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Autonics DS-DA Series High Performance Display Units Instruction Manual

Autonics

High Performance Display Units : RS485 Input
Ordering Information
DS / DA Series
INSTRUCTION MANUAL
TCD210084AD

Contents [hide]

DS-DA Series High Performance Display Units

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.

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, economic loss or fire.
2. 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.
3. Install on a device panel to use.
   Failure to follow this instruction may result in fire.
4. Do not connect, repair, or inspect the unit while connected to a power source.
   Failure to follow this instruction may result in fire.
5. Check 'Unit Descriptions' before wiring.
   Failure to follow this instruction may result in fire.
6. 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.

1. Use the unit within the rated specifications.
   Failure to follow this instruction may result in fire or product damage.
2. 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.
3. 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 varactor 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.
For selecting the specific model, follow the Au tonics web site.

1. Display method
   S: 7-segment
   A: 16-segment
2. Size
   16 : W 16 × H 24 mm
   22: W 20 × H 33 mm
   40: W 40 × H 60 mm
   60: W 60 × H 96 mm
3. Display color
   R: Red
   G: Green
4. Input method (basic unit)
   T: RS485 communication input
   C: RS485 communication input (synchronous time display)

Product Components

- Product
- 16 / 22 mm Cap (left-right 1 set)× 1
- Instruction manual
- 22 mm Connector × 1

Sold Separately

- Expansion unit (DS□-□E / DA□-□E)

  : select the same size/display color of basic unit (available to mix the display method)
- 16 / 22 mm Middle bracket (BK-D□R)
- 16 / 22 mm Unit-display unit (DU□-□)

Specifications

Model	DS16-□□	D□22-□□	D□40-□□	D□60-□□
Display color	Red / green model			
Power supply	12 – 24 VDC ▬ ▬ ▬			
Allowable voltage range	90 to 110 % of power supply			
Current consumption (red)	≤ 20 mA	≤ 25 mA	≤ 55 mA	≤ 65 mA
Current consumption (green)	≤ 15 mA	≤ 20 mA	≤ 40 mA	≤ 45 mA
Size (W×H)	9 × 16 mm	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 ℃, storage: -25 to 65 ℃ (non freezing or condensation)			
Ambient humidity	35 to 85%RH, storage: 35 to 85%RH (non freezing or condensation)			
Protection rating	IP40 (front part)			
Approval	CE EAC			
Weight (packaged) 01)	≈ 12 g (≈ 52 g)	≈ 17 g (≈ 58 g)	≈ 28 g (≈ 63 g)	≈ 60 g (≈ 110 g)

1. 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	D□□-□T	DS□-□C
Input method	RS485 communication	RS485 communication (time)
Directly connected Autonics Series	CT6, CT4, MP5, MT4, TK / TX, TM2, TM4, THD	_
Display character (range)	64 characters and symbols display: 0 to 9, A to Z, 27 symbols, decimal point	World local time, 12/24-hour, summer time
Max. number of multi- stage	24-unit	10-unit

Communication Interface

RS485

| Model	D□□-□T	DS□-□C
Protocol	Modbus RTU	
Application standard	Compliance with EIA RS485	
Max. connections (setting address)	Master 1-unit (01, fixed) / Slave 31-unit (01 to 32)	31-unit (226, fixed)
Comm. type	Two-wire half duplex	
Comm. distance	Max. 800 m	
Comm. speed	4800, 9600, 19200, 38400 bps	
Comm. response time	(Slave) 5 ms, 20 ms	–
Start bit	1-bit (fixed)	
Data bit	8-bit (fixed)	
Parity bit	NONE (fixed)	
Stop bit	1-bit (fixed)	

