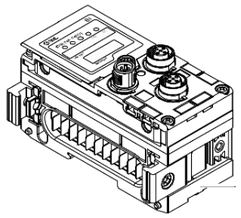
EX600-TF2Z157EN

ORIGINAL INSTRUCTIONS

Instruction Manual
Fieldbus device - SI unit for PROFIBUS-DP
EX600-SPR1A / -SPR2A



The intended use of this product is to control pneumatic valves and I/O while connected to the PROFIBUS-DP 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) [*1)], and other safety regulations.

[*1)] ISO 4414: Pneumatic fluid power - General rules relating to systems.
ISO 4413: Hydraulic fluid power - General rules relating to systems.
IEC 60204-1: Safety of machinery - Electrical equipment of machines. (Part 1: General requirements)
ISO 10218-1: Manipulating industrial robots -Safety. etc.

- 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.

⚠ **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.

⚠ 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 ºC
Ambient humidity	35 to 85% RH (no condensate)
Ambient storage temperature	−20 to +60 ºC
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)

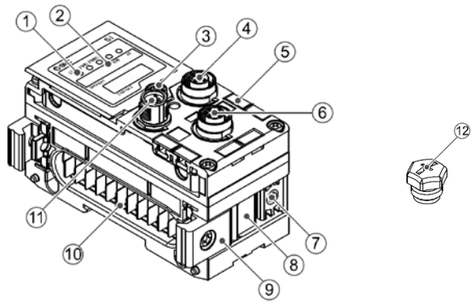
2.2 Electrical specifications

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		80 mA maximum
Solenoid valve specification	Output type	EX600-SPR1A	PNP / source (negative common)
		EX600-SPR2A	NPN / sink (positive common)
	Number of outputs		32 outputs
	Output condition at the time of communication error		HOLD / CLEAR / Force ON
	Connected load		24 VDC and 1.5 W max. Solenoid valve with surge voltage suppression (manufactured by SMC).
	Protection function		Short circuit protection

2.3 Communication specifications

Item	Specifications
Protocol	PROFIBUS DP (DP-V0)
Device type	Slave
Communication speed	9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 kbps 1.5 / 3.0 / 6.0 / 12 Mbps
Occupied area (No. of I/O)	512 inputs / 512 outputs maximum
Configuration file	GSD file (SMCB1411.gsd)
Terminating resistor	Internal (for type A cable)

3 Name and function of Individual parts



No	Part	Description
1	LED display	Displays the SI unit status.
2	Display cover	Open for the setting of switch.
3	Display cover screw	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	Connector for signal/power to next unit.
11	Connector (BUS IN)	Connector for Fieldbus Inputs.
12	Seal cap (2 pcs.)	For unused connectors (BUS OUT, PCI)

4 Assembly

4.1 Assembling the unit

⚠ Warning

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

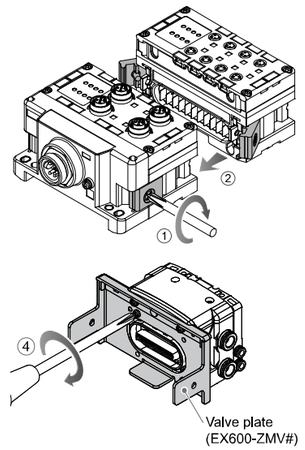
(1) Connect an I/O unit to the end plate. Digital and analogue units can be connected in any order. Joint bracket screw tightening torque: 1.5 to 1.6 N•m.

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

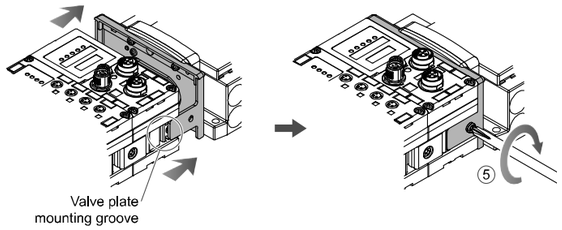
(3) Connect the SI unit. After connecting the required I/O units, connect the SI unit. The connection method is as above.

(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.



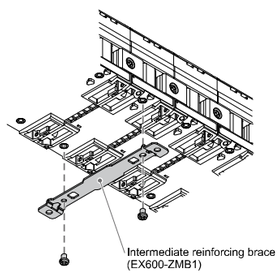
Then fix using the valve plate mounting screws (M4 x 6) supplied (Tightening torque: 0.7 to 0.8 N•m).



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).



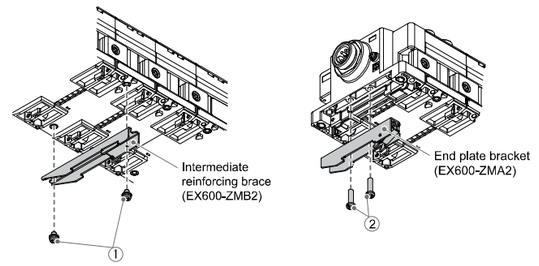
(2) Mount and tighten the end plate at one end of the unit and mount the intermediate reinforcing brace if required using M4 screws (Tightening torque: 0.7 to 0.8 N•m).
Fix the end plate at the valve side while referring to the operation manual for the applicable valve series.

- **DIN rail mounting**

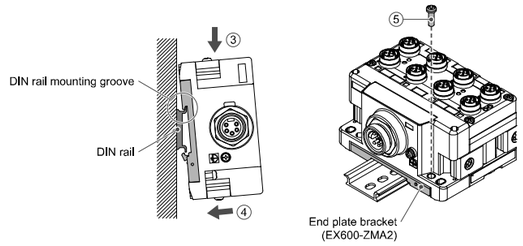
(1) When assembling six or more units, the middle part of the complete assembly must be fitted with an intermediate reinforcing brace for DIN rail mounting (EX600-ZMB2), using 2-M4 x 6 screws.
(Tightening torque: 0.7 to 0.8 N•m).

