

Fieldbus system Operation Manual



EX600-AX/EX600-AY/EX600-AM

Thank you for purchasing an SMC EX600 Series Fieldbus system. Please read this manual carefully before operating the product and make sure you understand its capabilities and limitations. Please keep this manual handy for future reference.

To obtain more detailed information about operating this product, please refer to the SMC website (URL <http://www.smcworld.com>) or contact SMC directly.

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.

Operator

- ◆ This operation manual is intended for those who have knowledge of machinery using pneumatic equipment, and have sufficient knowledge of assembly, operation and maintenance of such equipment. Only those persons are allowed to perform assembly, operation and maintenance.
- ◆ Read and understand this operation manual carefully before assembling, operating or providing maintenance to the product.

Safety Instructions

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.

Caution

- **When handling the unit or assembling/replacing units:**
-Do not touch the sharp metal parts of the connector or plug for connecting units.
-Take care not to hit your hand when disassembling the unit.
The connecting portions of the unit are firmly joined with seals.
-When joining units, take care not to get fingers caught between units.
An 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.

Maintenance

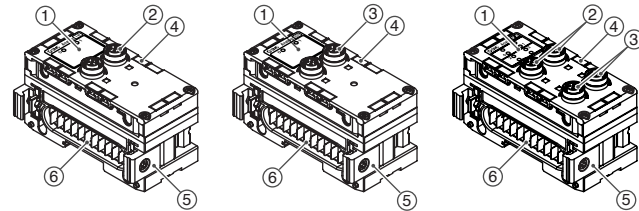
- ◆ Maintenance should be performed according to the Safety Instructions.
- ◆ Perform regular maintenance and inspections.
There is a risk of unexpected malfunction.
- ◆ Do not use solvents such as benzene, thinner etc. to clean each unit.
They could damage the surface of the body and erase the markings 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.

Names and Functions of Product

Names of individual parts

- Analog input unit
•EX600-AXA
- Analog output unit
•EX600-AYA
- Analog I/O unit
•EX600-AMB

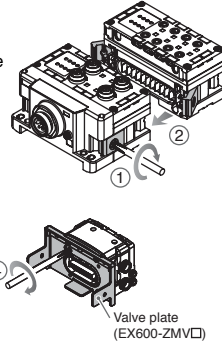


No.	Description	Function
1	Status display LED	Displays the status of the unit.
2	Connector (analog input)	Connector for Analog input device.
3	Connector (analog output)	Connector for Analog output device.
4	Marker groove	Groove to mount a marker.
5	Joint bracket	Bracket for joining to adjacent units.
6	Unit connector (plug)	Transmits signals and power supplies to adjacent units.

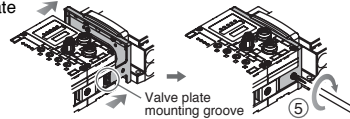
Assembly

Composing the unit as a manifold

- (1) Connect the unit to the end plate.
The Digital unit, Analog unit can be connected in any order.
Tighten the bracket of the joint using tightening torque 1.5 to 1.6 Nm.
- (2) Add more units.
Up to 10 units (including the SI unit) can be connected to one manifold.
- (3) Connecting the SI unit.
After connecting the necessary units, connect the SI unit.
Connecting method is the same as above (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 and the valve manifold.
Insert the valve plate to the valve plate set groove on the side of SI unit.
Then, tighten it with the valve plate set screws (M4x6) to fix the plate.
Tightening torque for set screws 0.7 to 0.8 Nm.

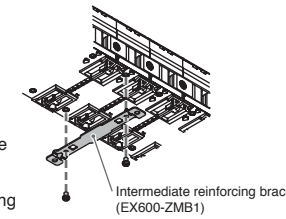


Mounting and Installation

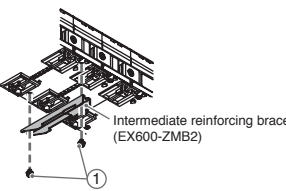
Installation

Direct mounting

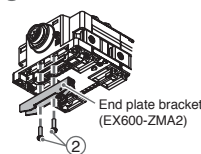
- (1) When joining six or more units, fix the middle part of the complete EX600 unit with an intermediate reinforcing brace (EX600-ZMB1) before mounting using 2-M4x5 screws.
Tightening torque: 0.7 to 0.8 Nm.
- (2) Fix and tighten the end plates at one end of the unit. (M4)
Tightening torque: 0.7 to 0.8 Nm.
Fix the end plate at the valve side while referring to the operation manual of the corresponding valve manifold.



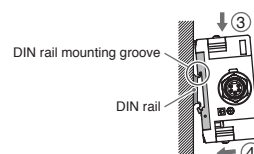
- DIN rail mounting
(Available for series other than SY series. Refer to the catalog for SY series.)
- (1) When joining six or more units, fix the middle part of the complete EX600 unit with an intermediate reinforcing brace (EX600-ZMB2) before mounting, using 2-M4x6 screws.
Tightening torque: 0.7 to 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.

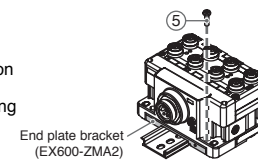


- (3) Hook the DIN rail mounting groove to the DIN rail.



