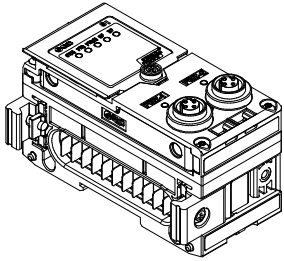




Instruction Manual
Fieldbus device - SI unit for PROFINET
IO-Link and OPCUA compatible
EX600-SPN31



The intended use of this product is to control pneumatic valves and I/O while connected to the PROFINET and IO-Link protocols.

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 unit 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 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)

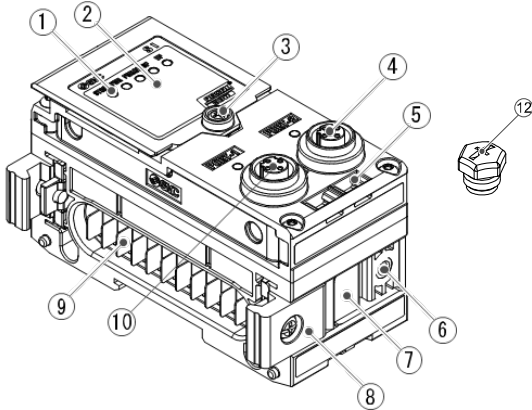
2.2 Electrical specifications

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	PNP / source (negative 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	PROFINET V2.42
Conformance class	Class C (only for IRT switch function)
Communication speed	100 Mbps
Configuration file	GSDML-V2.42-SMC-EX600-SPN31-YYYYMMDD.xml
Applicable functions	Fast Start Up
	MRP (Media Redundancy Protocol)
	System redundancy s.2
	Web server OPC UA 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 fixing 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.
12	Seal cap	For unused M12 connectors (fitted to PORT2 connector).

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.

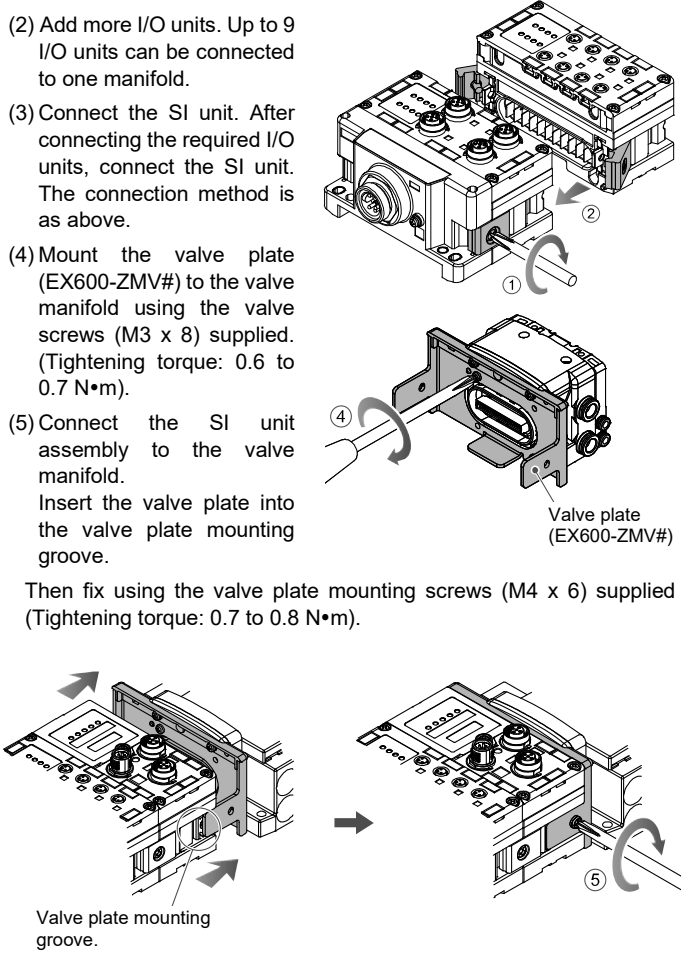
- (2) Add more I/O units. Up to 9 I/O units can be connected to one manifold.

- (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.

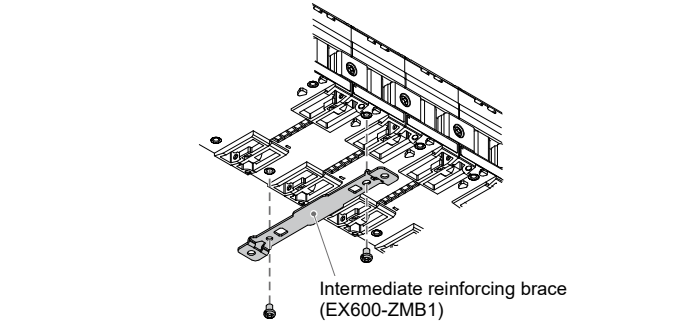
Then fix using the valve plate mounting screws (M4 x 6) supplied (Tightening torque: 0.7 to 0.8 N•m).



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).

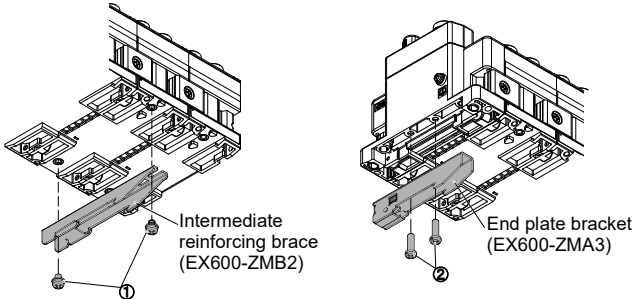


- (2) Mount and tighten the end plate at one end of the unit and mount the intermediate reinforcing brace if required using M4 screws (Tightening torque: 0.7 to 0.8 N•m). Fix the end plate at the valve side while referring to the operation manual for the applicable valve manifold series.

