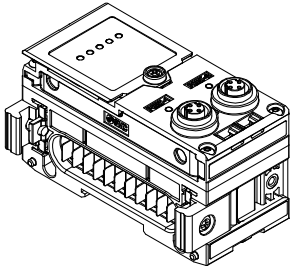




Instruction Manual
Fieldbus device - SI unit for EtherNet/IP™
EX600-SEN7 / -SEN8



The intended use of this product is to control pneumatic valves and I/O while connected to the EtherNet/IP™ protocol.

1 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.

^{*)}ISO 4414: Pneumatic fluid power — General rules and safety requirements for systems and their components.
ISO 4413: Hydraulic fluid power — General rules and safety requirements for systems and their components
IEC 60204-1: Safety of machinery - Electrical equipment of machines - Part 1: General requirements
ISO 10218-1: Robotics — Safety requirements — Part 1: Industrial robots

- Refer to product catalogue, Operation Manual and Handling Precautions for SMC Products for additional information.
- Keep this manual in a safe place for future reference.

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

Warning

- **Always ensure compliance with relevant safety laws and standards.**
- All work must be carried out in a safe manner by a qualified person in compliance with applicable national regulations.
- Refer to the operation manual on the SMC website (URL: <https://www.smcworld.com>) for further Safety Instructions.

2 Specifications

The EX600 range of units can be connected to a fieldbus to realize the reduction of input or output device wiring and a distributed control system. The system communicates with the fieldbus through the SI unit. One SI unit can be connected to manifold valves with up to 32 outputs, and to input, output, I/O and IO-Link master units to a maximum of 9 units.

2.1 General specifications

Item	Specifications
Ambient temperature	-10 to +50 °C
Ambient humidity	35 to 85%RH (no condensation)
Ambient storage temperature	-20 to +60 °C
Withstand voltage	500 VAC applied for 1 minute
Insulation resistance	500 VDC, 10 MΩ or more
Enclosure rating	IP67 (manifold assembled)
Weight	300 g

2 Specifications (continued)

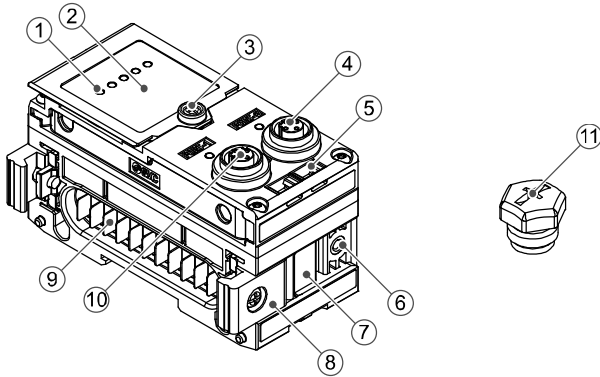
2.2 Electrical specifications

Item		Specifications
Power supply voltage / current	Control and Input power supply	24.0 VDC 2.0 A max.
	Solenoid valve and Output power supply	24.0 VDC 2.0 A max.
	Internal current consumption	120 mA maximum
Solenoid valve specification	Output type	EX600-SEN7 PNP / source (negative common)
		EX600-SEN8 NPN / sink (positive common)
	Number of outputs	32 outputs
	Applicable valve series	24 VDC and 1.0 W max. Solenoid valve with surge voltage suppression (manufactured by SMC)
	Output condition during communication error	HOLD / CLEAR / Force ON
	Protection function	Short circuit protection

2.3 Communication specifications

Item	Specifications
Protocol	EtherNet/IP™ (conformance version: Composite18)
Number of ports	2 ports
Communication medium	Standard EtherNet cable (CAT5 or more, 100BASE-TX)
Communication speed	10 / 100 Mbps
Communication type	Full duplex / Half duplex
Occupying area (number of input/output)	1212 bytes / 1210 bytes max.
IP address setting range	Setting by switch: 192.168.0 or 1.1 to 254 By DHCP server: arbitrary address
Device information	Vendor ID: 7 (SMC Corporation) Device type: 12 (communication adapter) Product code: 258
Network Topology	Star, Linear Bus and Ring (including DLR)
Applicable functions	QuickConnect™, Web server

