Installation & Maintenance Manual
Fieldbus system - Digital unit
Type EX600-DX / EX600-DY / EX600-DM

Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage.
These instructions indicate the level of potential hazard with the labels of "Caution", "Warning" or "Danger". They are all important notes for safety and must be followed in addition to International standards (ISO/IEC), Japan Industrial Standards (JIS) and other safety regulations.

⚠ **Caution**	CAUTION indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
⚠ **Warning**	WARNING indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
⚠ **Danger**	DANGER indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

This product is class A equipment that is intended for use in an industrial environment.
There may be potential difficulties in ensuring electromagnetic compatibility in other environments due to conducted as well as radiated disturbances.

⚠ Warning

- **Do not disassemble, modify (including changing the printed circuit board) or repair.**
  An injury or failure can result.
- **Do not operate the product outside of the specifications.**
  Do not use for flammable or harmful fluids.
  Fire, malfunction, or damage to the product can result.
  Verify the specifications before use.
- **Do not operate in an atmosphere containing flammable or explosive gases.**
  Fire or an explosion can result.
  This product is not designed to be explosion proof.
- **If using the product in an interlocking circuit:**
  - Provide a double interlocking system, for example a mechanical system.
  - Check the product regularly for proper operation.

  Otherwise malfunction can result, causing an accident.
- **The following instructions must be followed during maintenance:**
  - Turn off the power supply.
  - Stop the air supply, exhaust the residual pressure and verify that the air is released before performing maintenance.

  Otherwise an injury can result.

Safety Instructions (Continued)

⚠ Caution

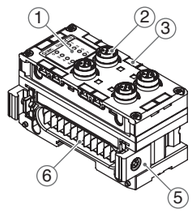
- **When handling, assembling or replacing the unit:**
  - Avoid touching any sharp metal parts of the connectors for connecting units.
  - When assembling units, take care not to get any fingers caught between units. Injury can result.
  - When disassembling units, take care to avoid excessive force. The connection parts of the unit are firmly joined with seals and injury can result.
- **After maintenance is complete, perform appropriate functional inspections.**
  Stop operation if the equipment does not function properly.
  Safety cannot be assured in the case of unexpected malfunction.
- **Provide grounding to assure the safety and noise resistance of the Fieldbus system.**
  Individual grounding should be provided close to the product with a short cable.

NOTE

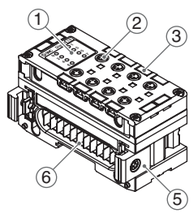
- The direct current power supply to combine should be UL1310 Class2 power supply when conformity to UL is necessary.

Summary of Product parts

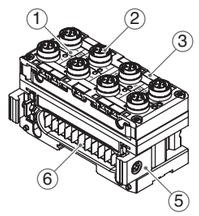
•Digital input unit
•EX600-DX□B



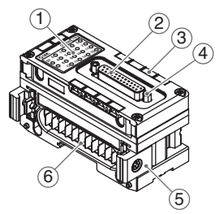
•EX600-DX□C□



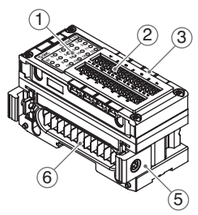
•EX600-DX□D



•EX600-DX□E

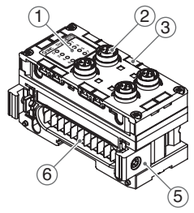


•EX600-DX□F

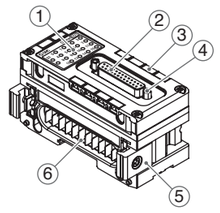


Names and Functions of Product (Continued)