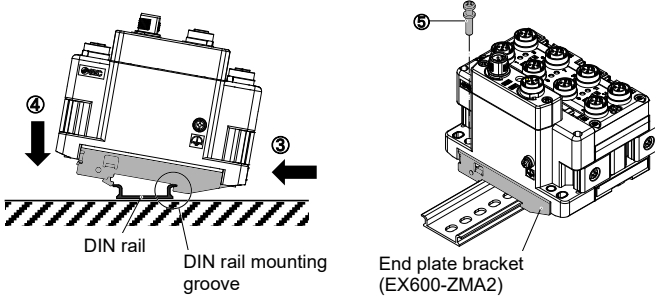
5 Installation (continued)

• 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-ZMA3) 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).

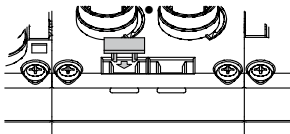


- (3) Hook the DIN rail mounting groove on to the DIN rail.
- (4) Press the manifold using its side hooked to the DIN rail as a fulcrum until the manifold is locked onto the DIN rail.
- (5) Fix the manifold by tightening the DIN rail fixing screws (M4 x 20 mm) on the end plate bracket (Tightening torque: 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 specifications.
- Select the appropriate type of protection according to the environment of operation.
IP67 protection is achieved when the following conditions are met.
(1) The units are connected properly with fieldbus cable with M12 connector and power cable with M12 connector.
(2) Suitable mounting of each unit and manifold valve.
(3) Be sure to fit a waterproof cap on any unused connectors.
- Do not use in a place where the product could be splashed by oil or chemicals.
- Do not use in an area where electrical surges are generated.

6 Wiring

6.1 Wiring connections

• Communication Connection

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

M12 4-pin D-coded Socket	Pin No.	PORT1 Port type: MDI	PORT2 Port type: MDI-X
	1	TD+ Transmit data+	RD+ Receive data+
	2	RD+ Receive data+	TD+ Transmit data+
	3	TD- Transmit data-	RD- Receive data-
	4	RD- Receive data-	TD- Transmit data-

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.

7 Settings

7.1 Configuration

A GSDML file is required to configure the EX600 with the PLC. At the same time, a special icon is required to display the icon for EX600 in the software of the PLC. Download the latest GSDML file and refer to the operation manual on the SMC website (URL: <https://www.smcworld.com>) for further information on settings.

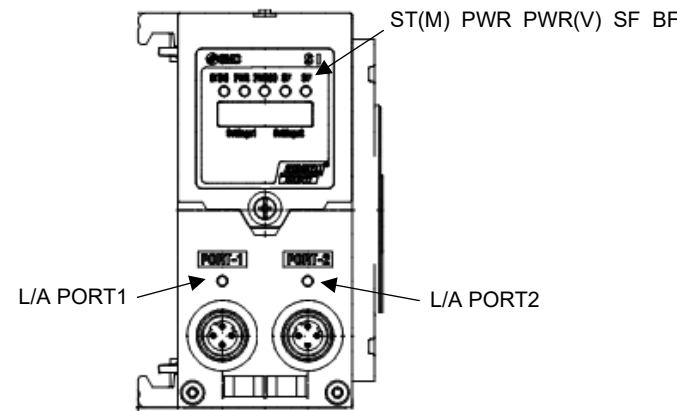
8 How to Order

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

9 Outline Dimensions (mm)

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

10 LED Display



Display	Content
ST(M)	Displays the diagnostic status of the unit.
PWR	Displays the status of the power supply voltage for control and input.
PWR(V)	Displays the status of the power supply voltage for output.
SF	Displays the system status.
BF	Displays the communication status.
L/A PORT1	Displays the communication status of PORT 1.
L/A PORT2	Displays the communication status of PORT 2.

10 LED Display (continued)

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	Either of the following diagnostics errors detected (with diagnostics enabled): •Valve ON/OFF counter exceeded the set value. •Valve is short circuited or disconnected.
	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 VDC (with diagnostics enabled).
	OFF	The power supply voltage for output is OFF or below 19 VDC (with diagnostics disabled).
	Green ON	The power supply voltage for output is normal.
SF	Red ON	The power supply voltage for output is OFF or Below 19 VDC (with diagnostics enabled).
	OFF	Normal operation.
	Green flashing	Diagnostics error detected.
BF	Red ON	Node flashing test
	OFF	PROFINET communication is established.
	Red flashing	The PLC configuration data and the EX600 configuration are not consistent.
BF	Red ON	Either of the following conditions: • Device name setting to PLC and SI unit is not consistent. • Communication cable not connected. • PLC or SI unit is faulty.

LED	LED colour	Content
L/A PORT 1	OFF	PORT 1: No Link, No Activity
	Green ON	PORT 1: Link, No Activity
	Green flashing	PORT 1: Link, Activity
L/A PORT 2	OFF	PORT 2: No Link, No Activity
	Green ON	PORT 2: Link, No Activity
	Green flashing	PORT 2: Link, Activity

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.

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)
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