

Fieldbus system Instruction Manual



EX600-SPN3/EX600-SPN4

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 <https://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) 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

- ◆ The 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 the 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.
- When handling, assembling or replacing the units:
 - 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.

Caution

NOTE

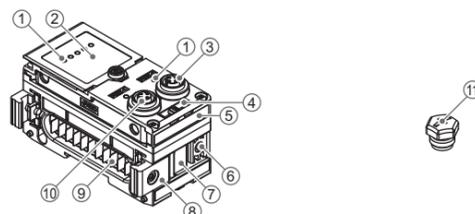
- The direct current power supply to combine should be UL1310 Class 2 power supply when conformity to UL is necessary.
- The output rating is tested as a DC output for General use.

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 <https://www.smcworld.com>) for more information about maintenance.

Summary of Product parts

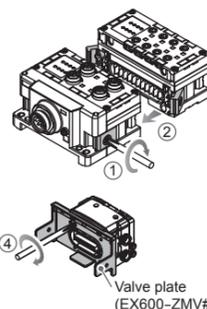


No.	Description	Function
1	Status display LED	Displays the status of the unit.
2	Display cover	The display cover should not be opened.
3	Connector (PORT2)	Connector for the fieldbus communication cable.
4	Marker groove	Groove for an identification marker.
5	MAC address label	Displays the 12 digit MAC address which is different for each SI unit.
6	Valve plate mounting hole	Holes for fixing the valve plate.
7	Valve plate mounting groove	Groove for mounting the valve plate.
8	Joint bracket	Bracket for joining to adjacent units.
9	Unit connector (Plug)	Connector for signals and power supplies to adjacent units.
10	Connector (PORT1)	Connector for the fieldbus communication cable.
11	Seal cap	Fitted to unused connector. (PORT2)

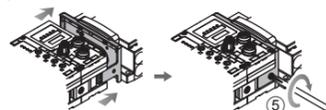
Assembly

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. (M3 x 8) Apply 0.6 to 0.7 Nm tightening torque to the screws.



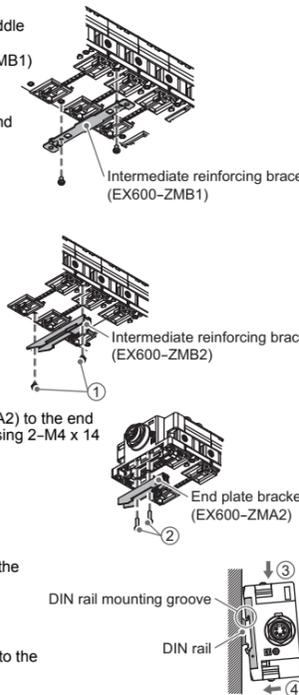
- (5) Connect the SI unit to the valve manifold. Insert the valve plate into the valve plate mounting groove on the side of the SI unit. Fix using the valve plate screws (M4 x 6) supplied, to a torque of 0.7 to 0.8 Nm.



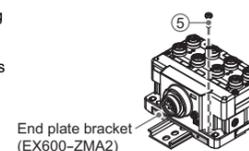
Mounting and Installation

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-M4 x 5 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-M4 x 6 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 of the valves, using 2-M4 x 14 screws. Tightening torque: 0.7 to 0.8 Nm.
 - (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. (M4 x 20) 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

Connector pin assignment

Configuration		Pin number	Signal name
PORT1	PORT2		
1	1	1	TD+
2	2	2	RD+
3	3	3	TD-
4	4	4	RD-

Mounting the marker

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



Setting and Adjustment

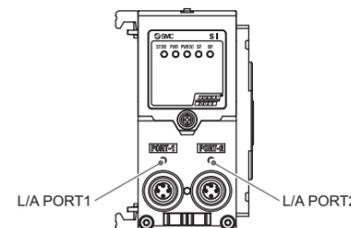
This product has no switches for setting, therefore the display cover should not be opened.