3 Name and function of parts



No	Part	Description
1	LED display	Displays the SI unit status.
2	Display cover	Display cover for switch setting.
3	Display cover screw	To open the display cover.
4	Connector (PORT 2)	Connector for Fieldbus Outputs.
5	Marker groove	Groove for identification marker.
6	Valve plate hole	Hole for valve plate mounting.
7	Valve plate groove	Groove for valve plate mounting.
8	Joint bracket	Bracket for joining to adjacent units.
9	Unit connector	Connector for signal/power to next unit.
10	Connector (PORT 1)	Connector for Fieldbus Inputs.
11	Seal cap (1 pc.)	For all unused M12 connectors

4 Assembly

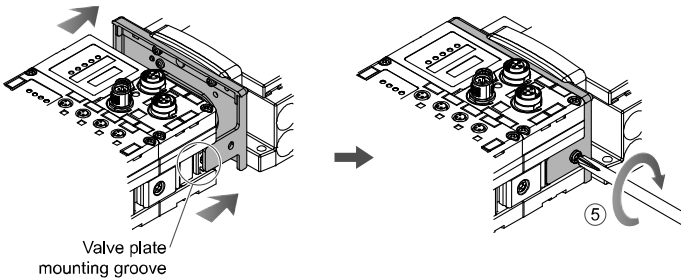
4.1 Assembling the unit

Warning

Do not install the product unless the safety instructions have been read and understood.

- (1) Connect an I/O unit to the end plate. Digital and analogue units can be connected in any order. Joint bracket screw tightening torque: 1.5 to 1.6 N•m.
- (2) Add more I/O units. Up to 9 I/O units can be connected to one manifold.
- (3) Connect the SI unit. After connecting the required I/O units, connect the SI unit. The connection method is as above.
- (4) Mount the valve plate (EX600-ZMV#) to the valve manifold using the valve screws (M3 x 8) supplied. (Tightening torque: 0.6 to 0.7 N•m).
- (5) Connect the SI unit assembly to the valve manifold. Insert the valve plate into the valve plate mounting groove.

Then fix using the valve plate mounting screws (M4 x 6) supplied (Tightening torque: 0.7 to 0.8 N•m).

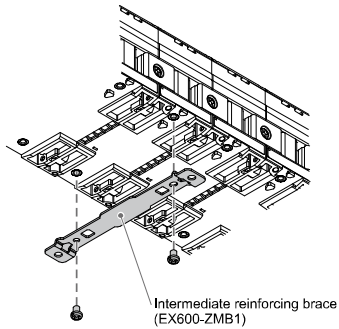


5 Installation

- Do not expose to direct sunlight. Use a suitable protective cover.
- Do not install in a location subject to vibration or impact in excess of the product's specifications.
- Do not mount in a location exposed to radiant heat that would result in temperatures in excess of the product's specifications.

• **Direct mounting**

- (1) When assembling six or more units, the middle part of the assembly must be fitted with an intermediate reinforcing brace (EX600-ZMB1) before mounting using 2 - M4x5 screws (Tightening torque: 0.7 to 0.8 N•m).

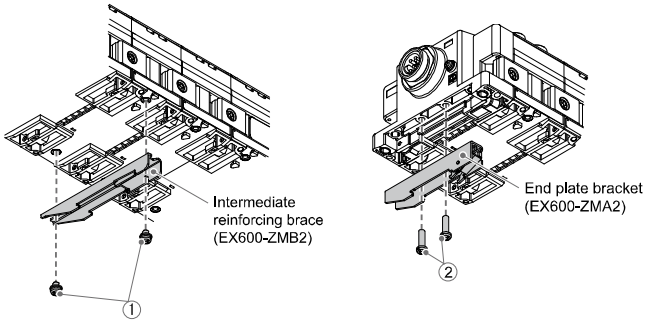


- (2) Mount and tighten the end plate at one end of the unit and mount the intermediate reinforcing brace if required using M4 screws (Tightening torque: 0.7 to 0.8 N•m). Fix the end plate at the valve side while referring to the operation manual for the applicable valve series.