Dimensions

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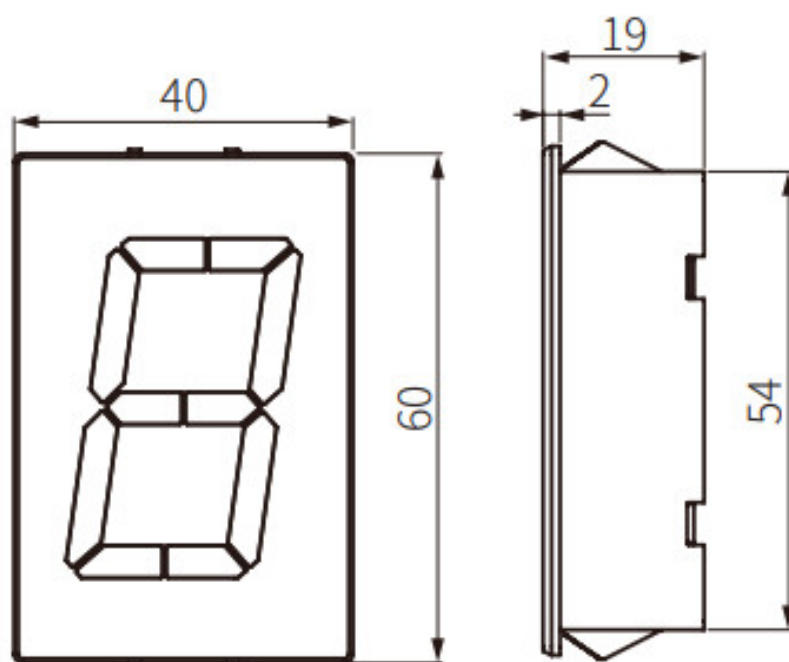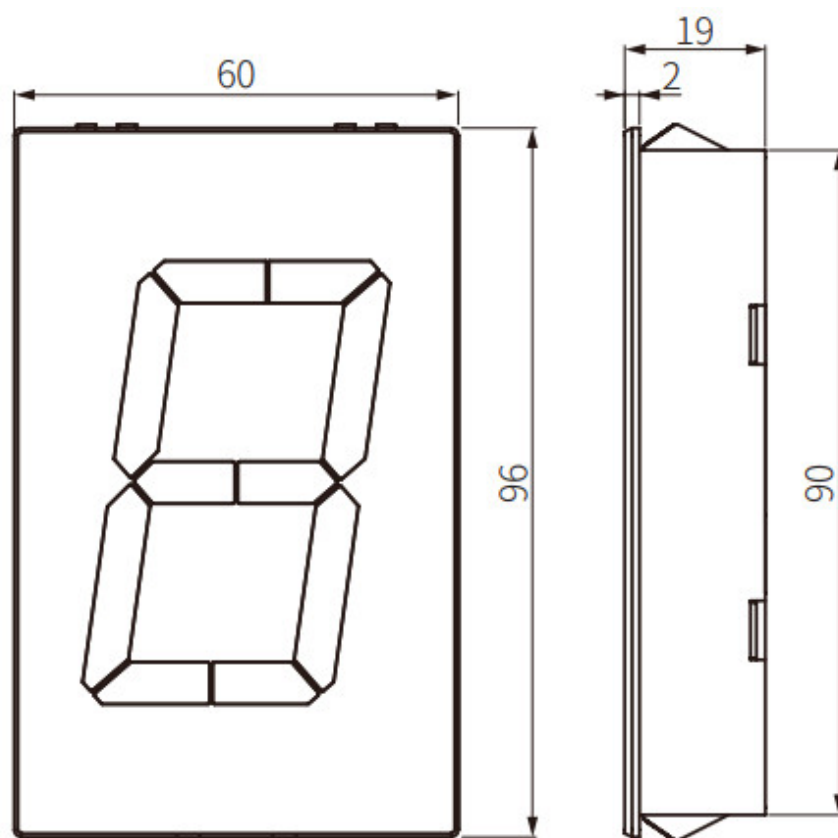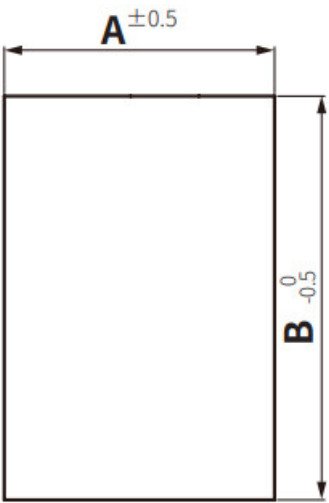- N: number of units

