Hysteresis for threshold value 1 is adjustable (2 ... 20 %), hysteresis for threshold 2 is non-adjustable (5 %)
- 1 NC + 1 NO for versions with one threshold value
- 1 CO for threshold value 1 and 1 NO for threshold value 2
- All terminals are removable
- Width 22.5 mm

Sensor	Function	Measuring range	Rated control supply voltage U_s AC 50/60 Hz	DT	Screw terminals 	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.	
		°C	V		Order No.	Price per PU	kg			
Analogically adjustable, 1 threshold value, width 22.5 mm; closed-circuit principle; without memory; 1 NO + 1 NC										
	PT100 (resistance sensor)	Overshoot	- 50 ... + 50	24 AC/DC 110/230 AC	C	3RS10 00-1CD00	1	1 unit	101	0.150
			0 ... + 100	24 AC/DC 110/230 AC	A	3RS10 00-1CK00	1	1 unit	101	0.190
		Under-shoot	0 ... + 100	24 AC/DC 110/230 AC	C	3RS10 00-1CD10	1	1 unit	101	0.145
			0 ... + 200	24 AC/DC 110/230 AC	A	3RS10 00-1CK10	1	1 unit	101	0.189
			0 ... + 100	24 AC/DC 110/230 AC	C	3RS10 00-1CD20	1	1 unit	101	0.145
			0 ... + 200	24 AC/DC 110/230 AC	A	3RS10 00-1CK20	1	1 unit	101	0.186
	Type J (thermo-element)	Overshoot	- 50 ... + 50	24 AC/DC 110/230 AC	C	3RS10 10-1CD00	1	1 unit	101	0.150
			0 ... + 100	24 AC/DC 110/230 AC	A	3RS10 10-1CK00	1	1 unit	101	0.186
		Under-shoot	0 ... + 100	24 AC/DC 110/230 AC	C	3RS10 10-1CD10	1	1 unit	101	0.150
			0 ... + 200	24 AC/DC 110/230 AC	C	3RS10 10-1CK10	1	1 unit	101	0.190
			0 ... + 100	24 AC/DC 110/230 AC	C	3RS10 10-1CD20	1	1 unit	101	0.150
			0 ... + 200	24 AC/DC 110/230 AC	C	3RS10 10-1CK20	1	1 unit	101	0.191
	Type K (thermo-element)	Overshoot	0 ... + 200	24 AC/DC 110/230 AC	A	3RS11 00-1CD20	1	1 unit	101	0.150
			0 ... + 600	24 AC/DC 110/230 AC	C	3RS11 00-1CK20	1	1 unit	101	0.190
		Under-shoot	0 ... + 200	24 AC/DC 110/230 AC	C	3RS11 00-1CD30	1	1 unit	101	0.149
			0 ... + 600	24 AC/DC 110/230 AC	C	3RS11 00-1CK30	1	1 unit	101	0.190
			0 ... + 200	24 AC/DC 110/230 AC	C	3RS11 01-1CD20	1	1 unit	101	0.150
			+ 500 ... + 1000	24 AC/DC 110/230 AC	C	3RS11 01-1CK40	1	1 unit	101	0.190
Analogically adjustable for warning and disconnection (2 threshold values), 22.5 mm width, open/closed-circuit principle switchable; without memory; 1 NO + 1 CO										
	PT100 (resistance sensor)	Overshoot	- 50 ... + 50	24 AC/DC 24 ... 240 AC/DC	C	3RS10 20-1DD00	1	1 unit	101	0.166
			0 ... + 100	24 AC/DC 24 ... 240 AC/DC	C	3RS10 20-1DW00	1	1 unit	101	0.175
		Under-shoot	0 ... + 100	24 AC/DC 24 ... 240 AC/DC	C	3RS10 20-1DD10	1	1 unit	101	0.164
			0 ... + 200	24 AC/DC 24 ... 240 AC/DC	C	3RS10 20-1DW10	1	1 unit	101	0.175
			0 ... + 100	24 AC/DC 24 ... 240 AC/DC	A	3RS10 20-1DD20	1	1 unit	101	0.166
			0 ... + 200	24 AC/DC 24 ... 240 AC/DC	A	3RS10 20-1DW20	1	1 unit	101	0.175
	Type J (thermo-element)	Overshoot	-50 ... + 50	24 AC/DC 24 ... 240 AC/DC	C	3RS10 30-1DD00	1	1 unit	101	0.165
			0 ... + 100	24 AC/DC 24 ... 240 AC/DC	C	3RS10 30-1DW00	1	1 unit	101	0.174
		Under-shoot	0 ... + 100	24 AC/DC 24 ... 240 AC/DC	C	3RS10 30-1DD10	1	1 unit	101	0.166
			0 ... + 200	24 AC/DC 24 ... 240 AC/DC	C	3RS10 30-1DW10	1	1 unit	101	0.175
			0 ... + 100	24 AC/DC 24 ... 240 AC/DC	C	3RS10 30-1DD20	1	1 unit	101	0.163
			0 ... + 200	24 AC/DC 24 ... 240 AC/DC	C	3RS10 30-1DW20	1	1 unit	101	0.173
	Type K (thermo-element)	Overshoot	0 ... + 200	24 AC/DC 24 ... 240 AC/DC	C	3RS11 20-1DD20	1	1 unit	101	0.165
			0 ... + 600	24 AC/DC 24 ... 240 AC/DC	C	3RS11 20-1DW20	1	1 unit	101	0.175
		Under-shoot	0 ... + 200	24 AC/DC 24 ... 240 AC/DC	C	3RS11 20-1DD30	1	1 unit	101	0.167
			0 ... + 600	24 AC/DC 24 ... 240 AC/DC	C	3RS11 20-1DW30	1	1 unit	101	0.175
			0 ... + 200	24 AC/DC 24 ... 240 AC/DC	C	3RS11 21-1DW20	1	1 unit	101	0.179
			+ 500 ... + 1000	24 AC/DC	C	3RS11 21-1DD40	1	1 unit	101	0.167



