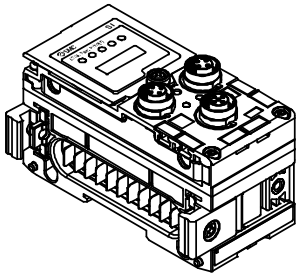




ORIGINAL INSTRUCTIONS

Instruction Manual
Fieldbus device - SI unit for Modbus/TCP
EX600-SMT1-X25



The intended use of this product is to control pneumatic valves and I/O while connected to the Modbus/TCP communication 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.

2 Specifications

The EX600 range of units can be connected to a fieldbus to realize the reduction of input / 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 units to a maximum of 9 units.

2.1 General specifications

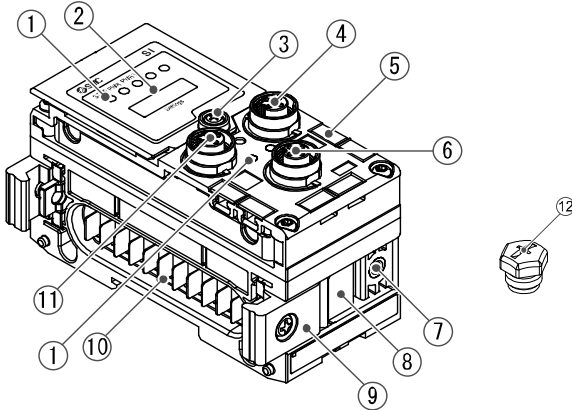
Item	Specifications
Ambient temperature	−10 to +50 °C
Ambient humidity	35 to 85% RH (no condensate)
Ambient storage temperature	−20 to +60 °C
Withstand voltage	500 VAC applied for 1 minute
Insulation resistance	500 VDC, 10 MΩ or more
Enclosure rating	IP67 (manifold assembled)
Weight	300 g

2 Specifications (continued)

2.2 Electrical specifications

Model		EX600-SMT1-X25
Power supply (Control and input)		24 VDC, 2 A
Power supply (Output)		24 VDC, 2 A
Solenoid valve	Max. number of solenoid valves	32 solenoid coils
	Output type of solenoid	PNP (Negative common)
	Connected load	Solenoid valve with surge voltage suppressor 24 VDC, 1.0 W or less (SMC)
	Short circuit protection	Yes
Fieldbus	Protocol	Modbus/TCP
	Media	100 BASE-TX
	Communication speed	10 Mbps / 100 Mbps (Automatic/Manual)
	Communication type	Full duplex / half duplex (Automatic/Manual)
	IP address setting method	Dip switch: from 192.168.0.1 to 192.168.1.254 Through DHCP server: Optional address

3 Name and function of Individual 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 (BUS OUT)	Connector for Fieldbus Outputs.
5	Marker groove	Groove for identification marker.
6	Connector (PCI)	Connector for Handheld terminal.
7	Valve plate hole	Hole for valve plate mounting.
8	Valve plate groove	Groove for valve plate mounting.
9	Joint bracket	Bracket for joining to adjacent units.
10	Unit connector (plug)	Connector for signal/power to next unit.
11	Connector (BUS IN)	Connector for Fieldbus Inputs.
12	Seal cap (2 pcs.)	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.

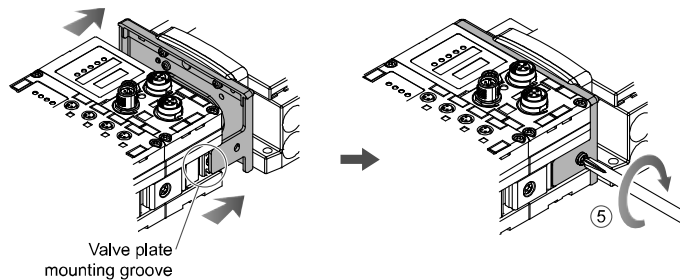
- (2) Add more I/O units. Up to 9 I/O units can be connected to one manifold.

- (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.

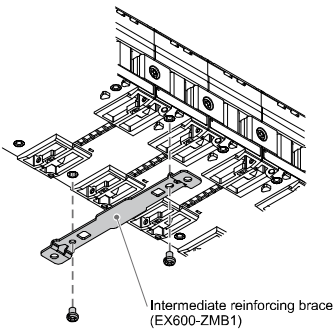
Then fix using the valve plate mounting screws (M4 x 6) supplied (Tightening torque: 0.7 to 0.8 N•m).