16 mm size
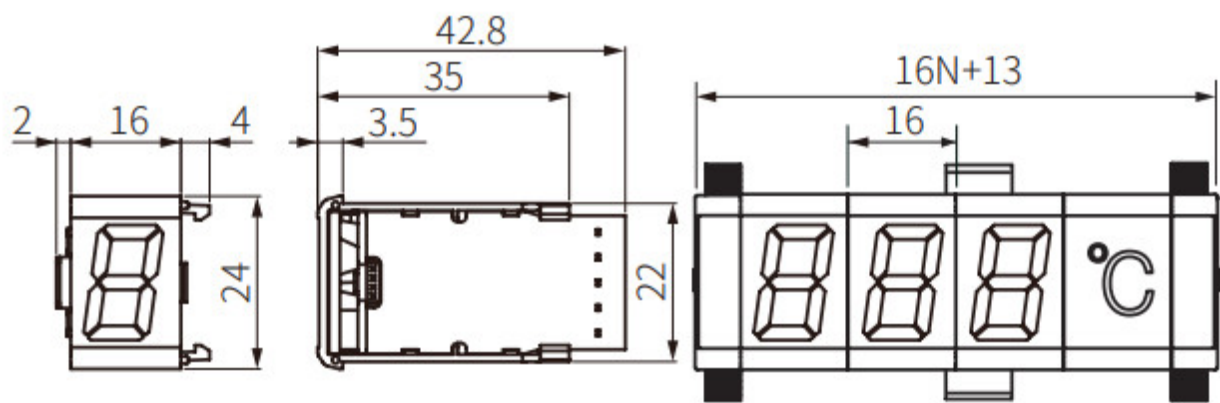
22 mm size
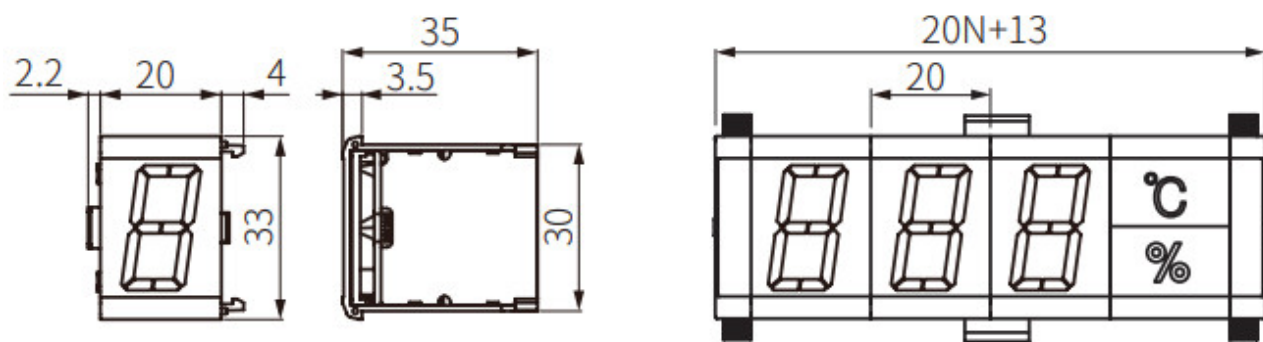
40 mm size

60 mm size

Panel cut-out

- Panel thickness: 1.5 to 4 mm

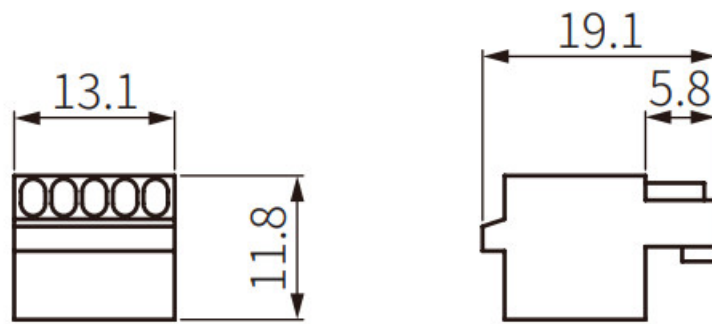| Model	A	B
16 mm	16N+11	23
22 mm	20N+11	31
40 mm	40N-2	55
60 mm	60N-3	91

