

Autonics INTELLIGENT DISPLAY UNIT (RS485 Communication Input) DS/DA-T 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.
 - Warning 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

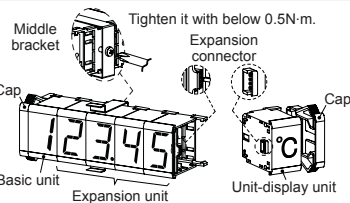
Model	Display method	Size	Model	Display method	Size
DS16-T	7-segment	W16xH24mm	DA22-T	16-segment	W20xH33mm
DS22-T		W20xH33mm	DA40-T		W40xH60mm
DS40-T		W40xH60mm	DA60-T		W60xH96mm
DS60-T		W60xH96mm			

Model	Display method	Size	Model	Display method	Size
DS16-E	7-segment	W16xH24mm	DA22-E	16-segment	W20xH33mm
DS22-E		W20xH33mm	DA40-E		W40xH60mm
DS40-E		W40xH60mm	DA60-E		W60xH96mm
DS60-E		W60xH96mm			

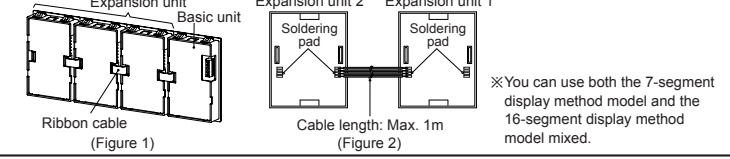
□ indicates color: R (red), G (green)

Connection of Units

- DS16/DA22**
 - 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.

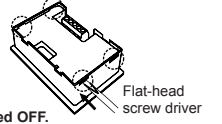


Connect expansion connectors of units using a ribbon cable (accessory) as (Figure 1). If the distance between expansion units is far as (Figure 2), you can connect the cable at the soldering pad. To use a soldering pad, remove the protection cover which only expansion units have.



Removing Protection Cover

To operate the function set switch of the D40, D60 models, you should remove the protection cover. Press the connection parts (4-point) of the protection cover at the top/bottom of the product with a flat-head screwdriver and the protection cover is removed.



Comprehensive Device Management Program [DAQMaster]

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: 1024x768 or higher
Others	RS232C serial port (9-pin), USB port

Visit our website (www.autonics.com) to download DAQMaster program.