* You can order this quantity or a multiple thereof.

Monitoring Relays



3RS10, 3RS11 Temperature Monitoring Relays

Relays, analogically adjustable, for 1 sensor

- Temperature monitoring relays with resistance sensors or thermoelements
- Temperature range -55 °C ... +1000 °C, depending on sensor type
- Wide-range voltage versions are electrically isolated.
- Analog adjustable, setting accuracy $\pm 5\%$
- Versions with 2 separately adjustable threshold values and adjustable open/closed-circuit principle
- Hysteresis for threshold value 1 is adjustable (2 ... 20 %), hysteresis for threshold 2 is non-adjustable (5 %)
- 1 NC + 1 NO for versions with one threshold value
- 1 CO for threshold value 1 and 1 NO for threshold value 2
- All terminals are removable
- Width 22.5 mm

Sensor	Function	Measuring range	Rated control supply voltage U_s AC 50/60 Hz	DT	Spring-type terminals	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.	
		°C	V		Order No.	Price per PU			kg	
Analogically adjustable, 1 threshold value, width 22.5 mm; closed-circuit principle; without memory; 1 NO + 1 NC										
 3RS10 00-2CD10	PT100 (resistance sensor)	Overshoot	- 50 ... + 50	24 AC/DC 110/230 AC	C	3RS10 00-2CD00	1	1 unit	101	0.125
			0 ... + 100	24 AC/DC 110/230 AC	C	3RS10 00-2CK00	1	1 unit	101	0.163
			0 ... + 200	24 AC/DC 110/230 AC	C	3RS10 00-2CD10 3RS10 00-2CK10	1	1 unit	101	0.125 0.165
					C	3RS10 00-2CD20 3RS10 00-2CK20	1	1 unit	101	0.121 0.165
	Type J (thermo-element)	Overshoot	0 ... + 200	24 AC/DC	C	3RS11 00-2CD20	1	1 unit	101	0.125
Analogically adjustable for warning and disconnection (2 threshold values), 22.5 mm width, open/closed-circuit principle switchable; without memory; 1 NO + 1 CO										
 3RS11 20-2DD20	PT100 (resistance sensor)	Overshoot	0 ... + 200	24 ... 240 AC/DC	C	3RS10 20-2DW20	1	1 unit	101	0.153
		Undershoot	0 ... + 200	24 AC/DC	C	3RS10 30-2DD20	1	1 unit	101	0.145
	Type J (thermo-element)	Overshoot	0 ... + 200	24 AC/DC	C	3RS11 20-2DD20	1	1 unit	101	0.140

Accessories

Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.	
							kg	
Blank labels								
Blank labels, 20 mm x 7 mm, pastel turquoise ¹⁾	C	3RT19 00-1SB20		100	340 units	101	0.200	
Push-in lugs and covers								
 3RP19 03		Push-in lugs For screw fixing, 2 units are required for each device	▶	3RP19 03	1	10 units	101	0.002
 3RP19 02		Sealable covers For securing against unauthorized adjustment of setting knobs	▶	3RP19 02	1	5 units	101	0.004

¹⁾ Computer labeling system for individual inscription of unit labeling plates available from:
murrplastik Systemtechnik GmbH.
<http://www.murrplastik.com>

Monitoring Relays

3RS10, 3RS11 Temperature Monitoring Relays

Relays, digitally adjustable, for 1 sensor

Overview



The 3RS10/3RS11 temperature monitoring relays can be used for measuring temperatures in solid, liquid and gas media. The temperature is detected by the sensor in the medium, evaluated by the device and monitored for overshoot or undershoot or for staying within an operating range (window function).