Cap

- 16 mm size
- 22 mm size
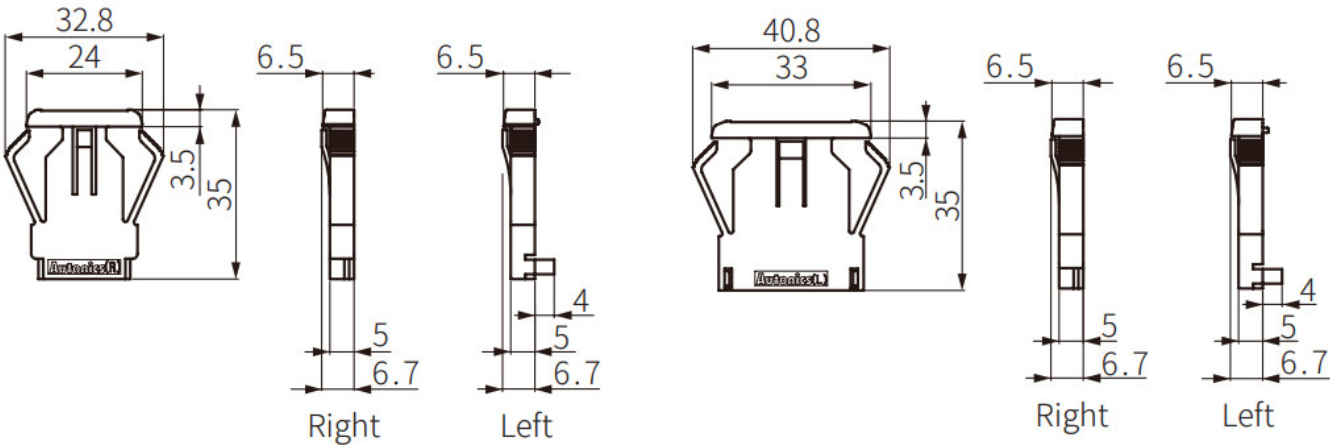
Connector

- 22 mm size

Connection of Units

16 / 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)
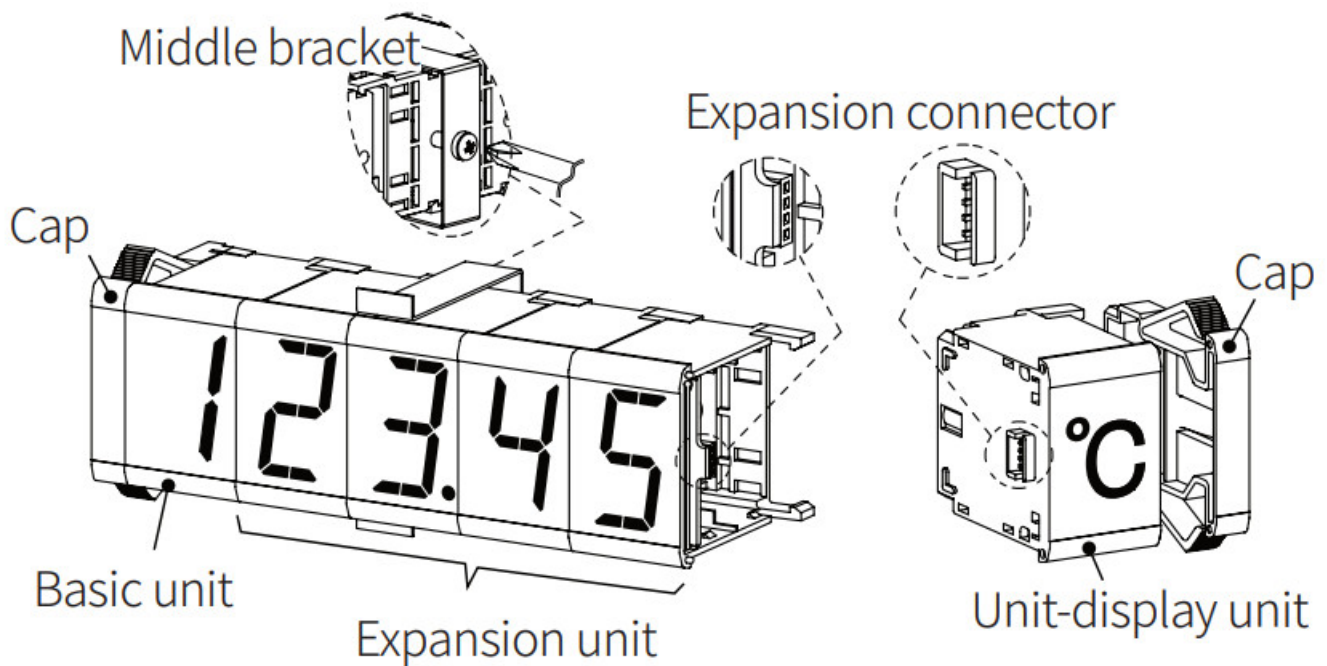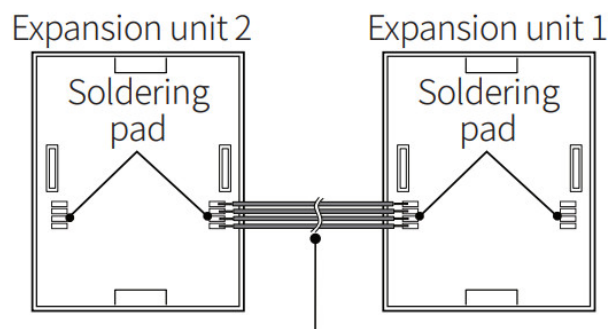

