

# Autonics

## INTELLIGENT DISPLAY UNIT (Pt Temperature Sensor Input) DS-R Series

### INSTRUCTION MANUAL



Thank you for choosing our Autonics products.  
Please read the following safety considerations before use.

#### ■ Safety Considerations

- ※Please observe all safety considerations for safe and proper product operation to avoid hazards.
- ※Safety considerations are categorized as follows.
  - Warning** Failure to follow these instructions may result in serious injury or death.
  - Caution** Failure to follow these instructions may result in personal injury or product damage.
- ※The symbols used on the product and instruction manual represent the following
  - ⚠ symbol represents caution due to special circumstances in which hazards may occur.

#### ⚠ Warning

- Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss.** (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.) Failure to follow this instruction may result in fire, personal injury, or economic loss.
- Install on a device panel to use.** Failure to follow this instruction may result in fire.
- Do not connect, repair, or inspect the unit while connected to a power source.** Failure to follow this instruction may result in fire.
- Check 'Unit description and function setting' before wiring.** Failure to follow this instruction may result in fire.
- Do not disassemble or modify the unit.** Failure to follow this instruction may result in fire.

#### ⚠ Caution

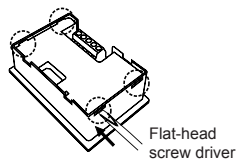
- Use the unit within the rated specifications.** Failure to follow this instruction may result in fire or product damage.
- Use dry cloth to clean the unit, and do not use water or organic solvent.** Failure to follow this instruction may result in fire.
- Do not use the unit in the place where flammable/explosive/corrosive gas, humidity, direct sunlight, radiant heat, vibration, impact, or salinity may be present.** Failure to follow this instruction may result in fire or explosion.
- Keep metal chip, dust, and wire residue from flowing into the unit.** Failure to follow this instruction may result in fire or product damage.

#### ■ Model

1) Basic unit					
Model	Display method	Size	Model	Display method	Size
DS22-RR	7 Segment	W20×H33mm	DS40-RRT	7 Segment	W40×H60mm
DS40-RR		W40×H60mm	DS60-RRT		W60×H96mm
DS60-RR		W60×H96mm			
2) Expansion unit					
Model	Display method	Size			
DS22-RE	7 Segment	W20×H33mm			
DS40-RE		W40×H60mm			
DS60-RE		W60×H96mm			

#### ■ Remove of Protection Cover

To operate the function set switch of the DS40, DS60 models, you should remove the protection cover. Press the connection parts (4 points) of the protection cover at the top/bottom of the product with a flat-head screwdriver and the protection cover is removed.



⚠ Caution: Before removing the protection cover, power must be turned OFF.

#### ■ Comprehensive Device Management Program [DAQMaster]

※It is only for the RS485 communication output model.

DAQMaster is able to display I/O source value, unit, and user setting value. For more information, please refer to the DAQMaster user manual. Visit our website (www.autonics.com) to download DAQMaster program.

Item	Minimum specifications
System	IBM PC compatible computer with Pentium III or above
Operations	Windows 98/NT/XP/Vista/7/8/10
Memory	256MB+
Hard disk	1GB+ of available hard disk space
VGA	Resolution: 1024×768 or higher
Others	RS232C serial port (9-pin), USB port

※The above specifications are subject to change and some models may be discontinued without notice.  
※Be sure to follow cautions written in the instruction manual and the technical descriptions (catalog, homepage).