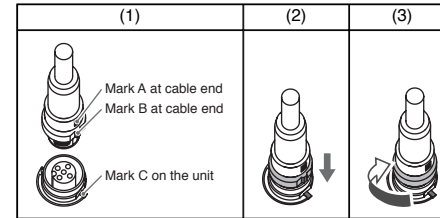
- (4) Press the manifold using its side hooked to the DIN rail as a fulcrum until the manifold is locked.

- (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.

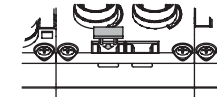


Wiring

- Connect the M12 or M8 connector cable. M12 connector is applicable for SPEEDCON connector.
SPEEDCON connector wiring method is explained below.
- (1) Align the mark B on the metal bracket of the cable side connector (plug/socket) with the mark A.
- (2) Align the mark C on the unit and insert the connector into the unit vertically.
If they are not aligned, the connector cannot be joined properly.
- (3) When the mark B of the connector has been turned 180 degrees (1/2 turn), wiring is completed. Confirm that the connection is not loose. If turned too far, it will become hard to remove the connector.



- Mounting the marker
Signal name of the input or output devices and unit address can be written to the marker, and it can be installed to each unit.
Mount the marker (EX600-ZT1) into the marker groove as required.

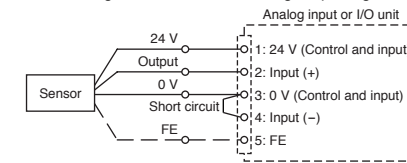


Connector pin assignment

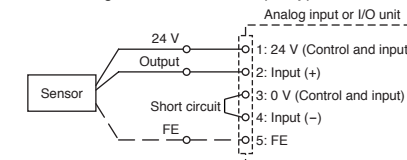
Configuration	Pin number	Signal name			
		Analog input unit EX600-AXA	Analog output unit EX600-AYA	Analog I/O unit EX600-AMB	
		Input connector	Output connector		
	1	24 V (control and input)	24 V (output)	24 V (control and input)	24 V (output)
	2	Input +	Output	Input +	Output
	3	0 V (control and input)	0 V (output)	0 V (control and input)	0 V (output)
	4	Input -	0 V (output)	Input -	0 V (output)
	5	FE	FE	FE	FE

Examples of wiring with input devices

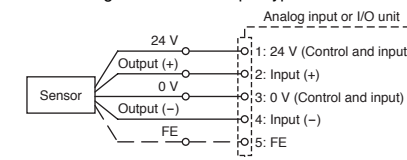
- When using a sensor whose analog output signal is 0 V standard type.



- When using a 2-wire current output type sensor.



- When using a differential output type sensor.



Precautions for handling

- When an analog sensor is connected to the Analog input or I/O unit, pay attention to the following cautions.
EX600 analog input has a differential input specification, and it receives 2-pin (input +) signal based on 4-pin (input -). Because of the specification, if 4-pin is not connected, it will not be able to read the signal input properly. Therefore, when using an analog sensor that does not have the differential output type, 3-pin and 4-pin should be connected externally.

LED Display

The status display LED shows the following unit state.

Analog input unit

Display	Content
Off	The power supply for control and input is Off.
Green LED is On	The product is operating normally.
Red LED is On	The power supply of input device has a short circuit.
0 and 1 red LEDs are On	Either of the following conditions: •The current value of the analog input device has exceeded the upper or lower limit. •When the range is set by current input type, voltage is input from the analog input device.
Red LED is flashing	Either of the following conditions: •The upper or lower limit of the range is exceeded. •The upper or lower limit of the measuring value (with user's setting value) is exceeded.

Analog output unit

Display	Content
Off	The power supply for control and input is Off.
Green LED is On	The product is operating normally.
Red LED is On	The power supply of output device has a short circuit.
Red LED is flashing	The upper or lower limit of the output value (with user's setting value) is exceeded.

Analog I/O unit

Display	Content
Off	The power supply for control and input is Off.
Green LED is On	The product is operating normally.
Red LED is On	The power supply of input or output devices has a short circuit.
0 and 1 red LEDs are On	Input Either of the following conditions: •The current value of the analog input device has exceeded the upper or lower limit. •When the range is set by current input type, voltage is input from the analog input device.
Red LED is flashing	Input Either of the following conditions: •The upper or lower limit of the range is exceeded. •The upper or lower limit of the measuring value (with user's setting value) is exceeded. Output The upper or lower limit of the output value (with user's setting value) is exceeded.

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

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	EX600-AXA	EX600-AYA	EX600-AMB
Power supply	24 VDC Class2, 2 A		
Control and input	24 VDC Class2, 2 A		
Output	24 VDC Class2, 2 A		
Input signal range	-10 V to 10 V -20 mA to 20 mA	-	0 V to 10 V 0 mA to 20 mA
Output signal range	-	0 V to 10 V 0 mA to 20 mA	0 V to 10 V 0 mA to 20 mA
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/s ² for 2 hours each in direction X, Y and Z respectively (De-energized)		
Impact resistance	147 m/s ² 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 catalog or SMC website (URL <http://www.smcworld.com>) to obtain more detailed information about product specifications.

Analog characteristics

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

Outline with Dimensions

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

SMC Corporation URL <http://www.smcworld.com>

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Note: Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.
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