The relays are also an excellent alternative to temperature controllers in the low-end performance range (two- or three-point closed-loop control).

Benefits

- Very simple operation without complicated menu selections
- two- or three-point closed-loop control can be configured quickly
- All versions with removable terminals
- All versions with screw terminals or alternatively with spring-type terminals

Application

The 3RS10 40, 3RS10 42, 3RS11 40, 3RS11 42, 3RS20 40 and 3RS21 40 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:

- Plant and environment protection
- Temperature limits for process variables e. g. in the packaging industry or electroplating
- Temperature limits for district heating plants
- Exhaust temperature monitoring
- 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

Monitoring Relays

3RS10, 3RS11 Temperature Monitoring Relays

Relays, digitally adjustable, for 1 sensor

Selection and ordering data

- Temperature monitoring relays with resistance sensors or thermoelements
- Temperature range -99 ... +1800 °C, depending on sensor type
- Wide-range voltage versions are electrically isolated.
- Non-volatile
- Short-circuit and open-circuit detection in sensor circuit
- Digital adjustable, with illuminated LCD
- Overshoot, undershoot or window monitoring
- Exact sensor type can be set
- 2 separately adjustable threshold values
- 1 hysteresis applies to both thresholds (0 ... 99 K)
- 1 delay time applies to both thresholds (0 ... 999 s)
- Adjustable open/closed-circuit principle
- Adjustable manual/remote reset
- Permanent display of actual value in °C or °F and tripping state
- 1 CO contact each per threshold value
- 1 NO for sensor monitoring
- All terminals are removable
- Width 45 mm

Sensor	Measuring range (measuring range limit depends on the sensor)	Rated control supply voltage U_s AC 50/60 Hz	DT	Screw terminals	⊕	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
				Order No.	Price per PU				kg

**Temperature monitoring relays, digitally adjustable,
2 threshold values, width 45 mm; 1 CO + 1 CO + 1 NO,
memory function possible with external jumper,
device parameters are non-volatile**



3RS10 40-1GD50

PT100/1000; KTY83/84; NTC (resistance sensors) ¹⁾	- 50 ... + 500 °C	24 AC/DC	A	3RS10 40-1GD50		1	1 unit	101	0.317
		24 ... 240 AC/DC	A	3RS10 40-1GW50		1	1 unit	101	0.329
	- 58 ... + 932 °F	24 AC/DC	C	3RS20 40-1GD50		1	1 unit	101	0.189
		24 ... 240 AC/DC	C	3RS20 40-1GW50		1	1 unit	101	0.186
TYPE J, K, T, E, N (thermoelement)	-99 ... 999 °C	24 AC/DC	A	3RS11 40-1GD60		1	1 unit	101	0.318
		24 ... 240 AC/DC	A	3RS11 40-1GW60		1	1 unit	101	0.329
	-99 ... 1830 °F	24 AC/DC	C	3RS21 40-1GD60		1	1 unit	101	0.317
		24 ... 240 AC/DC	C	3RS21 40-1GW60		1	1 unit	101	0.317

**Temperature monitoring relays, digitally adjustable,
2 threshold values, width 45 mm; 1 CO + 1 CO + 1 NO,
tripping state and device parameters are non-volatile**

PT100/1000; KTY83/84; NTC (resistance sensors) ¹⁾	- 50 ... + 750 °C	24 AC/DC	A	3RS10 42-1GD70		1	1 unit	101	0.317
		24 ... 240 AC/DC	A	3RS10 42-1GW70		1	1 unit	101	0.331
TYPE J, K, T, E, N, R, S, B (ther- moelement)	- 99 ... + 1800 °C	24 AC/DC	C	3RS11 42-1GD80		1	1 unit	101	0.318
		24 ... 240 AC/DC	A	3RS11 42-1GW80		1	1 unit	101	0.329

¹⁾ NTC type: B57227-K333-A1 (100 °C: 1.8 kΩ; 25 °C: 32.762 kΩ).


Monitoring Relays

3RS10, 3RS11 Temperature Monitoring Relays

Relays, digitally adjustable, for 1 sensor

- Temperature monitoring relays with resistance sensors or thermoelements
- Temperature range -99 ... +1800 °C, depending on sensor type
- Wide-range voltage versions are electrically isolated.
- Non-volatile
- Short-circuit and open-circuit detection in sensor circuit
- Digital adjustable, with illuminated LCD
- Overshoot, undershoot or window monitoring
- Exact sensor type can be set

- 2 separately adjustable threshold values
- 1 hysteresis applies to both thresholds (0 ... 99 K)
- 1 delay time applies to both thresholds (0 ... 999 s)
- Adjustable open/closed-circuit principle
- Adjustable manual/remote reset
- Permanent display of actual value in °C or °F and tripping state
- 1 CO contact each per threshold value
- 1 NO for sensor monitoring
- All terminals are removable
- Width 45 mm