#### ■ Specifications

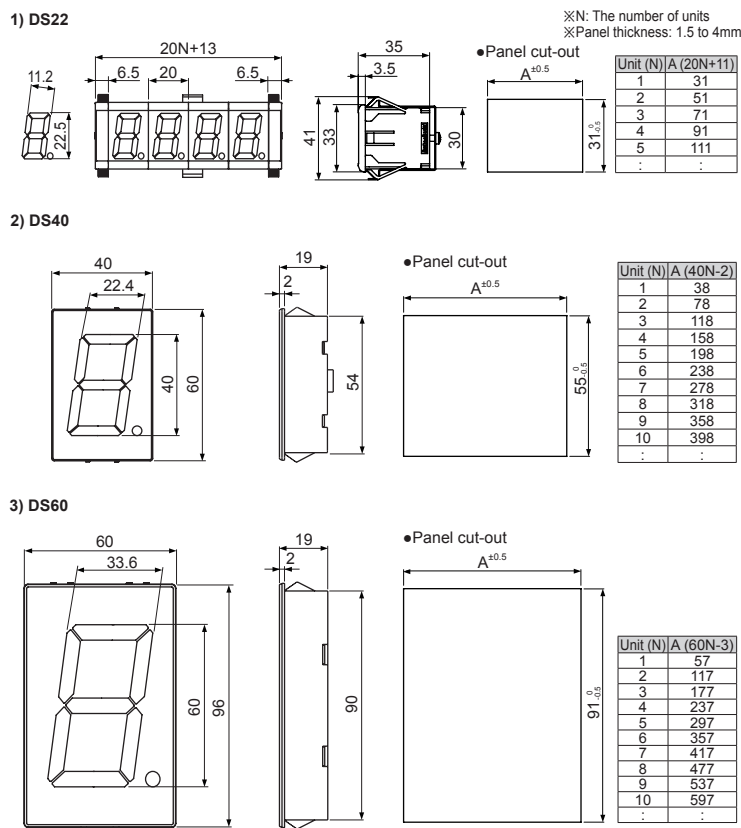
Model	Basic unit	DS22-RR	DS40-RR/RRT	DS60-RR/RRT
Expansion unit		DS22-RE	DS40-RE	DS60-RE
Input method	Pt temperature sensor input (Supports DPt100Ω, JPt 100Ω)			
Display color	Red			
Power supply	12-24VDC=			
Allowable voltage range	90 to 110% of rated voltage			
Current consumption	Max. 40mA	Max. 55mA	Max. 55mA	Max. 65mA
Character size	W11.2×H22.5mm	W22.4×H40mm	W22.4×H40mm	W33.6×H60mm
Temp. display range	-50.0 to 400.0°C or -58.0 to 752.0°F			
Display accuracy	F.S. ±0.5%			
Output	RS485 communication output (Modbus RTU)*1			
The number of max. multi-stage connection	4 units (except unit-display unit)			
Noise resistance	±500V the square wave noise (pulse width: 1μs) by the noise simulator			
Environment	Ambient temp.	-10 to 55°C, storage: -25 to 65°C		
	Ambient humi.	35 to 85%RH, storage: 35 to 85%RH		
Accessories	Basic unit	Right/Left cap: 1 Connector: 1	—	
	Expansion unit	Ribbon cable (50mm) : 1		
Protection structure	IP40 (front part)			
Approval	CE			
Weight*2	Basic unit	Approx. 62g (approx. 17g)	Approx. 67g (approx. 28g)	Approx. 114g (approx. 60g)
	Expansion unit	Approx. 92g (approx. 17g)*3	Approx. 67g (approx. 28g)	Approx. 114g (approx. 60g)
		*3: This is 3 units' weight as packaging unit and the weight in parentheses is only unit weight.		

- ※1: Only DS40-RRT, DS60-RRT models support RS485 communication output.
- ※2: The weight includes packaging. The weight in parentheses is for unit only.
- ※3: This is 3 units' weight as packaging unit and the weight in parentheses is only unit weight.
- ※Environment resistance is rated at no freezing or condensation.

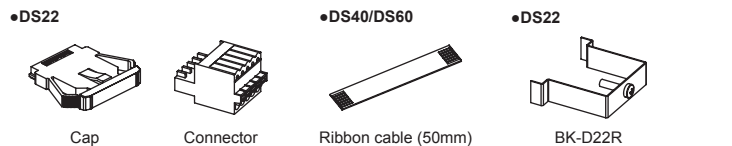
#### ●RS485 communication specifications

Comm. protocol	Modbus RTU with 16-bit CRC	Comm. speed	9600, 38400bps
Connection type	RS485	Comm. response time	5ms (fixed)
Application standard	Compliance with EIA RS485	Start bit	1-bit (fixed)
Max. connection	8units(address: 01 to 08)	Data bit	8-bit (fixed)
Comm. type	Two-wire half duplex	Parity bit	None (fixed)
Comm. distance	Max. 800m	Stop bit	1-bit (fixed)

#### ■ Dimensions



#### 4) Accessory



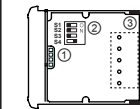
#### ■ Unit Description and Function Setting

Only the basic unit model has the function set switch and the input terminal. The DS22 models have them at the side, and the DS40, DS60 models have them at the rear.