※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

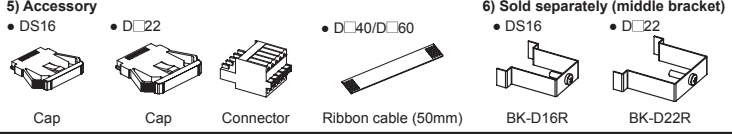
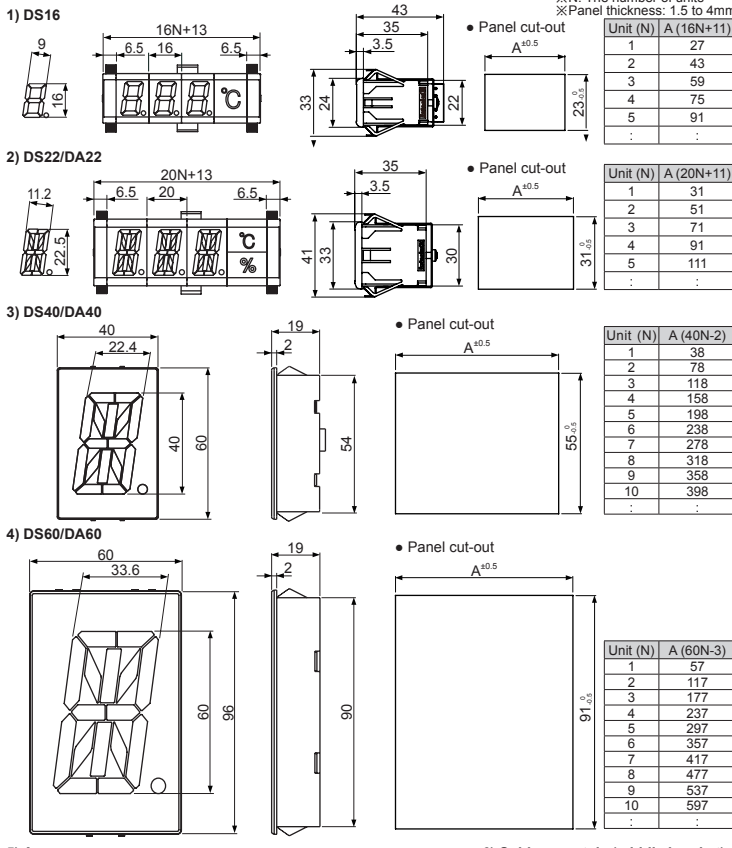
Model	Basic unit	DS16-T	D22-T	D40-T	D60-T
Expansion unit	DS16-E	D22-E	D40-E	D60-E	
Input method	RS485 communication (Modbus protocol)				
Display color	Red, green (selectable by model)				
Power supply	12-24VDC				
Allowable voltage range	90 to 110% of rated voltage				
Current consumption	Red type	Max. 20mA	Max. 25mA	Max. 55mA	Max. 65mA
	Green type	Max. 15mA	Max. 20mA	Max. 40mA	Max. 45mA
Character size	W9xH16mm	W11.2xH22.5mm	W22.4xH40mm	W33.6xH60mm	
Display character	Displays 64 types of character and sign (0 to 9, A to Z, 27 signs, dot)				
Max. connection	24 units				
Noise immunity	±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			
Accessory	Basic unit	Right/Left cap: 1	Right/Left cap: 1	Connector: 1	
	Expansion unit	Ribbon cable (50mm): 1			
Approval	CE				
Weight*1	Basic unit	Approx. 52g (approx. 12g)	Approx. 58g (approx. 17g)	Approx. 63g (approx. 28g)	Approx. 110g (approx. 60g)
	Expansion unit	Approx. 77g (approx. 12g)*2	Approx. 92g (approx. 17g)*2	Approx. 63g (approx. 28g)	Approx. 110g (approx. 60g)

※1: The weight includes packaging. The weight in parenthesis is for unit only. ※2: The weight represents a pack of 3 units. The weight in parenthesis is for 1 unit only. ※Environment resistance is rated at no freezing or condensation.

RS485 communication specifications

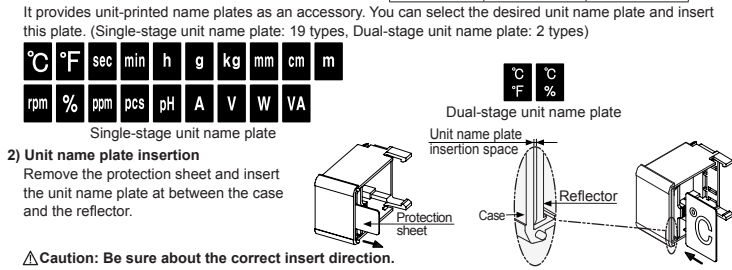
Mode	Slave	Master	Mode	Slave	Master
Comm. protocol	Modbus RTU with 16-bit CRC		Comm. distance	Max. 800m	
Connection type	RS485		Comm. speed	4800, 9600, 19200, 38400bps	
Application standard	Compliance with EIA RS485		Comm. response time	5ms, 20ms	
Max. connection	31 units (address: 01 to 32)	1 unit (address: 01(fixed))	Start bit	1-bit (fixed)	
Comm. type	Two-wire half duplex		Data bit	8-bit (fixed)	
			Parity bit	None (fixed)	
			Stop bit	1-bit (fixed)	