Sensor	Measuring range (measuring range limit depends on the sensor)	Rated control supply voltage U_s AC 50/60 Hz	DT	Spring-type terminals	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
		V			Order No.	Price per PU		kg

Temperature monitoring relays, digitally adjustable, 2 threshold values, width 45 mm; 1 CO + 1 CO + 1 NO, memory function possible with external jumper, device parameters are non-volatile



3RS10 40-2GW50

PT100/1000; KTY83/84; NTC (resistance sensors) ¹⁾	- 50 ... + 500 °C	24 AC/DC	A	3RS10 40-2GD50	1	1 unit	101	0.267
		24 ... 240 AC/DC	A	3RS10 40-2GW50	1	1 unit	101	0.281
	- 58 ... + 932 °F	24 AC/DC	C	3RS20 40-2GD50	1	1 unit	101	0.100
		24 ... 240 AC/DC	C	3RS20 40-2GW50	1	1 unit	101	0.100
TYPE J, K, T, E, N (thermoelement)	-99 ... 999 °C	24 AC/DC	C	3RS11 40-2GD60	1	1 unit	101	0.269
		24 ... 240 AC/DC	C	3RS11 40-2GW60	1	1 unit	101	0.300
	-99 ... 1830 °F	24 AC/DC	C	3RS21 40-2GD60	1	1 unit	101	0.100
		24 ... 240 AC/DC	C	3RS21 40-2GW60	1	1 unit	101	0.100

Temperature monitoring relays, digitally adjustable, 3 threshold values, width 45 mm; 1 CO + 1 CO + 1 NO, tripping state and device parameters are non-volatile

PT100/1000; KTY83/84; NTC (resistance sensors) ¹⁾	-50 ... +750 °C	24 AC/DC	C	3RS10 42-2GD70	1	1 unit	101	0.267
		24 ... 240 AC/DC	C	3RS10 42-2GW70	1	1 unit	101	0.281
TYPE J, K, T, E, N, R, S, B (thermoelement)	-99 ... +1800 °C	24 AC/DC	C	3RS11 42-2GD80	1	1 unit	101	0.269
		24 ... 240 AC/DC	C	3RS11 42-2GW80	1	1 unit	101	0.300

¹⁾ NTC type: B57227-K333-A1 (100 °C: 1.8 kΩ; 25 °C: 32.762 kΩ).

Accessories

Design	Language used for labels	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
								kg

Blank labels

Blank labels, 20 x 7 mm, pastel turquoise ¹⁾		C	3RT19 00-1SB20		100	340 units	101	0.200
--	--	---	-----------------------	--	-----	-----------	-----	-------

Replaceable cover labels for digital devices

Replaceable cover labels for digital devices	German	B	3RS19 01-1A		1	5 units	101	0.005
	English	B	3RS19 01-1C		1	5 units	101	0.005

Push-in lugs



Push-in lugs
for screw fixing,
2 units are required for each device

3RP19 03

			3RP19 03		1	10 units	101	0.002
--	--	--	-----------------	--	---	----------	-----	-------

Matching sensors can be found on the Internet at
<http://www.siemens.com/temperature>

¹⁾ Computer labeling system for individual inscription of unit labeling plates
available from:
murrplastik Systemtechnik GmbH.
<http://www.murrplastik.com>

Monitoring Relays

3RS10, 3RS11 Temperature Monitoring Relays

Relays, digitally adjustable for up to 3 sensors

Overview



The 3RS10 41 temperature monitoring relays can be used for measuring temperatures in solid, liquid and gas media. The temperature is sensed by the sensor in the medium, evaluated by the device and monitored for overshoot or undershoot or for staying within an operating range (window function). The evaluation unit can evaluate up to 3 resistance sensors at the same time and is specially designed for monitoring motor windings and bearings.

Benefits

- Very simple operation without complicated menu selections
- Space-saving with 45 mm width
- All devices are available alternatively with spring-type terminals
- Two- or three-point closed-loop control can be configured quickly
- All versions with removable terminals
- All versions with screw terminals or alternatively with innovative spring-type terminals

Application

The 3RS10 41 temperature monitoring relays can be used in almost any application in which several temperatures have to be monitored simultaneously for overshoot or undershoot or within a range.