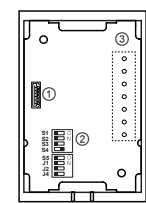
##### ⊖ Expansion connector

Using for connecting units.

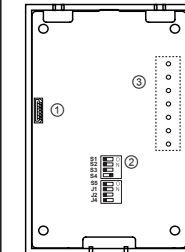
##### ●DS22-RR



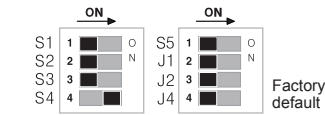
##### ●DS40-RR(T)



##### ●DS60-RR(T)



##### ⊕ Function set switches



No.	Switch	Function	Note
S1	DPt100Ω	JPt100Ω	Temp. sensor
S2	°C	°F	Temp. unit
S3	10 <sup>2</sup>	10 <sup>1</sup>	Integer display
S4	Not used	Use	DOT
S5	9600	38400	Comm. speed selection (bps)
J1	J1	7	Comm. address selection
J2	J2	8	
J3	J3	9	
J4	J4	0	

##### ⊖ Input terminals

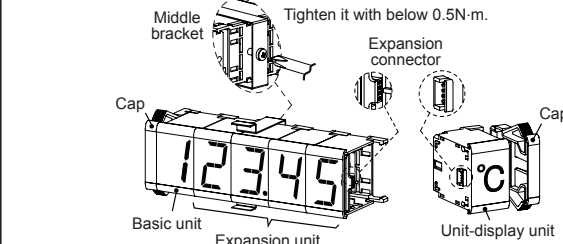
No.	Code	Function	Note
1	VCC	12-24VDC	Power
2	GND	0V	
3	A	Pt temp. sensor A	DPt100Ω, JPt100Ω
4	B	Pt temp. sensor B	
5	B'	Pt temp. sensor B'	RS485 comm.
6	A(+)	RS485 A(+)	
7	B(-)	RS485 B(-)	

- ※For DS22-RR connect the connector to input terminal.
- ※Only the model supporting RS485 communication output (DS40-RRT, DS60-RRT) has S5, J1 to J3 function set switches and no.6, 7 input terminals.

#### ■ Connection of Units

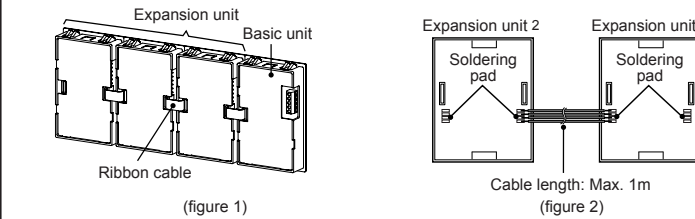
##### 1) DS22

- Connect a basic unit, expansion units, a unit-display unit from the left and connect the caps the end of right and left.
- The middle bracket (sold separately) helps to protect deflection when connecting over 7 units. Use one middle bracket per 7 units.
- The basic unit supplies the power for expansion units and the unit-display unit and DATA input.



##### 2) DS40/DS60

- Connect expansion connectors of units using a ribbon cable (accessory) as (figure 1). If the distance between expansion units is far as (figure 2), you can connect the cable at the soldering pad. To use a soldering pad, remove the protection cover which only expansion units have.



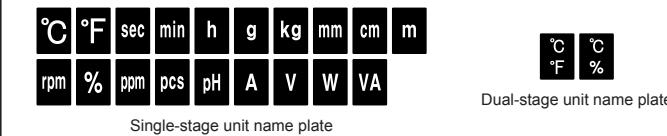
#### ■ Unit-display Unit

This unit is for displaying unit by inserting a name plate. It has only 22 sizes. (sold separately)

Size	Color	
	Red	Green
22mm	DU22-R	DU22-G

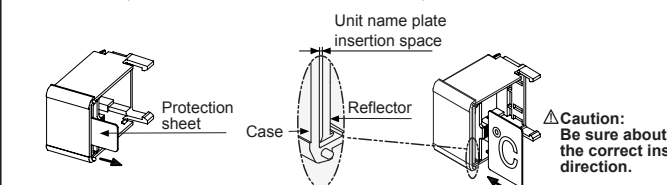
##### 1) Unit name plate type

It provides unit-printed name plates as an accessory. You can select the desired unit name plate and insert this plate. (Single-stage unit name plate: 19 types, Dual-stage unit name plate: 2 types)



##### 2) Unit name plate insertion

Remove the protection sheet and insert the unit name plate at between the case and the reflector.