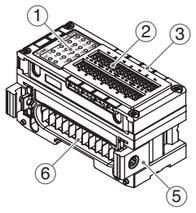
•Digital output unit
•EX600-DY□B



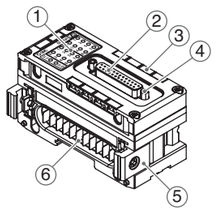
•EX600-DY□E



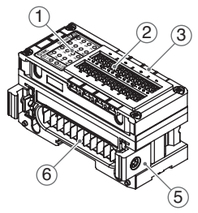
•EX600-DY□F



•Digital I/O unit
•EX600-DM□E



•EX600-DM□F

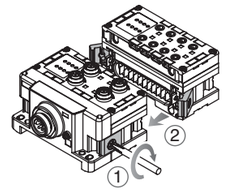


No.	Description	Function
1	Status display LED	Displays the status of the unit.
2	Connector	Connector for inputs or outputs, using M12 or D-sub connector, or a terminal block.
3	Marker groove	Groove for an identification marker.
4	Lock screw	Secures D-sub connector (4-40 UNC).
5	Joint bracket	Bracket for joining adjacent units.
6	Unit connector (Plug)	Connector for signals and power supplies to adjacent units.

Assembly

○Assembling the unit as a manifold

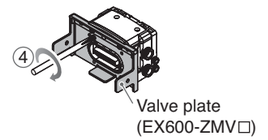
(1) Connect a unit to the end plate.
Digital and Analogue I/O units can be connected in any order.
Tighten the joint brackets to a torque of 1.5 to 1.6 Nm.



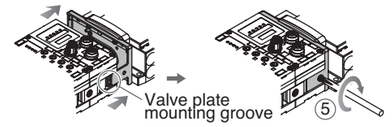
(2) Add more I/O units.
Up to 10 units (including the SI unit) can be connected to one manifold.

(3) Connecting the SI unit.
After connecting the required I/O units, connect the SI unit.
The method is as above in (1), (2).

(4) Mounting the valve plate.
Mount the valve plate (EX600-ZMV□) to the valve manifold using the valve set screws. (M3x8)
Apply 0.6 to 0.7 Nm tightening torque to the screws.



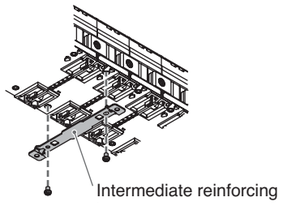
(5) Connect the SI unit to the valve manifold.
Insert the valve plate into the valve plate mounting groove on the side of the SI unit.
Fix using the valve plate screws (M4x6) supplied, to a torque of 0.7 to 0.8 Nm.



Mounting and Installation

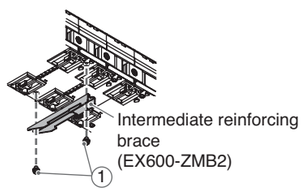
■Installation

•Direct mounting
(1) When joining six or more units, fix the middle part of the complete EX600 unit with an intermediate reinforcing brace (EX600-ZMB1) before mounting, using 2-M4x5 screws.
Tightening torque: 0.7 to 0.8 Nm.

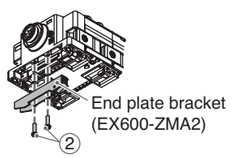


(2) Mount and tighten the end plate at one end of the unit. (M4)
Tightening torque: 0.7 to 0.8 Nm.
Fix the end plate at the valve side while referring to the operation manual of the corresponding valve manifold.

•DIN rail mounting
(Not available for SY series valves. Refer to the SY catalogue.)
(1) When joining six or more units, fix the middle part of the complete EX600 unit with an intermediate reinforcing brace (EX600-ZMB2) before mounting, using 2-M4x6 screws.
Tightening torque: 0.7 to 0.8 Nm.

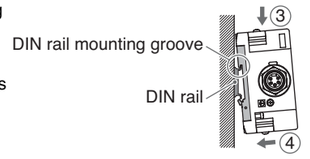


(2) Mount the end plate bracket (EX600-ZMA2) to the end plate at the opposite end to the valves, using 2-M4x14 screws.
Tightening torque: 0.7 to 0.8 Nm.



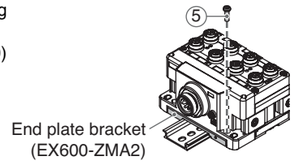
Mounting and Installation (Continued)

(3) Hook the DIN rail mounting groove on to the DIN rail.