Monitoring of set temperature limits and output of alarm messages for:

- Plant and environment protection
- 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


Monitoring Relays

3RS10, 3RS11 Temperature Monitoring Relays

Relays, digitally adjustable for up to 3 sensors

Selection and ordering data

- Relay for monitoring the temperatures of solids, liquids, and gases
- For two- and three-conductor resistance sensors or thermoelements
- Temperature range -99 ... +1800 °C, depending on sensor type
- Wide-range voltage versions are electrically isolated.
- Non-volatile
- Short-circuit and open-circuit detection in sensor circuit
- Digital adjustable, with illuminated LCD
- Overshoot, undershoot or window monitoring
- Exact sensor type and number of sensors can be set
- 2 separately adjustable threshold values
- 1 hysteresis; applies to both thresholds (0 ... 99 K)
- 1 delay time; applies to both thresholds (0 ... 999 s)
- Adjustable open/closed-circuit principle
- With connectable and disconnectable error memory
- Permanent display of actual value in °C or °F and tripping state
- 1 CO contact each per threshold value
- 1 NO for sensor monitoring
- All terminals are removable
- Width 45 mm

Sensor	Number of sensors	Measuring range	Rated control supply voltage U_s	DT	Screw terminals 	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
		°C	V		Order No.	Price per PU			kg


Motor monitoring relays, digitally adjustable for 3 sensors, width 45 mm; 1 CO + 1 NO



PT100/1000; KTY83/84; NTC (resistance sensors) ¹⁾	1 ... 3 sensors	-50 ... +500	24 ... 240 AC/DC	A	3RS10 41-1GW50		1	1 unit	101	0.333
--	-----------------	--------------	------------------	---	-----------------------	--	---	--------	-----	-------

3RS10 41-1GW50

¹⁾ NTC type: B57227-K333-A1 (100 °C: 1.8 kΩ; 25 °C: 32.762 kΩ).

Sensor	Number of sensors	Measuring range	Rated control supply voltage U_s	DT	Spring-type terminals 	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
		°C	V		Order No.	Price per PU			kg

Motor monitoring relays, digitally adjustable for 3 sensors, width 45 mm; 1 CO + 1 CO + 1 NO

PT100/1000; KTY83/84; NTC (resistance sensors) ¹⁾	1 ... 3 sensors	-50 ... +500	24 ... 240 AC/DC	A	3RS10 41-2GW50		1	1 unit	101	0.283
--	-----------------	--------------	------------------	---	-----------------------	--	---	--------	-----	-------

¹⁾ NTC type: B57227-K333-A1 (100 °C: 1.8 kΩ; 25 °C: 32.762 kΩ).

Accessories

Design	Language used for labels	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
								kg

Blank labels

Blank labels, 20 x 7 mm, pastel turquoise ¹⁾		C	3RT19 00-1SB20		100	340 units	101	0.200
---	--	---	-----------------------	--	-----	-----------	-----	-------

Replaceable cover labels for digital devices

Replaceable cover labels for digital devices	German	B	3RS19 01-1B		1	5 units	101	0.005
	English	B	3RS19 01-1D		1	5 units	101	0.005

Push-in lugs



Push-in lugs for screw fixing, 2 units are required for each device		▶	3RP19 03		1	10 units	101	0.002
---	--	---	-----------------	--	---	----------	-----	-------

3RP19 03

Matching sensors can be found on the Internet at <http://www.siemens.com/temperature>

¹⁾ Computer labeling system for individual inscription of unit labeling plates available from:
murrplastik Systemtechnik GmbH
<http://www.murrplastik.com>

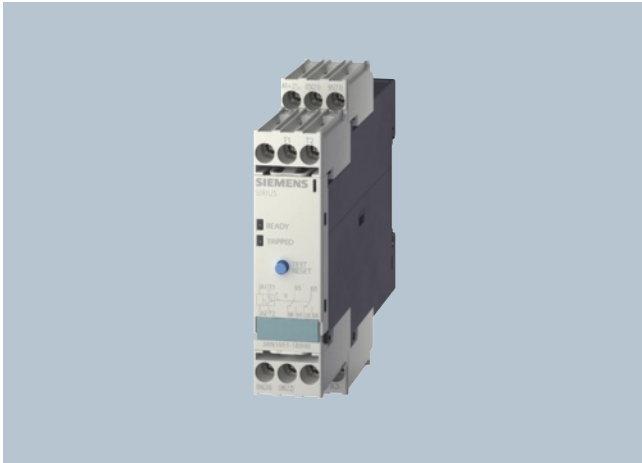
* You can order this quantity or a multiple thereof.

Monitoring Relays

3RN1 Thermistor Motor Protection

For PTC sensors

Overview



Thermistor motor protection devices are used for direct monitoring of the motor winding temperature. For this purpose, the motors are equipped with temperature-dependent resistors (PTC) that are directly installed in the motor winding and abruptly change their resistance at their limit temperature.

Benefits

- Thanks to direct motor protection, overdimensioning of the motors is not necessary
- No settings on the device are necessary
- Solid-state compatible output thanks to versions with hard gold-plated contacts
- Rapid error diagnosis thanks to versions that indicate open and short-circuit in the sensor circuit
- All versions with removable terminals
- All versions with screw terminals or alternatively with innovative spring-type terminals

Application

Direct motor protection through temperature monitoring of the motor winding offers 100 % motor protection even under the most difficult ambient conditions, without the need to make adjustments on the device. Versions with hard gold-plated contacts ensure, in addition, a high switching reliability that is even higher than an electronic control.