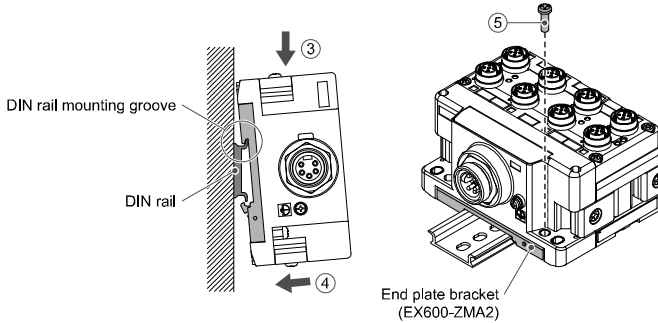
5 Installation (continued)

• **DIN rail mounting**

- (1) When assembling six or more units, the middle part of the complete assembly must be fitted with an intermediate reinforcing brace for DIN rail mounting (EX600-ZMB2), using 2 - M4 x 6 screws. (Tightening torque: 0.7 to 0.8 N•m).
- (2) Mount the end plate bracket (EX600-ZMA2) to the end plate using 2-M4 x 14 screws (Tightening torque: 0.7 to 0.8 N•m). For the SY series, use end plate bracket (EX600-ZMA3).



- (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 onto the DIN rail.
- (5) Fix the manifold by tightening the DIN rail fixing screws (M4 x 20) on the end plate bracket (Tightening torque: 0.7 to 0.8 N•m). Refer to the Operation Manual for the applicable valve series on the SMC website (URL: <https://www.smcworld.com>) for the mounting method of the valve manifold.



5.1 Wiring connections

• **Communication Connector**

Select the appropriate cables to mate with the connectors on the SI unit. The EtherNet/IP™ connection port pin layout is as shown below.

Connector	Pin No.	Signal name
	1	TX+
	2	RX+
	3	TX-
	4	RX-

• **Power Supply Connector**

The system is operated using power supplied from the EX600-ED# end plate. Refer to the end plate instruction manual and operation manual for the power supply connection details.

The M12 connector cable for fieldbus and power supply connections has two types, Standard M12 and SPEEDCON compatible. If both plug and socket have SPEEDCON connectors, the cable can be inserted and connected by turning it a 1/2 rotation. A standard connector can be connected to a SPEEDCON connector.

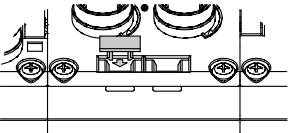
Warning

- Be sure to fit a seal cap (EX9-AWTS) on any unused connectors. Proper use of the seal cap enables the enclosure to maintain IP67 specification.

5 Installation (continued)

5.2 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 a marker (EX600-ZT1) into the marker groove as required.



5.3 Environment



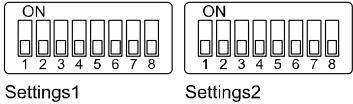
Warning

- Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
- Do not install in a location subject to vibration or impact in excess of the product's specifications.
- Do not mount in a location exposed to radiant heat that would result in temperatures in excess of the product's specifications.

6 Settings

6.1 Switch Settings

- Open the display cover.
- Turn OFF the power before setting the switches.
- Set the switches using a small flat blade screwdriver, referring to the information below.
- After setting the switches close the cover and tighten the screw (Tightening torque: 0.3 to 0.4 N•m).
- When the power supply is turned ON the setting is effective.



6.1.1 Hold / Clear setting

Set the output status for a communication error or an idle state.

Settings1	Content
1	
OFF	Output is OFF (default setting)
ON	Hold the Output

6.1.2 Diagnostics setting

Allocates the diagnostic data to the input data.

Switch setting when Settings1 switch 6 is OFF (normal mode).

