High Performance Display Units : RS485 / + Pt Input

DS / DA Series

INSTRUCTION MANUAL

TCD210085AA

Autonics

Thank you for choosing our Autonics product.
Read and understand the instruction manual and manual thoroughly before using the product.
For your safety, read and follow the below safety considerations before using.
For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.
Keep this instruction manual in a place where you can find easily.
The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice.
Follow Autonics website for the latest information.

Safety Considerations

- Observe all 'Safety Considerations' for safe and proper operation to avoid hazards.
- ⚠ symbol indicates caution due to special circumstances in which hazards may occur.

⚠ Warning Failure to follow instructions may result in serious injury or death.

01. 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, economic loss or fire.
02. Do not use the unit in the place where flammable/explosive/corrosive gas, high humidity, direct sunlight, radiant heat, vibration, impact or salinity may be present.
Failure to follow this instruction may result in explosion or fire.
03. Install on a device panel to use.
Failure to follow this instruction may result in fire.
04. Do not connect, repair, or inspect the unit while connected to a power source.
Failure to follow this instruction may result in fire.
05. Check 'Unit Descriptions' before wiring.
Failure to follow this instruction may result in fire.
06. Do not disassemble or modify the unit.
Failure to follow this instruction may result in fire.

⚠ Caution Failure to follow instructions may result in injury or product damage.

01. Use the unit within the rated specifications.
Failure to follow this instruction may result in fire or product damage.
02. Use a dry cloth to clean the unit, and do not use water or organic solvent.
Failure to follow this instruction may result in fire.
03. Keep the product away from metal chip, dust, and wire residue which flow into the unit.
Failure to follow this instruction may result in fire or product damage.

Cautions during Use

- Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents.
- 12 - 24 VDC⎓ model power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.
- 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.
  - Indoors (in the environment condition rated in 'Specifications')
  - Altitude max. 2,000 m
  - Pollution degree 2
  - Installation category I

Ordering Information

This is only for reference, the actual product does not support all combinations.
For selecting the specified model, follow the Autonics website.

D S ❶ - R ❷

❶ Size
22: W 20 × H 33 mm
40: W 40 × H 60 mm
60: W 60 × H 96 mm

❷ Input method (basic unit)
R: Pt temperature sensor input
RT: Pt temperature sensor input + RS485 communication output

Product Components

- Product
- 22 mm Cap (left-right 1 set)× 1
- Instruction manual
- 22 mm Connector × 1

Sold Separately

- Expansion unit (DS□-RE)
  : select the same size/display color of basic unit (available to mix the display method)
- 22 mm Middle bracket (BK-D22R)
- 22 mm Unit-display unit (DU22-□)

Specifications

Model	D□22-□□	D□40-□□	D□60-□□
Display color	Red		
Power supply	12 - 24 VDC⎓		
Allowable voltage range	90 to 110 % of power supply		
Current consumption (red)	≤ 25 mA	≤ 55 mA	≤ 65 mA
Current consumption (green)	≤ 20 mA	≤ 40 mA	≤ 45 mA
Size (W×H)	11.2 × 22.5 mm	22.4 × 40 mm	33.6 × 60 mm
Noise immunity	±500 V the square wave noise (pulse width: 1 μs) by the noise simulator		
Ambient temperature	-10 to 55 °C, storage: -25 to 65 °C (no freezing or condensation)		
Ambient humidity	35 to 85 %RH, storage: 35 to 85 %RH (no freezing or condensation)		
Protection structure	IP40 (front part)		
Approval	CE EAC		
Weight (packaged) 01)	≈ 17 g (≈ 58 g)	≈ 28 g (≈ 63 g)	≈ 60 g (≈ 110 g)

01) The package weight of 16 mm / 22 mm expansion unit varies, it based on 3 packages.
16 mm: ≈ 77 g / 22 mm: ≈ 92 g

Model	DS□-RR	DS□-RRT
Input method	Pt temperature sensor	Pt temperature sensor
Output	-	RS485 communication
Input sensor	DPt100Ω, JPt 100Ω	
Display character (range)	-50.0 to 400.0 °C or -58.0 to 752.0 °F • Display accuracy: F.S.± 0.5 %	
Max. number of multi-stage	4-unit (except unit-display unit)	

Communication Interface

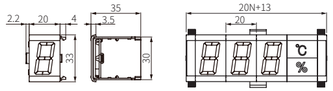
■ RS485

Protocol	Modbus RTU
Application standard	Compliance with EIA RS485
Max. connections (setting address)	8 units (01 to 08)
Comm. type	Two-wire half duplex
Comm. distance	Max. 800 m
Comm. speed	9600, 38400 bps
Comm. response time	5 ms (fixed)
Start bit	1 bit (fixed)
Data bit	8 bits (fixed)
Parity bit	NONE (fixed)
Stop bit	1 bit (fixed)