(4) Press the manifold using its side hooked to the DIN rail as a fulcrum until the manifold is locked.

(5) Fix the manifold by tightening the DIN rail fixing screws of the EX600-ZMA2. (M4x20)
Tightening torque:
0.7 to 0.8 Nm.
The tightening torque at the valve side depends on the valve type.
Refer to the operation manual of the corresponding valve manifold.



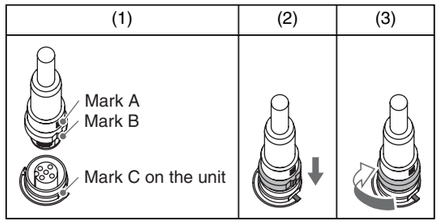
■Wiring

•Connect the M12 connector cable.
The M12 SPEEDCON connector connection method is explained below.

(1) Align mark B on the metal bracket of the cable connector (plug/socket) with mark A.

(2) Align with mark C on the unit and insert the connector vertically. If they are not aligned, the connector cannot be connected correctly.

(3) When mark B has been turned 180 degrees (1/2 turn), wiring is complete. Confirm that the connection is not loose. If turned too far, it will become difficult to remove the connector.

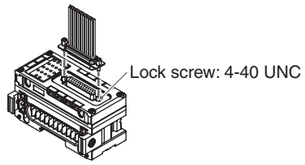


Mounting and Installation (Continued)

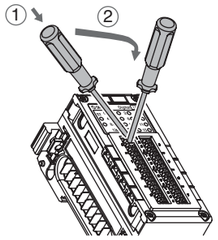
•D-sub socket connection method.
(1) Align the D-sub plug connector with the D-sub socket on the unit.

(2) Insert the connector vertically, taking care not to use excessive force or bend the pins.

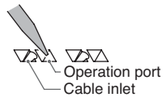
(3) Secure the connector using 2- locking screws (4-40 UNC). Maximum tightening torque is 0.6 Nm.



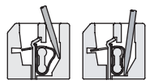
•Spring type terminal connection method.



①Insert a flat blade screwdriver inclined to the left into the right hole of the two holes as shown in the figure below.



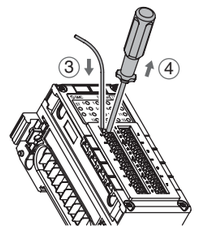
②Incline the screwdriver to the right as indicated by the arrow.
When the screwdriver is pushed downwards until it stops, the cable inlet will open.



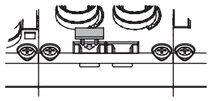
③Insert the cable.



④The spring will capture the cable when the flat blade screwdriver is pulled out. This completes the connection.



•Identification marker
The signal name of the input or output devices and unit address can be written on the marker, and can be installed on each unit.
Mount the marker (EX600-ZT1) into the marker groove as required.



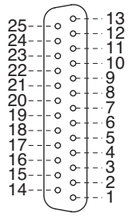
Mounting and Installation (Continued)

•Connector pin assignment

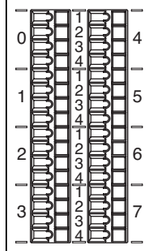
•Digital input unit

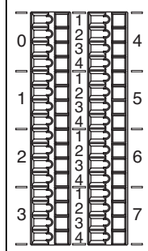
Configuration		Pin number	Signal name
EX600-DX□B/DX□D	EX600-DX□C□		
		1	24 V (Control and input)
		2	Input 2
		3	0 V (Control and input)
		4	Input 1
		5	FE

Configuration	Pin number	Signal name
EX600-DX□E		
	1	Input 0
	2	Input 2
	3	Input 4
	4	Input 6
	5	Input 8
	6	Input 10
	7	Input 12
	8	Input 14
	9	NC
	10	24 V (Control and input)
	11	0 V (Control and input)
	12	0 V (Control and input)
	13	FE