5 Installation

• **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).



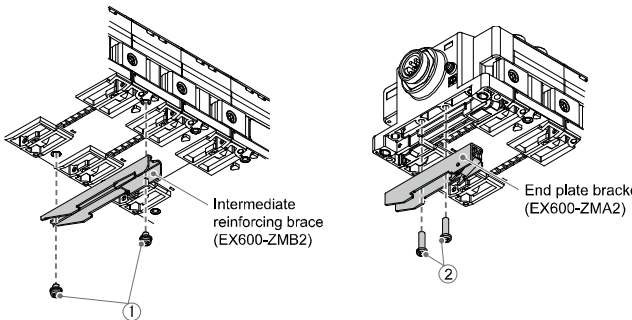
- (2) Mount and tighten the end plate at one end of the unit and mount the intermediate reinforcing brace if required using M4 screws (Tightening torque: 0.7 to 0.8 N•m). Fix the end plate at the valve side while referring to the operation manual for the applicable valve series.

5 Installation (continued)

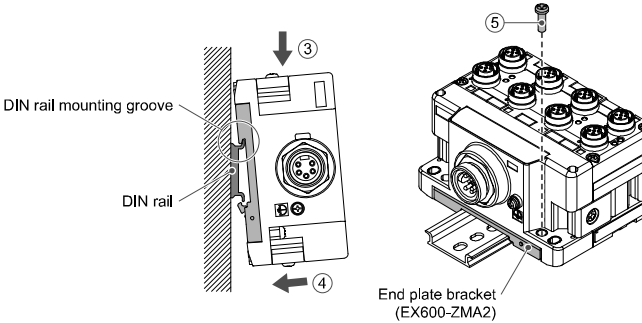
• **DIN rail mounting**

- (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).

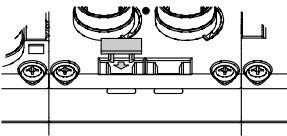


- (3) Hook the DIN rail mounting groove on to the DIN rail.
(4) Press the manifold using its side hooked to the DIN rail as a fulcrum until the manifold is locked onto the DIN rail.
(5) Fix the manifold by tightening the DIN rail fixing screws (M4 x 20) on the end plate bracket (Tightening torque: 0.7 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 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.



5.2 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 Wiring

6.1 Wiring connections

• Communication Connection

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

- M12 5pin socket: SPEEDCON

Connector	Pin No.	Signal name
BUS IN / BUS OUT		
	1	TX+
	2	RX+
	3	TX-
	4	RX-

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.

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.

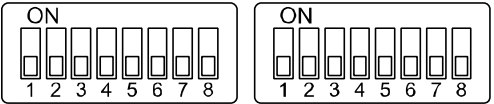
7 Settings

7.1 Switch settings

Caution

- Turn OFF the power before setting the switches.
 - Handle the switch setting with care. Excessive force can damage the switch.
- (1) Open the display cover.
- (2) Set the switches using a small flat blade screwdriver.
- (3) After setting the switches close the cover and tighten the screw (Tightening torque: 0.3 to 0.4 N•m).
- (4) When the power supply is turned ON the switch setting will become effective.

- Switch layout and functions



Settings1	Settings2
1 Hold / Clear setting	1
2 Communication speed setting	2
3	3
4	4
5 Reserved (Do not turn ON)	5
6	6
7	7
8 IP address byte 3 setting	8

• Hold / Clear setting

Sets the output status for when the fieldbus has a communication error or is in an idle state.