40 / 60 mm size

- 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.
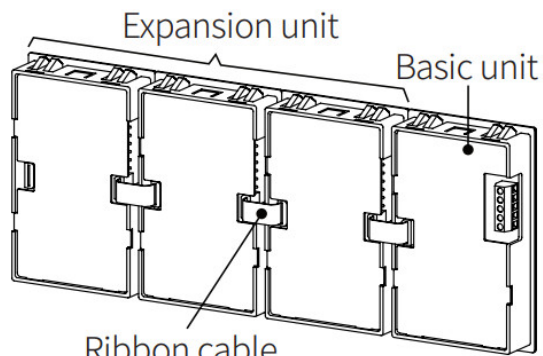
(Figure 1)

(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.

(-) screwdriver
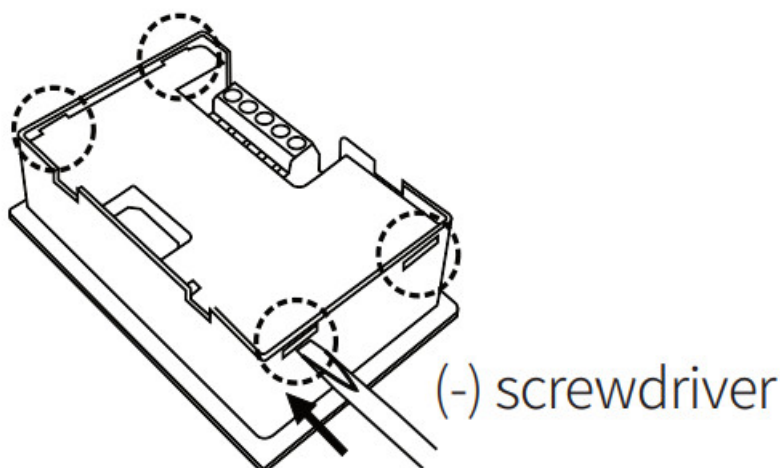
Software

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

DAQMaster

• DAQ Master 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.
[RS485 Input Model] Unit Descriptions

■ **16 mm size**
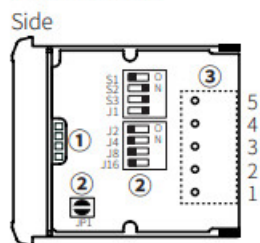
Side

■ **22 mm size**

Side

■ **40 mm size**

Rear

■ **60 mm size**

Rear

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

2. Function set switches Basic unit only

   • Slave mode (JP1 OFF: Open ⏚)

No.	Setting value (OFF ▢▆ ON)				Function	Default
	5 ms		20 ms		Comm. response time	5 ms (OFF)
S1	OFF		ON			

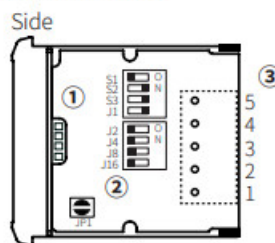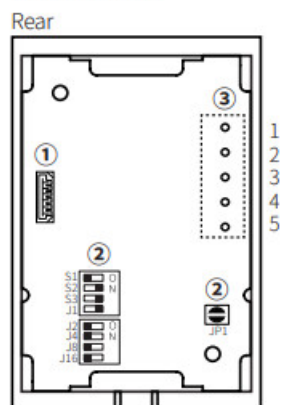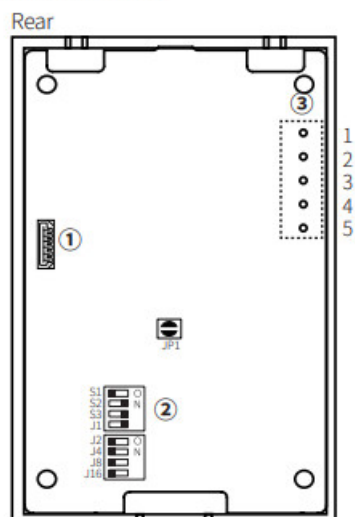| No.	Setting value (OFF ▢▆ ON)				Function	Default
	4800	9600	19200	38400	Comm. speed (bps)	38400 (S2 / S3: ON)
S2	OFF	ON	OFF	ON		
S3	OFF	OFF	ON	ON		