Configuration	Pin number	Signal name
EX600-DX□E		
	14	Input 1
	15	Input 3
	16	Input 5
	17	Input 7
	18	Input 9
	19	Input 11
	20	Input 13
	21	Input 15
	22	24 V (Control and input)
	23	0 V (Control and input)
	24	0 V (Control and input)
	25	FE
	-	-

Mounting and Installation (Continued)

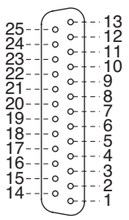
Configuration	Group	Pin number	Signal name
EX600-DX□F			
	0	1	24 V (Control and input) X0
		2	Input 0
		3	Input 1
		4	0 V (Control and input) X0
	1	1	24 V (Control and input) X1
		2	Input 2
		3	Input 3
		4	0 V (Control and input) X1
	2	1	24 V (Control and input) X2
		2	Input 4
		3	Input 5
		4	0 V (Control and input) X2
	3	1	24V (Control and input) X3
		2	Input 6
		3	Input 7
		4	0 V (Control and input) X3

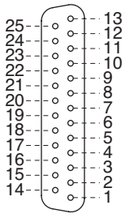
Configuration	Group	Pin number	Signal name
EX600-DX□F			
	4	1	24 V (Control and input) X4
		2	Input 8
		3	Input 9
		4	0 V (Control and input) X4
	5	1	24 V (Control and input) X5
		2	Input 10
		3	Input 11
		4	0 V (Control and input) X5
	6	1	24 V (Control and input) X6
		2	Input 12
		3	Input 13
		4	0 V (Control and input) X6
	7	1	24V (Control and input) X7
		2	Input 14
		3	Input 15
		4	0 V (Control and input) X7

Mounting and Installation (Continued)

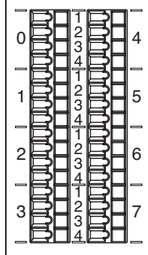
•Digital output unit

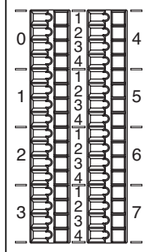
Configuration	Pin number	Signal name	
EX600-DY□B		EX600-DYPB	EX600-DYNB
	1	NC	24 V (Output)
	2	Output 2	Output 2
	3	0 V (Output)	NC
	4	Output 1	Output 1
	5	FE	FE

Configuration	Pin number	Signal name	
EX600-DY□E		EX600-DYPE	EX600-DYNE
	1	Output 0	
	2	Output 2	
	3	Output 4	
	4	Output 6	
	5	Output 8	
	6	Output 10	
	7	Output 12	
	8	Output 14	
	9	NC	
	10	NC	
	11	NC	
	12	NC	
	13	0 V (Output)	24 V (Output)

Configuration	Pin number	Signal name	
EX600-DY□E		EX600-DYPE	EX600-DYNE
	14	Output 1	
	15	Output 3	
	16	Output 5	
	17	Output 7	
	18	Output 9	
	19	Output 11	
	20	Output 13	
	21	Output 15	
	22	NC	
	23	NC	
	24	NC	
	25	0 V (Output)	24 V (Output)
	-	-	

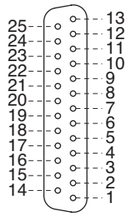
Mounting and Installation (Continued)

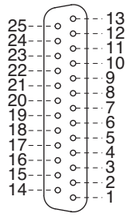
Configuration	Group	Pin number	Signal name	
EX600-DY□F			EX600-DYPF	EX600-DYNF
	0	1	0 V (Output)	24 V (Output)
		2	Output 0	
		3	0 V (Output)	24 V (Output)
		4	Output 1	
	1	1	0 V (Output)	24 V (Output)
		2	Output 2	
		3	0 V (Output)	24 V (Output)
		4	Output 3	
	2	1	0 V (Output)	24 V (Output)
		2	Output 4	
		3	0 V (Output)	24 V (Output)
		4	Output 5	
	3	1	0 V (Output)	24 V (Output)
		2	Output 6	
		3	0 V (Output)	24 V (Output)
		4	Output 7	