Dimensions



Unit-display Unit

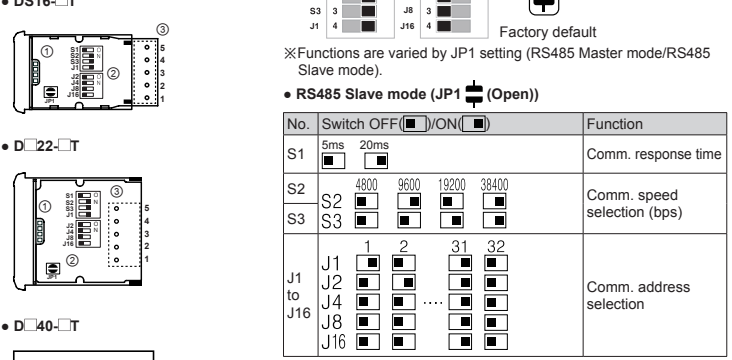
This unit is for displaying unit by inserting a name plate. It has only 16, 22 sizes. (sold separately)



Unit Description and Function Setting

Only the basic unit model has the function set switch and the input terminal. The DS16, D22 models have them at the side, and the D40, D60 models have them at the rear.

- Expansion connector** Using for connecting units. Refer to 'Connection of units'.
- Function set switches**
 - DS16-T: Shows JP1 switch settings for RS485 Slave mode (JP1 Open) and RS485 Master mode (JP1 Short).



No.	Switch OFF () / ON ()	Function
S1	5ms / 20ms	Comm. response time
S2	4800 / 9600 / 19200 / 38400	Comm. speed selection (bps)
S3	J1 to J16	Comm. address selection

No.	Switch OFF () / ON ()	Function
S1	Manual setting / Auto setting	Series setting method
S2	4800 / 9600 / 19200 / 38400	Comm. speed selection (bps)
S3	J1 to J8	Series selection (manual setting)
J1 to J8	CT6, MP5, MT4, TK/TX, TM2, TM4, THD	Series selection (manual setting), Not using the highest digit
J16	No / Yes	Unit-display unit

※Refer to 'RS485 Master Mode'.

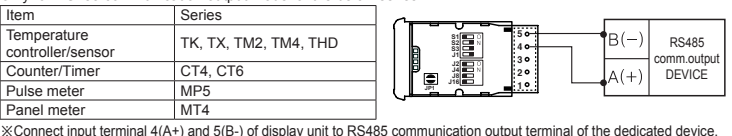
No.	Code	Function	No.	Code	Function
1	VCC	12-24VDC	4	A(+)	RS485 A (+)
2	GND	0V	5	B(-)	RS485 B (-)
3					

※For D22-T connect the connector to input terminal.

RS485 Master Mode

Connect the unit and the specified Autonics device which supports Master mode for displaying current value without PC/PLC. The specified Autonics devices are connected by auto or manual setting. Display may be varied by connection setting. Refer to the below examples.

- Supported Autonics device for RS485 Master mode** Only for RS485 communication output model of the below series.
 - Temperature controller/sensor: TK, TX, TM2, TM4, THD
 - Counter/Timer: CT4, CT6
 - Pulse meter: MP5
 - Panel meter: MT4



※Connect input terminal 4(A+) and 5(B-) of display unit to RS485 communication output terminal of the dedicated device.

RS485 Slave Mode (Data Input Method)

- E.g.: Displays 10H38M (10 hour 38 minute)
- Comm. address: 1, Comm. speed: 9600bps, Data bit: 8-bit, Start/Stop bit: 1-bit, Parity bit: None

Byte	Data (400001)	Data (400002)	Data (400003)	Data (400004)	Error Check (CRC16)
Counter	High Low	High Low	High Low	High Low	High Low
08H	00H 01H	01H 00H	11H 03H	08H 16H	D4H 59H



RS485 Slave Mode (Input Data Chart)

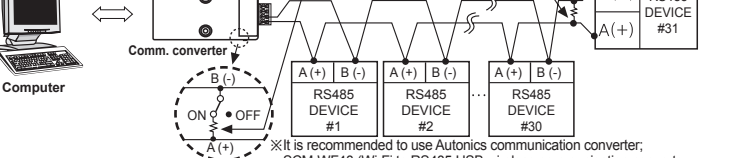
If there is no input data after supplying the power, the basic unit displays 'T'.