No.		1	2	…	31	32	Function	Default
J1		ON	OFF		ON	OFF	Comm. address	1 Comm. address (J1: ON / J2 to 16: OFF)
J2		OFF	ON		ON	OFF		
J4		OFF	OFF	…	ON	OFF		
J8		OFF	OFF		ON	OFF		
J16		OFF	OFF		ON	OFF		

• **Master mode (JP1 ON: Short ▆)**

No.	Setting value				Function	Default
	Manual		Auto		Connection setting method	Manual (OFF)
S1	OFF		ON			

No.	4800	9600	19200	38400		Function	Default
S2	OFF	ON	OFF	ON		Comm. speed (bps)	38400 (S2 / S3: ON)
S3	OFF	OFF	ON	ON			
J1 to J8	• If the connection setting method (S1) is the manual (OFF), see the 'Directly Connected Autonics Series.'					Directly connected Autonics Series	CT 4 (J1: ON / J2 to 8: OFF)
J16	Not used		Use			Unit-display unit	Not used (OFF)

- Input terminal Basic unit only

[RS485 Input Model] Directly Connected Autonics Series

- Connecting to a device which supports Master mode displays current value or current value and setting value without PC / PLC.
- Only for RS485 communication output model supports it among the directly connected Autonics Series. Connect input terminal 4 (A+) and 5 (B-) of display unit to RS485 communication output terminal of the dedicated device.

	CT6	CT4	MP5	MT4	TK/TX	TM2	TM4	THD
J1	OFF	ON	OFF	ON	OFF	ON	OFF	ON
J2	OFF	OFF	ON	ON	OFF	OFF	ON	ON
J4	OFF	OFF	OFF	OFF	ON	ON	ON	ON
J8	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF

Not using the highest digit (using manual setting)

	CT6	MP5	MT4	TK/TX
J1	OFF	ON	OFF	ON
J2	OFF	OFF	ON	ON
J4	OFF	OFF	OFF	OFF
J8	ON	ON	ON	ON

[RS485 Input Model] Example of Display

- In case of manual setting, the highest digit may be not used.
  [Refer to CT6(5digit), MP5(4digit), MT4(3digit), TK/TX(3digit, using unit-display unit)]
- To display the set value (PRESET or SV), connect the same number of units as the current value.
- CT Series: Displayed in the PRESET 2 position when using the 1-state PRESET model.

■ CT6
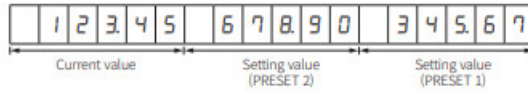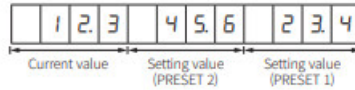
1 2 3. 4 5	6 7 8. 9 0	3 4 5. 6 7
Current value	Setting value (PRESET 2)	Setting value (PRESET 1)

■ CT6 (5-digit)

1 2 3. 4 5	6 7 8. 9 0	3 4 5. 6 7
Current value	Setting value (PRESET 2)	Setting value (PRESET 1)

■ CT4

1 2. 3	4 5. 6	2 3. 4
Current value	Setting value (PRESET 2)	Setting value (PRESET 1)

■ MP5   ■ MP5 (4-digit)

`1 2. 3 4`   `- 1 2. 3`   `1 2. 3 4`   `- 1 2. 3`

■ MT4   ■ MT4 (3-digit)

`1 2. 3`   `- 1. 2`   `1 2. 3`   `- 1. 2`

■ TK / TX   ■ TK / TX (3-digit,
  (using unit-display unit)   using unit-display unit)

2 3. 4 °C	3 5. 0 °C		2 3. 4 °C 3 5. 0 °C
Current value	Setting value (SV)

For the right one: Current value | Setting value (SV)
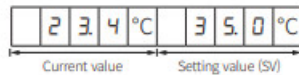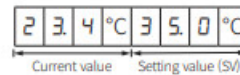
■ TM2 (using unit-display unit)

`2 3. 4 °C - 1 2. 3 °C`
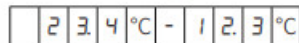
■ TM4 (using unit-display unit)

`2 3. 4 °C - 5 6. 7 °C   1 2 3. 4 °C   6 7. 8 °C`

■ THD (using unit-display unit)

`1 2. 3 °C 5 2. 7 %`

[RS485 Input Model] Input Data Chart

- Based on the Slave mode.
- If there is no input data after supplying the power, the basic unit displays input method character (T).