- Parameter Setting
- Hardware Configuration
- I/O Map
- Diagnostic

Refer to the SMC website (URL <https://www.smcworld.com>) for more information about these settings.

LED Display

The status display LED displays the power supply and communication status.



LED display	Content	
ST(M)	Green ON	Normal operation.
	Green flashing	Diagnostic error of I/O unit is detected.
	Red flashing	Either of the following diagnostic error is detected. (When diagnostic parameter is enabled) <ul style="list-style-type: none"> • Valve ON/OFF counter has exceeded the set value. • Valve is short circuited or disconnected.
	Red/green flashing	Internal communication error between SI unit and I/O unit is detected.
	Red ON	SI unit has failed.
PWR	Green ON	The power supply voltage for control and input is properly.
	Red ON	The power supply voltage for control and input is below 19 VDC. (When diagnostic parameter is enabled)
PWR(V)	OFF	The power supply voltage for output is below 19 VDC. (When diagnostic parameter is disabled)
	Green ON	The power supply for output is properly.
SF	Red ON	The power supply voltage for output is below 19 VDC. (When diagnostic parameter is enabled)
	OFF	Normal operation.
BF	Red ON	Diagnostic error is detected.
	Green flashing	Node flashing test.
	OFF	PROFINET communication is established.
L/A PORT1	Red flashing	The configuration data of PLC and actual EX600 configuration is not consistent.
	Red ON	Either of the following conditions. <ul style="list-style-type: none"> • Device name setting to PLC and SI unit is not consistent. • The power supply for PLC is OFF. • The communication cable is not connected. • The PLC or SI unit has broken.
L/A PORT2	OFF	PORT1 side: No Link, No Activity
	Green ON	PORT1 side: Link, No Activity
L/A PORT2	Green flashing	PORT1 side: Link, Activity
	Green ON	PORT2 side: No Link, No Activity
L/A PORT2	Green ON	PORT2 side: Link, No Activity
	Green flashing	PORT2 side: Link, Activity

Refer to the SMC website (URL <https://www.smcworld.com>) for more information about LED state.

Troubleshooting

Refer to the LED Display. Refer to the SMC website (URL <https://www.smcworld.com>) for more information about troubleshooting.

Specifications

Model	EX600-SPN3	EX600-SPN4
Protocol	PROFINET V2.3S	
Conformance Class	Class C	
Communication speed	100 Mbps	
Configuration file	GSDML file	
Application function	Fast Start Up MRP System Redundancy S2 Web server	
Power supply for Control/Input	24 VDC Class 2, 2 A	
Power supply for Output	24 VDC Class 2, 2 A	
Internal current consumption (Power supply for Control/Input)	120 mA or less	
Output type	Source/PNP (Negative common)	Sink/NPN (Positive common)
Number of outputs	32 outputs	
Connected load and output rating	Solenoid valve with surge voltage suppressor of 24 VDC, 1.0 W or less, DC General per output (manufactured by SMC)	
Fail safe	Hold/Clear/Forced ON	
Protection	Short circuit protection	
Operating temperature	-10 to 50 °C (Max. surrounding air temperature rating: 50 °C)	
Pollution degree	For use pollution Degree 3 Environment (UL508)	
Vibration resistance	10 to 57 Hz constant amplitude 0.75 mm p-p 57 to 150 Hz constant acceleration 49m/s ² for 2 hours each in direction X, Y and Z respectively (De-energized)	
Impact resistance	147m/s ² 3 times each in direction of X, Y and Z respectively (De-energized)	
Enclosure	IP67 (Manifold assembly) (IP rating is outside range for UL/cUL certified)	
Standard	CE marked (EMC directive, RoHS directive), UL (CSA)	
Weight	300 g	

Refer to the product catalogue or SMC website (URL <https://www.smcworld.com>) for more information about product specifications.

Outline with Dimensions

Refer to the product catalogue or SMC website (URL <https://www.smcworld.com>) for more information about outline dimensions.

SMC Corporation URL <https://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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