Configuration	Group	Pin number	Signal name	
EX600-DY□F			EX600-DYPF	EX600-DYNF
	4	1	0 V (Output)	24 V (Output)
		2	Output 8	
		3	0 V (Output)	24 V (Output)
		4	Output 9	
	5	1	0 V (Output)	24 V (Output)
		2	Output 10	
		3	0 V (Output)	24 V (Output)
		4	Output 11	
	6	1	0 V (Output)	24 V (Output)
		2	Output 12	
		3	0 V (Output)	24 V (Output)
		4	Output 13	
	7	1	0 V (Output)	24 V (Output)
		2	Output 14	
		3	0 V (Output)	24 V (Output)
		4	Output 15	

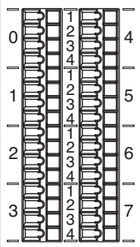
Mounting and Installation (Continued)

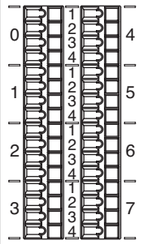
•Digital I/O unit

Configuration	Pin number	Signal name	
EX600-DM□E		EX600-DMPE	EX600-DMNE
	1	Input 0	
	2	Input 1	
	3	Input 2	
	4	Input 3	
	5	Input 4	
	6	Input 5	
	7	Input 6	
	8	Input 7	
	9	24 V(Control and input)	
	10	24 V(Control and input)	
	11	0 V(Control and input)	
	12	0 V(Control and input)	
	13	FE	

Configuration	Pin number	Signal name	
EX600-DM□E		EX600-DMPE	EX600-DMNE
	14	Output 0	
	15	Output 1	
	16	Output 2	
	17	Output 3	
	18	Output 4	
	19	Output 5	
	20	Output 6	
	21	Output 7	
	22	0 V (Output)	24 V (Output)
	23	0 V (Output)	24 V (Output)
	24	0 V (Output)	24 V (Output)
	25	FE	
	-	-	

Mounting and Installation (Continued)

Configuration	Group	Pin number	Signal name	
EX600-DM□F			EX600-DMPF	EX600-DMNF
	0	1	24 V (Control and input) X0	
		2	Input 0	
		3	Input 1	
		4	0V (Control and input) X0	
	1	1	24 V (Control and input) X1	
		2	Input 2	
		3	Input 3	
		4	0 V (Control and input) X1	
	2	1	24 V (Control and input) X2	
		2	Input 4	
		3	Input 5	
		4	0 V (Control and input) X2	
	3	1	24V (Control and input) X3	
		2	Input 6	
		3	Input 7	
		4	0 V (Control and input) X3	

Configuration	Group	Pin number	Signal name	
EX600-DM□F			EX600-DMPF	EX600-DMNF
	4	1	0 V (Output)	24 V (Output)
		2	Output 0	
		3	0 V (Output)	24 V (Output)
		4	Output 1	
	5	1	0 V (Output)	24 V (Output)
		2	Output 2	
		3	0 V (Output)	24 V (Output)
		4	Output 3	
	6	1	0 V (Output)	24 V (Output)
		2	Output 4	
		3	0 V (Output)	24 V (Output)
		4	Output 5	
	7	1	0 V (Output)	24 V (Output)
		2	Output 6	
		3	0 V (Output)	24 V (Output)
		4	Output 7	

LED Display

•Digital input unit — ST: STatus display LED

Model	Display	Content
EX600-DX□B EX600-DX□C□ EX600-DX□D	OFF.	The power supply for control and input, or the input device, is OFF.
	Green LED is ON.	The input device is ON.
	Red LED is ON.	The input device has a short circuit.
	Red LED is flashing.	•The input device ON/OFF count has exceeded the set value. •The input device is open circuit. (Only for EX600-DX□C1)
EX600-DX□E EX600-DX□F	ST LED is OFF.	The power supply for control and input is OFF.
	Green ST LED is ON.	The product is operating normally.
	Red ST LED is ON.	The input device has a short circuit.
	Red ST LED is flashing.	The input device ON/OFF count has exceeded the set value.
	"0 to 15" LEDs are OFF.	The input device is OFF.
	"0 to 15" Green LEDs are ON.	The input device is ON.