#### ■ Examples of Display

##### 1) Temperature (°C) display (DPt100Ω, 400.0°C)

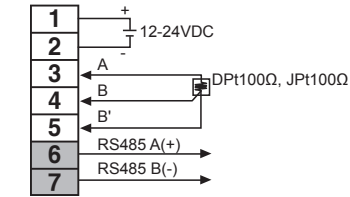


##### 2) Temperature (°F) display (JPt100Ω, 752.0°F)



※DS-R Series is applied Zero Blanking function automatically.

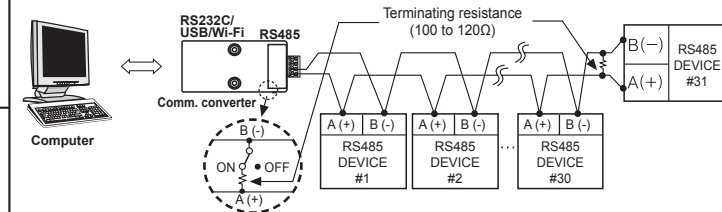
#### ■ Connections



※Shaded terminals are only for the model supporting RS485 communication output(DS40-RRT, DS60-RRT).

#### ■ Communication Setting

##### 1) Application of system organization



※It is recommended to use Autonics communication converter: SCM-WF48 (Wi-Fi to RS485-USB wireless communication converter, sold separately), SCM-US48I (USB to RS485 converter, sold separately), SCM-38I (RS232C to RS485 converter, sold separately). Please use twist pair wire for RS485 communication.

##### 2) Modbus Address Mapping

No.(Address)	Func	R/W	Description	Note
301001 (03E8)	04	R	°C Temp. (-500 to 4000)	×10 data
301002 (03E9)	04	R	°F Temp. (-580 to 7520)	×10 data
301003 to 301100	04	R	Reserved	

#### ■ Error

Display	Description	Troubleshooting
o (1 unit)	Flashes when input sensor is disconnected or sensor is not connected.	Check input sensor status.
oP (2 units)		
oPn (3 units)		
H	Flashes when measured value is higher than input range.	When input is within the rated input range, this display disappears.
L	Flashes when measured value is lower than input range.	

#### ■ Cautions during Use

- Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents.
- 12-24VDC power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.
- Check the polarity of the terminals before wiring the temperature sensor. For Pt temperature sensor, wire it as 3-wire type, using cables in same thickness and length.
- Install a power switch or circuit breaker in the easily accessible place for supplying or disconnecting the power.
- Keep away from high voltage lines or power lines to prevent inductive noise. In case installing power line and input signal line closely, use line filter or varistor at power line and shielded wire at input signal line. Do not use near the equipment which generates strong magnetic force or high frequency noise.
- This unit may be used in the following environments.
  - ①Indoors (in the environment condition rated in 'Specifications')
  - ②Altitude max. 2,000m
  - ③Pollution degree 2
  - ④Installation category I

#### ■ Major Products

- Photoelectric Sensors
- Fiber Optic Sensors
- Door Sensors
- Door Side Sensors
- Area Sensors
- Proximity Sensors
- Pressure Sensors
- Rotary Encoders
- Connector/Sockets
- Switching Mode Power Supplies
- Control Switches/Lamps/Buzzers
- I/O Terminal Blocks & Cables
- Stepper Motors/Drivers/Motion Controllers
- Graphic/Logic Panels
- Field Network Devices
- Laser Marking System (Fiber, Co., Nd:YAG)
- Laser Welding/Cutting System
- Temperature Controllers
- Temperature/Humidity Transducers
- SSRs/Power Controllers
- Counters
- Timers
- Panel Meters
- Tachometers/Pulse (Rate) Meters
- Display Units
- Sensor Controllers

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