Settings1	Mode	Content	Diagnostic size for Input
2	3		
ON/OFF	OFF	0	Input data only (default setting)
ON/OFF	ON	1	Input data + System diagnostics + Unit diagnostics

Switch setting when Settings1 switch 6 is ON (EX600-SEN1/2 compatibility mode).

Settings1	Mode	Content	Diagnostic size for Input
2	3		
OFF	OFF	0	Input data only (default setting)
OFF	ON	1	Input data + System diagnostics
ON	ON/OFF	2	Input data + System diagnostics + Unit diagnostics

6.1.3 IO-Link Master size setting

Sets the byte size which every IO-Link master in the manifold occupies (for normal mode only).

Settings1	Content
4	5
OFF	OFF
OFF	ON
ON	ON/OFF

6 Settings (continued)

No	Process data size at each communication port	IO size at each port	IO-Link master size setting
		Port 1Port 2Port 3Port 4	44 bytes70 bytes134 bytes
1	2/2/2/2 byte	2222	Yes
2	4/4/4/4 byte	4444	
3	8/8/8/8 byte	8888	
4	16/16/2/2 byte	161622	
5	32/2/2/2 byte	32222	
6	16/16/8/8 byte	161688	No
7	16/16/16/16 byte	16161616	
8	24/24/8/8 byte	242488	
9	24/24/24/24 byte	24242424	
10	32/32/8/8 byte	323288	
11	32/32/32/32 byte	32323232	

*: If the "No" (cannot be selected) method is selected, all process data are treated as zero and the product generates "process data mapping fault" diagnostics that indicates the amount of process data size exceeds the IO-Link master size (Diagnostics at SI unit).

6.1.4 V-SEL setting

Select the occupying number of valve outputs (for EX600-SEN1/2 compatibility mode only).

Settings1	Content	SI unit output data size
4	5	
OFF	OFF	32 outputs (default setting)
OFF	ON	24 outputs
ON	OFF	16 outputs
ON	ON	8 outputs

6.1.5 Operating mode setting

Settings1	Content
6	
OFF	Run in normal mode
ON	Run in EX600-SEN1/2 compatibility mode

6.1.6 IP address setting

Set the IP address of the SI unit.

Settings1	Settings2	IP Address
8	12345678	
OFF	ON	192.168.0.1
OFF	OFF	192.168.0.2
:	:	:
OFF	ON	192.168.0.253
OFF	OFF	192.168.0.254
ON	ON	192.168.1.1
ON	OFF	192.168.1.2
:	:	:
ON	ON	192.168.1.253
ON	OFF	192.168.1.254
ON/OFF	ON	DHCP mode
ON/OFF	OFF	Remote control mode

- DHCP mode is the mode to obtain IP address from DHCP server. Obtained IP address is lost when the power supply is cut.
- Remote control mode is the mode to respond to commands via the BOOTP/DHCP server provided by Rockwell Automation. Refer to the BOOTP/DHCP server manual for further details.

6.2 Configuration

Technical documentation giving detailed configuration information can be found on the SMC website (URL: <https://www.smcworld.com>).

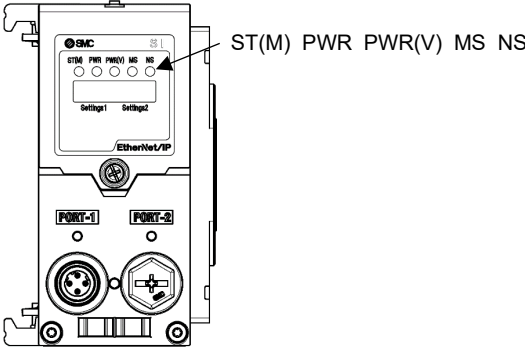
7 How to Order

Refer to the operation manual on the SMC website (URL: <https://www.smcworld.com>) for How to order information.

8 Outline Dimensions (mm)

Refer to the operation manual on the SMC website (URL: <https://www.smcworld.com>) for outline dimensions.