•Digital output unit — ST: STatus display LED

Model	Display	Content
EX600-DY□B	OFF.	The power supply for control and input, or the output device, is OFF.
	Green LED is ON.	The output device is ON.
	Red LED is ON.	The output device has a short circuit.
	Red LED is flashing.	•The output device ON/OFF count has exceeded the set value. •The output device is open circuit.
EX600-DY□E EX600-DY□F	ST LED is OFF.	The power supply for control and input is OFF.
	Green ST LED is ON.	The product is operating normally.
	Red ST LED is ON.	The output device has a short circuit.
	Red ST LED is flashing.	•The output device ON/OFF count has exceeded the set value. •The output device is open circuit.
	"0 to 15" LEDs are OFF.	The output device is OFF.
	"0 to 15" Green LEDs are ON.	The output device is ON.

LED Display (Continued)

•Digital I/O unit — ST: STatus display LED

Model	Display	Content
EX600-DM□E EX600-DM□F	ST LED is OFF.	The power supply for control and input is OFF.
	Green ST LED is ON.	The product is operating normally.
	Red ST(I) LED is ON.	The input device has a short circuit.
	Red ST(O) LED is ON.	The output device has a short circuit.
	Red ST(I) LED is flashing.	The input device ON/OFF count has exceeded the set value.
	Red ST(O) LED is flashing.	•The output device ON/OFF count has exceeded the set value. •The output device is open circuit.
	"0 to 7" LEDs are OFF.	The input device or the output device are OFF.
	Input (left) "0 to 7" Green LEDs are ON.	The input device is ON.
	Output (right) "0 to 7" Green LEDs are ON.	The output device is ON.

Maintenance

•Maintenance should be performed according to the Safety Instructions.
•Perform regular maintenance and inspections.
There is a risk of unexpected malfunction.
•Do not use solvents such as benzene, thinner etc. to clean each unit.
They could damage the surface of the body and erase the markings on the body.
Use a soft cloth to remove stains.
For heavy stains, use a cloth soaked with diluted neutral detergent and fully squeezed, then wipe up the stains again with a dry cloth.

Refer to the SMC website (URL http://www.smcworld.com) to obtain more detailed information about maintenance.

Troubleshooting

Refer to the LED Display. Refer to the SMC website (URL http://www.smcworld.com) to obtain more detailed information about troubleshooting.

Specification

Model		DX□B/DX□C /DX□D	DM□E/DM□F	DY□B/DY□E/DY□F
			DM□E/DM□F	
Power supply	Control and input	24 VDC Class2, 2 A		
	Output	-	24 VDC Class2, 2 A	
Rated input current		9 mA or less	5 mA or less	-
Max. load current		-		500 mA or less/output
Operating temperature range		-10 to 50 °C (Max. surrounding air temperature rating: 50 °C)		
Storage temperature range		-20 to 60 °C		
Pollution degree		For use in Pollution Degree 2 Environment (UL508)		
Vibration resistance		10 to 57 Hz: constant amplitude 0.75 mm p-p 57 to 150 Hz: constant acceleration 49 m/s² for 2 hours each in direction X, Y and Z respectively (De-energized)		
Impact resistance		147 m/s² 3 times each in directions of X, Y and Z respectively (De-energized)		

∗1: Input terminals are not isolated from Power source.
∗2: Do not connect outside Power source to Input and Output terminals.

Refer to the product catalogue or SMC website (URL http://www.smcworld.com) to obtain more detailed information about product specifications.

Outline with Dimensions

Refer to the product catalogue or SMC website (URL http://www.smcworld.com) to obtain more detailed information about outline dimensions.

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SMC Corporation

URL http://www.smcworld.com (Global) http://www.smceu.com (Europe)

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