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

1. **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 personal injury, fire, or economic loss.
2. **Do not disassemble or modify the unit. Please contact us if necessary.**
   Failure to follow this instruction may result in fire.

⚠ Caution

1. **Do not use the unit outdoors.**
   Failure to follow this instruction may result in shortening the life cycle of the unit or product malfunction.
2. **Use the unit within the rated specifications.**
   Failure to follow this instruction may result in shortening the life cycle of the unit.
3. **Do not use water or oil-based detergent when cleaning the unit. Use dry cloth to clean the unit.**
   Failure to follow this instruction may result in fire.
4. **Do not use the unit where flammable or explosive gas, humidity, direct sunlight, radiant heat, vibration, or impact may be present.**
   Failure to follow this instruction may result in fire or explosion.
5. **Keep 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

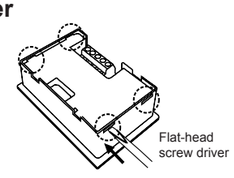
Model	Display method	Size	Model	Display method	Size
DS22-RR	7 Segment	W20×H33mm	**DS40-RRT**	7 Segment	W40×H60mm
DS40-RR		W40×H60mm	**DS60-RRT**		W60×H96mm
DS60-RR		W60×H96mm			

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 DAQMater 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.**

▣ Specifications

Model		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. 65mA
Character size		W11.2×H22.5mm	W22.4×H40mm	W33.6×H60mm
Temp. display range		-50.0 to 400.0℃ or -58.0 to 752.0℉		
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℃, storage: -25 to 65℃		
	Ambient humi.	35 to 85%RH, storage: 35 to 85%RH		
Accessory	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)

※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

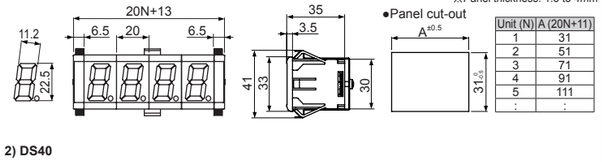
Comm. protocol	Modbus RTU with 16-bit CRC	Comm. speed	9600, 38400bps
Connection type	RS485	Comm. response time	5ms (fixed)
Application standard	Compliance with EIA RS485	Start bit	1-bit (fixed)
Max. connection	8units(address: 01 to 08)	Data bit	8-bit (fixed)
Comm. type	Two-wire half duplex	Parity bit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

▣ Dimensions

(unit: mm)

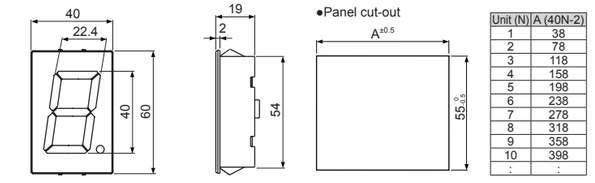
※N: The number of units
※Panel thickness: 1.5 to 4mm

1) DS22



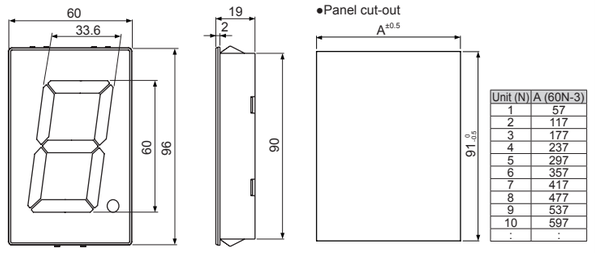
Unit (N)	A (20N+11)
1	31
2	51
3	71
4	91
5	111
:	:

2) DS40



Unit (N)	A (40N-2)
1	38
2	78
3	118
4	158
5	198
6	238
7	278
8	318
9	358
10	398
:	:

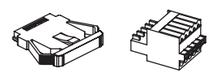
3) DS60



Unit (N)	A (60N-3)
1	57
2	117
3	177
4	237
5	297
6	357
7	417
8	477
9	537
10	597
:	:

4) Accessory

●DS22



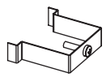
Cap Connector

●DS40/DS60

Ribbon cable (50mm)

5) Sold separately (middle bracket)

●DS22



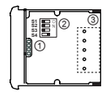
BK-D22R

▣ Part Descriptions And Function Setting

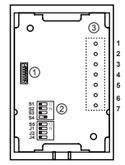
Only the basic unit model has the function set switch and the input terminal.
The DS22 models have them at the side, and the DS40, DS60 models have them at the rear.

①Expansion connector
Using for connecting units.