| 7-segment				16-segment				High 2-bit / Low 4-bit			
D5 D4 (L L)	D5 D4 (L H)	D5 D4 (H L)	D5 D4 (H H)	D5 D4 (L L)	D5 D4 (L H)	D5 D4 (H L)	D5 D4 (H H)	D3	D2	D1	D0
0	G	W	]	0	G	W	]	L	L	L	L
1	H	X	:	1	H	X	[	L	L	L	H
2	I	Y	.	2	I	Y	+	L	L	H	L
3	J	Z	..	3	J	Z	:	L	L	H	H
4	K	-1	°	4	K	-1	;	L	H	L	L
5	L	(	₩	5	L	(	<	L	H	L	H
6	M	)	h	6	M	)	>	L	H	H	L
7	N	'	I	7	N	'	|	L	H	H	H
8	O	"	J	8	O	"	!	H	L	L	L
9	P	^	K	9	P	^	@	H	L	L	H
A	Q	.	K	A	Q	.	#	H	L	H	L
B	R	/	N	B	R	/	$	H	L	H	H
C	S	?	O	C	S	?	%	H	H	L	L
D	T	-	T	D	T	-	&	H	H	L	H
E	U	_	X	E	U	_	★	H	H	H	L
F	V	=	Blank	F	V	=	Blank	H	H	H	H

[RS485 (synchronous time display) Model] Unit Descriptions

■ 22 mm size
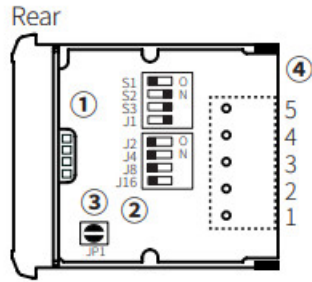
■ 40 mm size
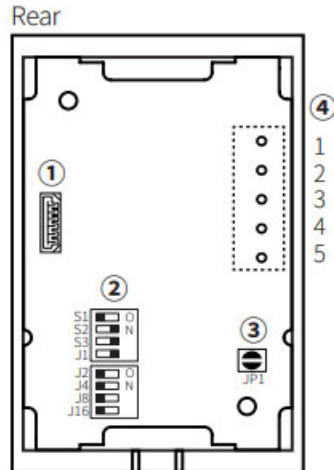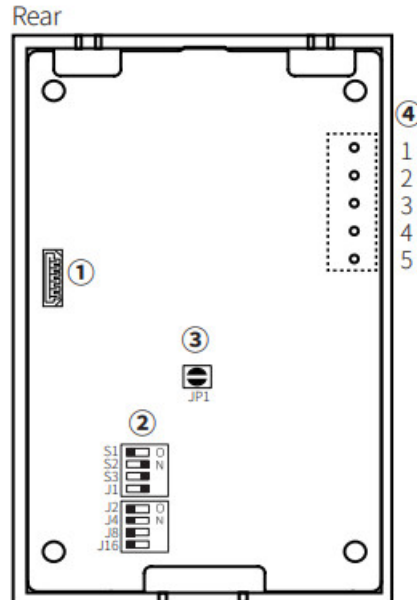
■ 60 mm size

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

2. Function set switches Basic unit only

No.	Setting value (OFF ▢▮ ON)				Function	Default
	24-hour	**12-hour** [01]			Time display	24-hour (OFF)
S1	OFF	ON				
	4800	**9600**	**19200**	**38400**		
S2	OFF	ON	OFF	ON	Comm. speed (bps)	38400 (S2 / S3: ON)
S3	OFF	OFF	ON	ON		
01) When setting the 12-hour display, use 16-segment expansion unit for displaying 'M' of AM/PM.						
J1 to J16	See the 'World Time Zone.'				Select world time zone	UTC-11:00 (J1: ON / J2 to 16: OFF)

3. Delimiter for hour/min/sec Basic unit only

JP1	Setting value	Expansion unit	Display e.g.: PM 6 hour 60 min 15 sec (based on 12-hour display)
Open	Sign [ ]	DA Series (16-segment)	PM 6 60 15
Short	Decimal point[.]	DS Series (7-segment)	PM 6 6 15

4. Input terminal Basic unit only

No.	Code	Function
1	VCC	12 – 24 VDC ▬ ▬ ▬
2	GND	0 V
3	–	–
4	A (+)	RS485 A (+)
5	B (-)	RS485 B (-)

- 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.