Motor protection:

- At increased ambient temperatures
- For high switching frequency
- For long start-up and braking procedures
- Used together with frequency converters (low speeds)

ATEX approval for operation in areas subject to explosion hazard

The SIRIUS 3RN1 thermistor motor protection relay for PTC sensors is certified according to ATEX Ex II (2) G and GD for gases and dust.

See "Appendix" --> "Standards and approvals" --> "Type overview of approved devices for explosion-protected areas (ATEX Explosion Protection)".

Motor protection using current- and temperature-dependent protective devices

EN 60204 and IEC 60204 stipulate that motors must be protected from overheating at a rating of 0.5 kW and higher. The protection can take the form of overload protection, overtemperature protection or current limiting.

For motors with frequent starting and braking and in environments where cooling may be impaired (e. g. by dust), it is recommended to use the overtemperature protection option in the form of a protective device coordinated with this mode of operation. A good choice in this case is the use of 3RN1 thermistor motor protection devices.

On rotor-critical motors, overtemperature detection in the stator windings can lead to delayed and hence inadequate protection. In this case the standards stipulate additional protection, e. g. by means of an overload relay.

This combination of thermistor motor protection and an overload relay is recommended for full motor protection in case of frequent starting and braking of motors, irregular intermittent duty or excessive switching frequency. To prevent premature tripping of the overload relay in such operating conditions, a higher setting than that normally required for the operational current is chosen. The overload relay then performs the stall protection, and the 3RN1 thermistor motor protection device monitors the temperature of the motor windings.

Application	Motor protection		
	Only current-dependent, e. g. with overload relay	Only temperature-dependent, e. g. with thermistor motor protection relay	Current- and temperature-dependent
Motor protection in case of			
Overloading in uninterrupted duty	✓	✓	✓
Long start-up and braking operations	○	✓	✓
Irregular intermittent duty	○	✓	✓
Excessively high switching frequency	○	✓	✓
Single-phase operation and current unbalance	✓	✓	✓
Voltage and frequency fluctuations	✓	✓	✓
Stalling of the rotor	✓	✓	✓
Switching on a stalled rotor of a stator-critical motor	✓	✓	✓
Switching on a stalled rotor of a rotor-critical motor	✓	○	✓
Elevated ambient temperature	--	✓	✓
Impeded cooling	--	✓	✓

- ✓ Full protection
- Conditional protection
- No protection


Monitoring Relays

3RN1 Thermistor Motor Protection

For PTC sensors

Selection and ordering data



- Thermistor motor protection relays monitor the motor winding temperature using temperature-dependent resistors (PTCs, type A) that are directly installed in the motor winding by the manufacturer.
- Monostable versions with closed-circuit principle, i. e. relays respond in the event of control supply voltage failure
- 3RN10 13-.BW01: Bistable version, does not trigger in the event of control supply voltage failure
- All devices have PTB01 ATEX approval for dust or gas
See "Appendix" --> "Standards and approvals" --> "Type overview of approved devices for potentially explosive areas (ATEX explosion protection)".
- All devices except for 24 V AC/DC feature electrical isolation
- Versions with safe isolation up to 300 V according to EN 61140
- Non-volatile versions
- Versions with short-circuit and open-circuit detection in sensor circuit
- Versions with solid-state compatible contacts with hard gold-plating
- Versions for up to 6 sensor circuits
- Versions with manual, remote, autoreset and test button
- Terminal labeling according to DIN 50005
- All terminals are removable
- Width 22.5 mm (45 mm on version for several sensor circuits)

RESET	Contacts	Rated control supply voltage U_s 50/60 Hz	DT	Screw terminals 	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
		V		Order No.	Price per PU			kg

Compact signal evaluation units, width 22.5 mm, 1 LED

Terminal A1 is jumpered with the root of the CO contact								
Auto	1 CO	24 AC/DC	▶	3RN10 00-1AB00	1	1 unit	101	0.114
		110 AC	A	3RN10 00-1AG00	1	1 unit	101	0.157
		230 AC	▶	3RN10 00-1AM00	1	1 unit	101	0.156