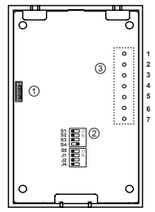
●DS22-RR



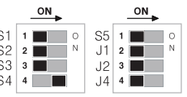
●DS40-RR(T)



●DS60-RR(T)



②Function set switches



No.	Switch OFF(□)	Switch ON(■)	Function
S1	DPt100Ω	JPt100Ω	Temp. sensor
S2	℃	℉	Temp. unit
S3	10^2	10^1	Integer display
S4	Not used	Use	DOT
S5	9600	38400	Comm. speed selection (bps)
J1 J2 J4	J1 1 2 J2 J4	···· 7 8	Comm. address selection

③Input terminals

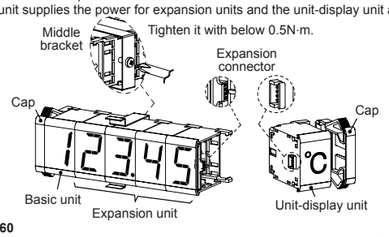
No.	Code	Function	Note
1	VCC	12-24VDC	Power
2	GND	0V	
3	A	Pt temp. sensor A	DPt100Ω, JPt100Ω
4	B	Pt temp. sensor B	
5	B'	Pt temp. sensor B'	
6	A(+)	RS485 A(+)	RS485 comm.
7	B(-)	RS485 B(-)	

※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

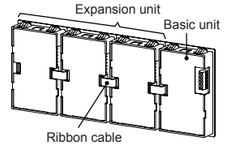
1) DS22

●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.

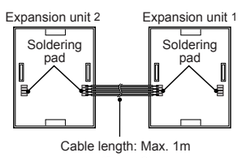


2) DS40/DS60

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.



(figure 1)



(figure 2)

▣ Unit-display Unit

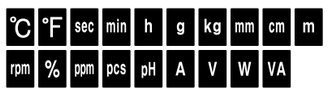
This unit is for displaying unit by inserting a name plate.
It has only 22 sizes. (sold separately)

●Model

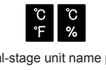
Size \ Color	Red	Green
22mm	DU22-R	DU22-G

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)



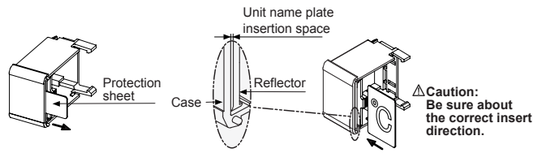
Single-stage unit name plate



Dual-stage unit name plate

2) Unit name plate insertion

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



⚠**Caution: Be sure about the correct insert direction.**

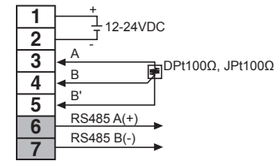
▣ Examples Of Display

1) Temperature (℃) display (DPt100Ω, 400.0℃)

2) Temperature (℉) display (JPt100Ω, 75.2℉)

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

▣ Connections

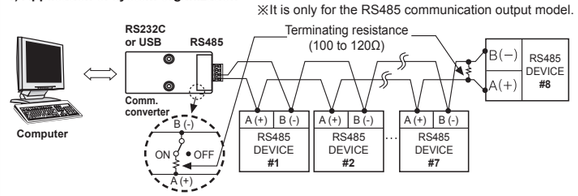


※Shaded terminals are only for the model supporting RS485 communication output(DS40-RRT, DS60-RRT).

▣ Communication Setting

1) Application of system organization

※It is only for the RS485 communication output model.



※It is recommended to use Autonics communication converter; 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

●Monitoring data

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

▣ Cautions During Use

1. This unit must be mounted on the Panel.
2. This is non-insulated product. Use insulated power for power supply.
3. For using Pt temperature sensor, you must wire 3-wire. To extend the wire, the thickness and length of 3 wires should be same. If line resistances are different, temperature error occurs.
4. When input value is out of range, each display unit displays Error message. When it is under min. input value, a unit displays 'L'. When it is over max. input value, a unit displays 'H'.
5. When Pt temperature sensor are not connected, it displays 'oP' (using 2 units)' or 'oPn (using 3 units)'.
6. Input signal line
   ①Shorten the cable distance between the external device and this product.
   ②Use shield cable when input wiring is long.
   ③Wire the input signal line separately from the power line.
7. Dielectric or insulation resistance test when this unit is installed in the control panel.
   ①Separate the unit from the control panel.
   ②Short circuit all terminals of the unit.
8. Do not use this unit at below places.
   ①Place where there are severe vibration or impact.
   ②Place where strong alkalis or acids are used.
   ③Place where there are direct ray of the sun.
   ④Place where strong magnetic field or electric noise are generated.
9. Installation environment
   ①It shall be used indoor
   ②Altitude max. 2,000m
   ③Pollution degree 2
   ④Installation category I

※**Failure to follow these instructions may result in product damage.**

▣ 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_2, 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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