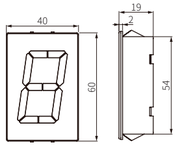
Dimensions

- Unit: mm, For the detailed drawings, follow the Autonics website.
- N: number of units

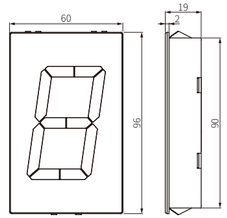
■ 22 mm size



■ 40 mm size

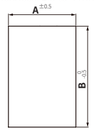


■ 60 mm size



■ Panel cut-out

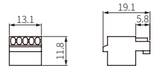
- Panel thickness: 1.5 to 4 mm



Model	A	B
22 mm	20N+11	31
40 mm	40N-2	55
60 mm	60N-3	91

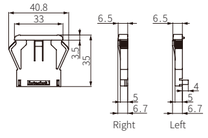
■ Connector

- 22 mm size



■ Cap

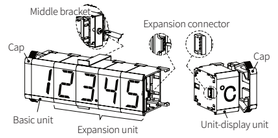
- 22 mm size



Connection of Units

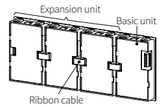
■ 22 mm size

- Connect a basic unit, expansion units, a unit-display unit from the left and connect the caps the end of right and left.
- Use the middle bracket (sold separately) to protect deflection when connecting over 7 units. Use one middle bracket per 7 units. (tightening torque: ≤ 0.5 N·m)

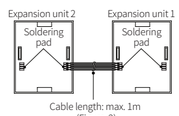


■ 40 / 60 mm size

- Connect expansion connectors of units using a ribbon cable. (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.
- See 'Removing Protection Cover of Expansion Unit' to detach the cover.



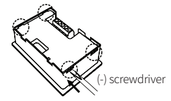
(Figure 1)



(Figure 2)

Removing Protection Cover of Expansion Unit

Press the connection parts (4-point) of the protection cover at the top/bottom of the 40 / 60 mm expansion unit with (-) screwdriver and the protection cover is removed. To operate the function set switches, you should remove the protection cover on the rear part.
⚠ Caution: Before removing the protection cover, power must be turned OFF.



Software

- Download the installation file and the manuals from the Autonics website.

■ DAQMaster

- DAQMaster is the comprehensive device management program for Autonics' products, providing parameter setting, monitoring and data management.

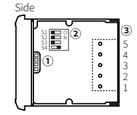
Example Programs

Download the various example programs from the Autonics website.

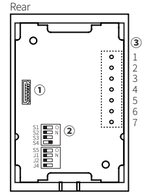
Unit Descriptions

- Temperature sensor input + RS485 communication output model support S5 / J1 to J4 switch, 6 and 7 of the input terminal.
- Activate Zero Blanking function automatically.

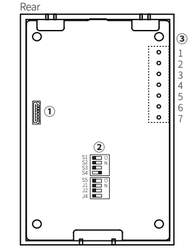
■ 22 mm size



■ 40 mm size



■ 60 mm size



❶ Expansion connector Using for connecting expansion unit. See 'Connection of Units.'

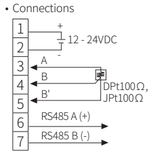
❷ Function set switches Basic unit only

No.	Switch OFF (■□)		···	Switch ON (□■)		Function	Default
S1	DPt100Ω			JPt100Ω		Temperature sensor	OFF
S2	°C			°F		Temperature unit	OFF
S3	10^0			10^1		Integer display	OFF
S4	Not used			Use		Decimal point	ON
S5	9600 bps			38400 bps		Comm. speed (bps)	OFF
	1	2		7	8	Comm. address	OFF
J1	ON	OFF		ON	OFF		
J2	OFF	ON	...	ON	OFF		
J4	OFF	OFF		ON	OFF		

❸ Input terminal Basic unit only

No.	Code	Function
1	VCC	12 - 24 VDC⎓
2	GND	0 V
3	A	Pt temperature sensor A input
4	B	Pt temperature sensor B input
5	B'	Pt temperature sensor B input
6	A (+)	RS485 A (+) output
7	B (-)	RS485 B (-) output

- Connections



- The basic unit supplies the power for expansion unit and the unit-display unit and DATA input.
- For the 22 mm size model, connect the connector to the input terminal.

Error

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

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