DS Series (7-segment)				DA Series (16-segment)				DU Series (unit)		High 2-bit				Low 4-bit			
D5	D4	D3	D2	D5	D4	D3	D2	D5	D4	D3	D2	D1	D0	D3	D2	D1	D0
0	G	W	J	0	G	W	J	No unit	X	L	L	L	L	L	L	L	L
1	H	X	1	1	H	X	1	Upper-Lower OFF		L	L	L	H	L	L	L	H
2	I	Y	2	2	I	Y	2	Upper-Lower ON		L	L	L	L	L	L	L	L
3	J	Z	3	3	J	Z	3	Upper ON		L	L	L	H	L	L	L	H
4	K	-1	4	4	K	-1	4	Lower ON		L	L	L	L	L	L	L	L
5	L	(	5	5	L	(	5	Upper-Lower flashes		L	L	L	L	L	L	L	L
6	M	)	6	6	M	)	6	Upper flashes		L	L	L	L	L	L	L	L
7	N	.	7	7	N	.	7	Lower flashes		L	L	L	L	L	L	L	L
8	O	0	8	8	O	0	8			L	L	L	L	L	L	L	L
9	P	A	9	9	P	A	9			L	L	L	L	L	L	L	L
A	Q	B	A	A	Q	B	A			L	L	L	L	L	L	L	L
B	R	C	B	B	R	C	B			L	L	L	L	L	L	L	L
C	S	D	C	C	S	D	C			L	L	L	L	L	L	L	L
D	T	E	D	D	T	E	D			L	L	L	L	L	L	L	L
E	U	F	E	E	U	F	E			L	L	L	L	L	L	L	L
F	V	G	F	F	V	G	F			L	L	L	L	L	L	L	L

※1: If this data is not for the unit-display unit, it maintains former state.

RS485 Slave Mode (Communication Setting)

- Application of system organization**
 - Terminating resistance (100 to 120Ω)
 - RS232C/USB/Wi-Fi RS485
 - RS485 DEVICE #1, #2, #30
 - Computer



※It is recommended to use Autonics communication converter, SCM-WF48 (Wi-Fi to RS485-USB wireless communication converter, sold separately), SCM-US48 (USB to RS485 converter, sold separately), SCM-38 (RS232C to RS485 converter, sold separately). Please use twist pair wire for RS485 communication.

- Modbus Address Mapping**
 - Data format: Digit 1, 3, 5, ... 23 data; Digit 2, 4, 6, ... 24 data
 - Unit, Dot, Data
 - ※Unit, point are displayed when it is 'H'.

No. (Address)	Func.	R/W	Parameter	Parameter name	Description	Setting range	Default
400001 (0000)	03/06/16	R/W	Zero Blanking	Setting Zero Blanking ON/OFF	0: OFF, 1: ON	0	0
400002 (0001)	03/06/16	R/W	Digit 1, 2	1, 2 display data		0	0
400003 (0002)	03/06/16	R/W	Digit 3, 4	3, 4 display data		0	0
400004 (0003)	03/06/16	R/W	Digit 5, 6	5, 6 display data		0	0
400005 (0004)	03/06/16	R/W	Digit 7, 8	7, 8 display data		0	0
400006 (0005)	03/06/16	R/W	Digit 9, 10	9, 10 display data		0	0
400007 (0006)	03/06/16	R/W	Digit 11, 12	11, 12 display data		0	0
400008 (0007)	03/06/16	R/W	Digit 13, 14	13, 14 display data		0	0
400009 (0008)	03/06/16	R/W	Digit 15, 16	15, 16 display data		0	0
400010 (0009)	03/06/16	R/W	Digit 17, 18	17, 18 display data		0	0
400011 (000A)	03/06/16	R/W	Digit 19, 20	19, 20 display data		0	0
400012 (000B)	03/06/16	R/W	Digit 21, 22	21, 22 display data		0	0
400013 (000C)	03/06/16	R/W	Digit 23, 24	23, 24 display data		0	0
400014 to 400050	03/06/16	R/W	Reserved			0	0

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.
- 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. 2,000m
 - Pollution degree 2
 - Installation 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
- Autonics Corporation
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