Standard evaluation units, width 22.5 mm, 2 LEDs

	Auto	1 NO + 1 NC	▶	3RN10 10-1CB00	1	1 unit	101	0.134
			▶	3RN10 10-1CG00	1	1 unit	101	0.174
			▶	3RN10 10-1CM00	1	1 unit	101	0.175
			▶	3RN10 10-1CW00	1	1 unit	101	0.146
		24 ... 240 AC/DC						
		2 CO	A	3RN10 10-1BB00	1	1 unit	101	0.162
		110 AC	A	3RN10 10-1BG00	1	1 unit	101	0.213
		230 AC	A	3RN10 10-1BM00	1	1 unit	101	0.213
		2 CO, gold-plated	A	3RN10 10-1GB00	1	1 unit	101	0.154
3RN10 11-1BB00	Manual/Remote ¹⁾	1 NO + 1 NC	▶	3RN10 11-1CB00	1	1 unit	101	0.147
		110/230 AC	▶	3RN10 11-1CK00	1	1 unit	101	0.188
		Short-circuit detection in sensor circuit						
	Manual/Remote ¹⁾	2 CO	A	3RN10 11-1BB00	1	1 unit	101	0.163
			A	3RN10 11-1BG00	1	1 unit	101	0.214
			A	3RN10 11-1BM00	1	1 unit	101	0.212
		2 CO, gold-plated	A	3RN10 11-1GB00	1	1 unit	101	0.165
		24 AC/DC						
		Non-volatile ²⁾						
Manual/Remote	1 NO + 1 NC	24 AC/DC	▶	3RN10 12-1CB00	1	1 unit	101	0.148
Auto/Remote		110/230 AC	▶	3RN10 12-1CK00	1	1 unit	101	0.188
3RN10 13-1BB00	Non-volatile ²⁾ , short-circuit detection in sensor circuit							
Manual/Remote	2 CO	24 AC/DC	A	3RN10 12-1BB00	1	1 unit	101	0.164
Auto/Remote		110 AC	A	3RN10 12-1BG00	1	1 unit	101	0.214
		230 AC	A	3RN10 12-1BM00	1	1 unit	101	0.216
		2 CO, gold-plated	A	3RN10 12-1GB00	1	1 unit	101	0.155
		24 AC/DC						
		Non-volatile ²⁾ , short-circuit and open-circuit detection and indication in sensor circuit; wide-range voltage with screw terminal with safe isolation						
Manual/Remote	2 CO	24 AC/DC	▶	3RN10 13-1BB00	1	1 unit	101	0.160
Auto/Remote		24 ... 240 AC/DC	▶	3RN10 13-1BW10	1	1 unit	101	0.172
		24 ... 240 AC/DC	A	3RN10 13-1GW10	1	1 unit	101	0.168

Evaluation units for 2 sensor circuits, warning and disconnection, width 22.5 mm, 3 LEDs

Test/RESET button, non-volatile ²⁾								
Manual/Remote	1 NO + 1 CO	24 ... 240 AC/DC	▶	3RN10 22-1DW00	1	1 unit	101	0.173

Evaluation units for 6 sensor circuits, multiple motor protection, width 45 mm, 8 LEDs

Test/RESET button, non-volatile ²⁾								
Manual/Remote	1 NO + 1 NC	24 ... 240 AC/DC	▶	3RN10 62-1CW00	1	1 unit	101	0.296

Bistable evaluation units, width 22.5 mm

Test / RESET button, non-volatile ²⁾ , short-circuit and open-circuit detection and indication in sensor circuit								
Manual/Remote	2 CO	24 ... 240 AC/DC	▶	3RN10 13-1BW01	1	1 unit	101	0.169

¹⁾ The unit can be reset with the RESET button or by disconnecting the control supply voltage.

²⁾ For more information on protection against voltage failure see Technical Information LV 1 T.


* You can order this quantity or a multiple thereof.

Monitoring Relays

3RN1 Thermistor Motor Protection

For PTC sensors

- Thermistor motor protection relays monitor the motor winding temperature using temperature-dependent resistors (PTCs, type A) that are directly installed in the motor winding by the manufacturer.
- Monostable versions with closed-circuit principle, i. e. relays respond in the event of control supply voltage failure
- 3RN10 13-.BW01: Bistable version, does not trigger in the event of control supply voltage failure
- All devices have PTB01 ATEX approval for dust or gas
See "Appendix" --> "Standards and approvals" --> "Type overview of approved devices for potentially explosive areas (ATEX explosion protection)".
- All devices except for 24 V AC/DC feature electrical isolation
- Versions with safe isolation up to 300 V according to EN 61140
- Non-volatile versions
- Versions with short-circuit and open-circuit detection in sensor circuit
- Versions with solid-state compatible contacts with hard gold-plating
- Versions for up to 6 sensor circuits
- Versions with manual, remote, autoreset and test button
- Terminal labeling according to DIN EN 50005
- All terminals are removable
- Width 22.5 mm (45 mm on version for several sensor circuits)

RESET	Contacts	Rated control supply voltage U_s 50/60 Hz	DT	Spring-type terminals		PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
				Order No.	Price per PU				kg

Compact signal evaluation units, width 22.5 mm, 1 LED

Terminal A1 is jumpered with the root of the changeover contact

Auto	1 CO	24 AC/DC 110 AC 230 AC	A	3RN10 00-2AB00		1	1 unit	101	0.104
			B	3RN10 00-2AG00		1	1 unit	101	0.153
			B	3RN10 00-2AM00		1	1 unit	101	0.153