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

7 Settings (continued)

• Communication speed and Full / Half duplex setting

Settings1			Content
2	3	4	
OFF	ON/OFF	ON/OFF	Automatic
ON	OFF	OFF	10 Mbps, half duplex
ON	OFF	ON	10 Mbps, full duplex
ON	ON	OFF	100 Mbps, half duplex
ON	ON	ON	100 Mbps, full duplex

• IP address setting

Settings1	Settings2								IP Address	Subnet mask
8	1	2	3	4	5	6	7	8		
OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	192.168.0.1	255.255.255.0
OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	192.168.0.2	
:	:	:	:	:	:	:	:	:	:	
OFF	ON	OFF	ON	ON	ON	ON	ON	ON	192.168.0.253	
OFF	OFF	ON	ON	ON	ON	ON	ON	ON	192.168.0.254	
ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	192.168.1.1	
ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	192.168.1.2	
:	:	:	:	:	:	:	:	:	:	
ON	ON	OFF	ON	ON	ON	ON	ON	ON	192.168.1.253	
ON	OFF	ON	ON	ON	ON	ON	ON	ON	192.168.1.254	
ON/OFF	ON	ON	ON	ON	ON	ON	ON	ON	DHCP mode	
ON/OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Remote control mode	

- 1) DHCP mode is the mode to obtain IP address from DHCP server. Obtained IP address is lost when the power supply is cut.
- 2) 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.
- 3) Settings1 switch number 5 to 7 are not used and should remain OFF.

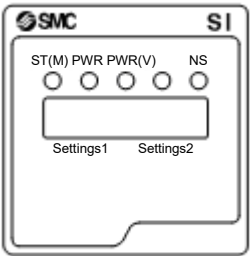
- Enable DHCP: The IP address etc. can be obtained from BOOTP/DHCP Server. If the power is supplied in this state, information including IP address is obtained again.
- Disable DHCP: The IP address etc. cannot be obtained from BOOTP/DHCP Server. If the power is supplied in this state, the previous setting can be held.

7.2 Configuration

The product has parameters that can be set for each unit or each channel. The parameters can be changed using Web server.

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

8 LED Display



Display	Content
ST (M)	Displays the diagnostic status of the SI unit.
PWR	Displays the status of the power supply voltage for control and inputs.
PWR (V)	Displays the status of the power supply voltage for outputs.
NS	Displays the network status.

8 LED Display (continued)

- SI unit common status

LED display	Content
ST(M) PWR PWR(V) ○ ○ ○ OFF.	Power supply for control and input is OFF.
ST(M) PWR PWR(V) ● ● ● Green LEDs are ON.	The SI unit is in normal operation.
ST(M) PWR PWR(V) ● ○ ○ Red ST(M) LED is ON.	Component failure inside the SI unit.
ST(M) PWR PWR(V) ○ ● ○ Red PWR LED is ON.	Power supply voltage for control and input is out of range.
ST(M) PWR PWR(V) ○ ○ ● Red PWR(V) LED is ON.	Power supply voltage for outputs is out of range.
ST(M) PWR PWR(V) ● ● ● Green ST(M) LED is flashing.	A unit other than the SI unit has been diagnosed and detected.
ST(M) PWR PWR(V) ● ● ● Red ST(M) LED is flashing.	Either of the following conditions: <ul style="list-style-type: none">The valve ON/OFF counter has exceeded the set value.The valve is short circuited or disconnected.
ST(M) PWR PWR(V) ● ● ● Red/Green ST(M) LED is flashing alternately.	Connection error between units has occurred.

- Modbus/TCP status

LED display	Content
NS ○ NS LED is OFF.	Power supply for control and input is OFF, or IP address is not set.
NS ● Green NS LED is flashing.	The SI unit received an IP address, but connection is not established.
NS ● Green NS LED is ON.	Connection is established.
NS ● Red NS LED is flashing.	Communication time out (when process active time out is set).
NS ● Red NS LED is ON.	IP address is duplicated.

9 How to Order

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

10 Outline Dimensions (mm)

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

11 Maintenance

11.1 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.
- When cleaning the product 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. Do not use solvents such as benzene, thinner etc. to clean each unit.
- How to reset the product for power cut or forcible de-energizing. Supply power to the product. The output status just before the power failure is not maintained when power supply is recovered. Start operation after confirming safety of the entire equipment.

12 Limitations of Use

12.1 Limited warranty and Disclaimer/Compliance Requirements

Refer to Handling Precautions for SMC Products.

13 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.

14 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)
SMC Corporation, 1-5-5, Kyobashi, Chuo-ku, Tokyo 104-0031, JAPAN
Specifications are subject to change without prior notice from the manufacturer.
© SMC Corporation All Rights Reserved.
Template DKP50047-F-085O