5 Installation (continued)

(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 DIL 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.

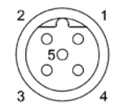
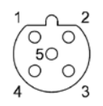


5.1 Wiring connections

- **Communication Connector**

Select the appropriate cables to mate with the connectors on the SI unit. The PROFIBUS connection has 2 ports, BUS IN and BUS OUT, and both ports can be used to connect.

M12 5-pin Plug / Socket

Connector		Pin No.	Signal name
BUS IN	BUS OUT		
		1	N.C.
		2	RXD/TXD-N
		3	N.C.
		4	RXD/TXD-P
Plug	Socket	5	Shield

- **Power Supply Connector**

The system is operated using power supplied from the 56-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.

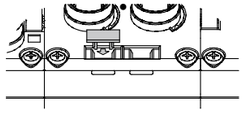
⚠ Warning

- 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

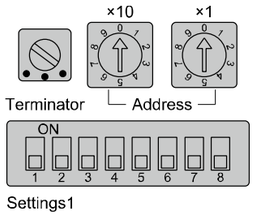
- Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
- Do not install in a location subject to vibration or impact in excess of the product's specifications.
- Do not mount in a location exposed to radiant heat that would result in temperatures in excess of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

6 Setting

6.1 Switch Setting

(1) Open the display cover.
(2) Turn OFF the power before setting the switches.
(3) Set the switches using a small flat blade screwdriver, referring to the information below.
(4) After setting the switches close the cover and tighten the screw (Tightening torque: 0.3 to 0.4 N•m).

- **Address setting**



Settings1

Address setting

Settings1	Address		Node Address
8	x10	X1	
OFF	0	0	0 (default)
	0	1	1
	0	2	2
	:	:	:
	9	8	98
	9	9	99
ON	0	0	100
	0	1	101
	:	:	:
	2	5	125

* When the address is set to 0, or to above 126, it will cause an error and turn ON the [SF] and [BF] LED's.

- **V_SEL switch setting**
  Select the number of outputs (size) occupied by the SI unit.

Settings1		No. of valves	Output data size used by SI unit
1	2		
OFF	OFF	32 outputs	4 bytes (default)
OFF	ON	24 outputs	3 bytes
ON	OFF	16 outputs	2 bytes
ON	ON	8 outputs	1 byte

* Set the number of occupied valve outputs to at least the number of valves used.

Refer to the operation manual on the SMC website (URL: https://www.smcworld.com) for other switch settings.

- HOLD / CLEAR setting switch
- Terminator switch

6 Setting (continued)

6.2 Configuration

An applicable GSD file is required to configure the SI unit in the PROFIBUS-DP network. A special icon file is also required to display the EX600 icon. Please download the latest GSD and icon files from the SMC website (URL: https://www.smcworld.com).

Download file name	GSD and icon files
SMCB1411.zip	SMCB1411.gsd EX600_1N.bmp (standard type) EX600_1D.bmp (diagnostic type) EX600_1S.bmp (special operating mode)

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 or catalogue on the SMC website (URL: https://www.smcworld.com) for How to order information.

8 Outline Dimensions (mm)

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

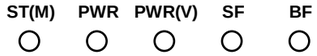
9 Maintenance

9.1 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.

10 LED Display



- ST(M)-LED

LED display	Content
ST(M) OFF	The power supply for control and input is OFF.
ST(M) Green LED is ON	The unit is in normal operation.
ST(M) Green LED is flashing	Detected diagnostic error of I/O unit.
ST(M) Red LED is flashing	Detected either of the diagnostic errors below (When diagnostics is activated) •The valve ON/OFF counter has exceeded the set value. •The valve is short circuited or disconnected.
ST(M) Red/green LED is flashing alternately	Detected a communication error between SI unit and I/O unit.
ST(M) Red LED is ON	SI unit has failed.

- PWR-LED

LED Display	Contents
PWR Green LED is ON	The power supply voltage level for control and input is normal.
PWR Red LED is ON	The power supply voltage level for control and input is abnormal. (When diagnostics is activated)

- PWR(V)-LED

LED Display	Contents
PWR(V) OFF	Power supply voltage for output is OFF or the voltage level is abnormal. (When diagnostics is not activated)
PWR(V) Green LED is ON	The power supply voltage level for output is normal.
PWR(V) Red LED is ON	Power supply voltage for output is OFF or the voltage level is abnormal. (When diagnostics is activated)

10 LED Display (continued)

- SF-LED or BF-LED

LED Display	Contents
SF BF OFF	Either of the following conditions: •Communication with the master is established and normal. •The power supply for control and input is OFF.
SF BF Red SF LED is ON	The communication with the master has been established, but a diagnosis error has occurred.
SF BF Red BF LED is ON	Either of the following conditions: •The cable between the master and SI unit is not connected. •SI unit is not receiving the master data correctly. •The master or the SI unit has broken.
SF BF Red BF and SF LEDs are both ON	The address of the SI unit is set to 0, or to 126 or over.
SF BF Red SF LED is ON and red BF LED is flashing	The configuration data of the master and device are not consistent.
SF BF Red BF LED is flashing	One second flashing cycle: SI unit is recognizing the communication speed but the master address setting is wrong. Two seconds flashing cycle: The power source of PLC is OFF or the cable has a broken wire.

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)
SMC Corporation, 4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101-0021, Japan

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