[RS485 (synchronous time display) Model] World Time Zone

- Display the switch setting OFF=0, ON=1.

J1	J2	J4	J8	J16	Time zone	Region
0	0	0	0	0	UTC-12:00	International Date Line West
1	0	0	0	0	UTC-11:00	Coordinated Universal Time -11
0	1	0	0	0	UTC-10:00	Hawaii
1	1	0	0	0	UTC-09:00	Alaska
0	0	1	0	0	UTC-08:00	Pacific Time(US&Canada), Baja California
1	0	1	0	0	UTC-07:00	Mountain Time(US&Canada), Arizona, Chihuahua, La Paz, Mazatlan
0	1	1	0	0	UTC-06:00	Guadalajara, Mexico City, Monterrey, Saskatchewan, Central America, Central Time(US&Canada)
1	1	1	0	0	UTC-05:00	Eastern Time(US&Canada), Indiana(East), Bogota, Lima, Quito, Rio Branco, Chemical

0	0	0	1	0	UTC-04:00	Atlantic Time(Canada), Asuncion, Georgetown, La Paz, Manaus, San Juan, Cuiaba
1	0	0	1	0	UTC-03:30	Newfoundland
0	1	0	1	0	UTC-03:00	Greenland, Montevideo, Buenos Aires, Brasilia, Santiago, Salvador, Cayenne, Fortaleza
1	1	0	1	0	UTC-02:00	Coordinated Universal Time -02
0	0	1	1	0	UTC-01:00	Cabo Verde Is., Azores
1	0	1	1	0	UTC 00:00	Coordinated Universal Time, Dublin, Edinburgh, Lisbon, London, Monrovia, Reykjavik, Casablanca
0	1	1	1	0	UTC+01:00	Belgrade, Bratislava, Budapest, Ljubljana, Prague, Brussels, Copenhagen, Madrid, Paris, Windhoek, Sarajevo, Skopje, Warsaw, Zagreb, West Central Africa, Amsterdam, Berlin, Bern, Rome, Stockholm, Vienna
1	1	1	1	0	UTC+02:00	Damascus, E.Europe, Beirut, Athens, Bucharest, Amman, Jerusalem, Istanbul, Cairo, Kaliningrad, Tripoli, Harare, Pretoria, Helsinki, Kyiv, Riga, Sofia, Tallinn, Vilnius
0	0	0	0	1	UTC+03:00	Nairobi, Moscow, St. Petersburg, Volgograd, Minsk, Baghdad, Kuwait, Riyadh
1	0	0	0	1	UTC+03:30	Tehran
0	1	0	0	1	UTC+04:00	Baku, Abu Dhabi, Muscat, Yerevan, Izhevsk, Samara, Tbilisi, Port Louis
1	1	0	0	1	UTC+04:30	Kabul
0	0	1	0	1	UTC+05:00	Ashgabat, Tashkent, Ekaterinburg, Islamabad, Karachi
1	0	1	0	1	UTC+05:30	Sri Jayewardenepura, Chennai, Kolkata, Mumbai, New Delhi
0	1	1	0	1	UTC+05:45	Kathmandu
1	1	1	0	1	UTC+06:00	Novosibirsk, Dhaka, Astana
0	0	0	1	1	UTC+06:30	Yangon(Rangoon)
1	0	0	1	1	UTC+07:00	Bangkok, Hanoi, Jakarta, Krasnoyarsk
0	1	0	1	1	UTC+08:00	Beijing, Chongqing, Hong Kong, Urumqi, Ulaanbaatar, Irkutsk, Kuala Lumpur, Singapore, Taipei, Perth
1	1	0	1	1	UTC+09:00	Seoul, Yakutsk, Osaka, Sapporo, Tokyo
0	0	1	1	1	UTC+09:30	Darwin, Adelaide

1	0	1	1	1	UTC+10:00	Guam, Port Moresby, Magadan, Brisbane, Vladivostok, Canberra, Melbourne, Sydney, Hobart
0	1	1	1	1	UTC+11:00	Solomon Is., New Caledonia, Chordate
1	1	1	1	1	UTC+12:00	Coordinated Universal Time +12, Anadyr, Petropavlovsk- SK, Auckland, Wellington, Fiji

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Documents / Resources

	Autonics DS-DA Series High Performance Display Units [pdf] Instruction Manual DS-DA Series High Performance Display Units, DS-DA Series, High Performance Display Units, Performance Display Units, Display Units, Units

References

- **autonics.com**