Standard evaluation units, width 22.5 mm, 2 LEDs



3RN10 12-2CK00

Auto	1 NO + 1 NC	24 AC/DC 110 AC 230 AC	A	3RN10 10-2CB00		1	1 unit	101	0.116
			A	3RN10 10-2CG00		1	1 unit	101	0.153
			A	3RN10 10-2CM00		1	1 unit	101	0.159
		24 ... 240 AC/DC	A	3RN10 10-2CW00		1	1 unit	101	0.127
	2 CO	24 AC/DC 110 AC 230 AC	A	3RN10 10-2BB00		1	1 unit	101	0.137
			C	3RN10 10-2BG00		1	1 unit	101	0.139
			A	3RN10 10-2BM00		1	1 unit	101	0.190
	2 CO, gold-plated	24 AC/DC	C	3RN10 10-2GB00		1	1 unit	101	0.139
Manual/Remote ¹⁾	1 NO + 1 NC	24 AC/DC 110/230 AC	A	3RN10 11-2CB00		1	1 unit	101	0.125
			A	3RN10 11-2CK00		1	1 unit	101	0.164
	Short-circuit detection in sensor circuit								
Manual/Remote ¹⁾	2 CO	24 AC/DC 110 AC 230 AC	A	3RN10 11-2BB00		1	1 unit	101	0.138
			C	3RN10 11-2BG00		1	1 unit	101	0.190
			A	3RN10 11-2BM00		1	1 unit	101	0.192
	2 CO, gold-plated	24 AC/DC	A	3RN10 11-2GB00		1	1 unit	101	0.154
	Non-volatile ²⁾								
Manual/Auto/Remote	1 NO + 1 NC	24 AC/DC 110/230 AC	A	3RN10 12-2CB00		1	1 unit	101	0.125
			A	3RN10 12-2CK00		1	1 unit	101	0.161
	Non-volatile ²⁾ , short-circuit detection in sensor circuit								
Manual/Auto/Remote	2 CO	24 AC/DC 110 AC 230 AC	C	3RN10 12-2BB00		1	1 unit	101	0.130
			C	3RN10 12-2BG00		1	1 unit	101	0.130
			C	3RN10 12-2BM00		1	1 unit	101	0.181
	2 CO, gold-plated	24 AC/DC	C	3RN10 12-2GB00		1	1 unit	101	0.140
	Non-volatile ²⁾ , short-circuit and open-circuit detection and indication in sensor circuit								
Manual/Auto/Remote	2 CO	24 AC/DC 24 ... 240 AC/DC	A	3RN10 13-2BB00		1	1 unit	101	0.140
			A	3RN10 13-2BW00		1	1 unit	101	0.151
	2 CO, gold-plated	24 ... 240 AC/DC	C	3RN10 13-2GW00		1	1 unit	101	0.143

Evaluation units for 2 sensor circuits, warning and disconnection, width 22.5 mm, 3 LEDs

Manual/Auto/Remote	Test/RESET button, non-volatile ²⁾ 1 NO + 1 CO	24 ... 240 AC/DC	A	3RN10 22-2DW00		1	1 unit	101	0.147
--------------------	--	------------------	---	-----------------------	--	---	--------	-----	-------

Evaluation units for 6 sensor circuits, multiple motor protection, width 45 mm, 8 LEDs

Manual/Auto/Remote	Test/RESET button, non-volatile ²⁾ 1 NO + 1 NC	24 ... 240 AC/DC	A	3RN10 62-2CW00		1	1 unit	101	0.251
--------------------	--	------------------	---	-----------------------	--	---	--------	-----	-------

Bistable evaluation units, width 22.5 mm

Manual/Auto/Remote	Test / RESET button, non-volatile ²⁾ , short-circuit and open-circuit detection and indication in sensor circuit 2 CO	24 ... 240 AC/DC	A	3RN10 13-2BW01		1	1 unit	101	0.139
--------------------	---	------------------	---	-----------------------	--	---	--------	-----	-------

¹⁾ The unit can be reset with the RESET button or by disconnecting the control supply voltage.

²⁾ For more information on protection against voltage failure see Technical Information LV 1 T.

Monitoring Relays

3RN1 Thermistor Motor Protection

For PTC sensors

Accessories

Use	Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
-----	---------	----	-----------	--------------	-------------------	-----	----	-----------------------------

Blank labels

Blank labels, 20 mm x 7 mm, pastel turquoise¹⁾

C

3RT19 00-1SB20

100 340 units

101

0.200

Push-in lugs



For devices with 1 or 2 CO contacts

Push-in lugs
For screw fixing, 2 units are required for each device

▶

3RP19 03

1 10 units

101

0.002

3RP19 03

¹⁾ Computer labeling system for individual inscription of unit labeling plates available from:
murrplastik Systemtechnik GmbH.
<http://www.murrplastik.com>