9 LED Display



Display	Content
ST(M)	Displays the diagnostic status of the unit.
PWR	Status of power supply voltage for control and input.
PWR(V)	Status of power supply voltage for output.
MS	Displays the module status.
NS	Displays the network status.
PORT-1	Displays the communication status of PORT 1.
PORT-2	Displays the communication status of PORT 2.

9.1 SI unit status

LED	LED Colour	Operation
ST(M)	OFF	The power supply for control and input is OFF.
	Green ON	Normal operation.
	Green flashing	Diagnostic error in I/O unit detected.
	Red flashing	One of the following diagnostic errors detected (when diagnostics is enabled). <ul style="list-style-type: none">Valve ON/OFF counter exceeds set value.Valve is short circuited or disconnected.IO-Link master process data mapping fault.
	Red/Green flashing	Communication error detected between SI unit and I/O unit.
PWR	Red ON	SI unit has failed.
	Green ON	The power supply voltage for control and input is normal.
PWR(V)	Red ON	The power supply voltage for control and input is below 19 V (when diagnostics is enabled).
	Green ON	The power supply voltage for output is normal.
PWR(V)	Red ON	The power supply voltage for output is OFF or below 19 V (when diagnostics is disabled).
	Green ON	The power supply voltage for output is normal.
MS	Red ON	The power supply voltage for output is OFF or below 19 V (when diagnostics is enabled).
	Green flashing	Either of the following conditions are detected: <ul style="list-style-type: none">The unit has not been configured correctly.The master is in idle state.
NS	Green ON	Normal operation.
	Red flashing	Diagnostics error detected.
	Red ON	SI unit has failed.
	OFF	IP address is not set.
	Green flashing	EtherNet/IP™ communication is not established.
NS	Green ON	EtherNet/IP™ communication is established.
	Red flashing	EtherNet/IP™ communication has timed out.
NS	Red ON	IP address is duplicated.

9 LED Display (continued)

9.2 Communication status

LED	LED colour	Content
L/A PORT-1	OFF	Port-1: No Link, No Activity
	Green ON	Port-1: 100 Mbps Link, No Activity
	Green flashing	Port-1: 100 Mbps Link, Activity
	Yellow ON	Port-1: 10 Mbps Link, No Activity
	Yellow flashing	Port-1: 10 Mbps Link, Activity
L/A PORT-2	OFF	Port-2: No Link, No Activity
	Green ON	Port-2: 100 Mbps Link, No Activity
	Green flashing	Port-2: 100 Mbps Link, Activity
	Yellow ON	Port-2: Link, 10 Mbps No Activity
	Yellow flashing	Port-2: 10 Mbps Link, Activity

10 Maintenance

10.1 General Maintenance



Caution

- Not following proper maintenance procedures could cause the product to malfunction and lead to equipment damage.
- If handled improperly, compressed air can be dangerous.
- Maintenance of pneumatic systems should be performed only by qualified personnel.
- Before performing maintenance, turn off the power supply and be sure to cut off the supply pressure. Confirm that the air is released to atmosphere.
- After installation and maintenance, apply operating pressure and power to the equipment and perform appropriate functional and leakage tests to make sure the equipment is installed correctly.
- If any electrical connections are disturbed during maintenance, ensure they are reconnected correctly and safety checks are carried out as required to ensure continued compliance with applicable national regulations.

- Do not make any modification to the product.
- Do not disassemble the product, unless required by installation or maintenance instructions
- Stop operation if the product does not function correctly.

11 Limitations of Use

11.1 Limited warranty and Disclaimer/Compliance Requirements

Refer to Handling Precautions for SMC Products.

12 Product disposal

This product should not be disposed of as municipal waste. Check your local regulations and guidelines to dispose of this product correctly, in order to reduce the impact on human health and the environment.

13 Contacts

Refer to www.smcworld.com or www.smc.eu for your local distributor / importer.

SMC Corporation

URL : <https://www.smcworld.com> (Global) <https://www.smc.eu> (Europe)
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