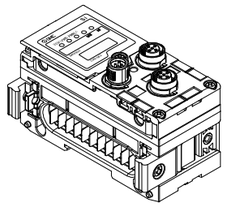
ORIGINAL INSTRUCTIONS

Instruction Manual
Fieldbus device - SI unit for PROFIBUS-DP
Series 56-EX600-SPR#A-X10

II 3G Ex ec IIC T4 Gc -10°C ≤ Ta ≤ 50°C
II 3D Ex tc IIIC T82°C Dc IP67



The intended use of this SI unit is for the control of pneumatic valves.

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.

Ex Marking Description

II 3G Ex ec IIC T4 Gc -10°C ≤ Ta ≤ 50°C
II 3D Ex tc IIIC T82°C Dc IP67

Equipment Group II	tc - protected by enclosure
Category 3	IIIC - for all types of dust
Gas (G) and Dust (D) environment	T82°C - Max. surface temperature
Ex - European standards apply	Gc/Dc - Equipment Protection Level
ec – Increased safety	Ta - ambient temperature
IIC - for all types of gas	IP67 - Protection structure
T4 - Temperature classification	

Based on the conformity assessment carried out by SMC Corporation.

Certificate Number: SMC 20.0009 X

If the Certificate number includes an X, special conditions for safe use apply as follows:-

- Protect the product from sources of heat which can generate surface temperatures greater than the temperature classification.
- Protect the product and cable connections against all impact or mechanical damage using a suitable Ex compliant enclosure.

1 Safety Instructions (continued)

- Protect the product from direct sunlight or UV light using a suitable protective cover.
- Do not disconnect the M12 connectors before first switching OFF the power supply.
- Use only Ex approved connectors and use shielded cable to provide grounding.
- Use only a damp cloth to clean the product to avoid an electrostatic charge.

2 Specifications

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
Weight	300 g

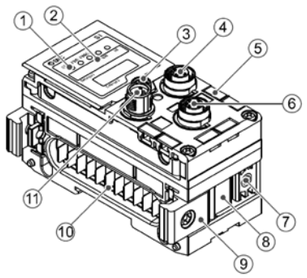
Electrical specifications

Item		Specifications
Power supply voltage range / current consumption	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 types	PNP / source (negative common) 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 LED and surge voltage suppression (manufactured by SMC).
	Protection function	Short circuit protection

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	Display cover should not be opened.
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.

4 Assembly

4.1 Assembling the unit

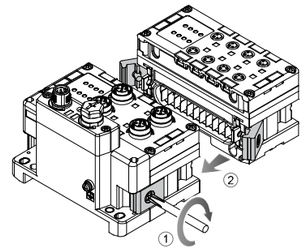
⚠ Warning

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.

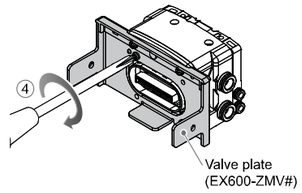
(2) Add more I/O units. Up to 9 I/O units can be connected to one manifold.

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

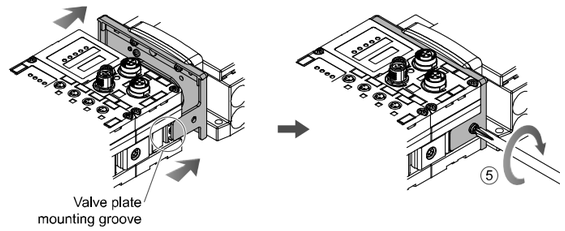


(4) Mount the valve plate (EX600-ZMV#) to the valve manifold using the valve screws (M3 x 8) supplied. (Tightening torque: 0.6 to 0.7 N•m).

(5) Connect the SI unit assembly to the valve manifold.
Insert the valve plate into the valve plate mounting groove.



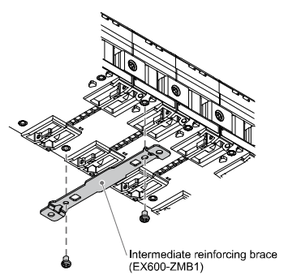
Then fix using the valve plate mounting screws (M4 x 6) supplied (Tightening torque: 0.7 to 0.8 N•m).



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-M4 x 5 screws (Tightening torque: 0.7 to 0.8 N•m).



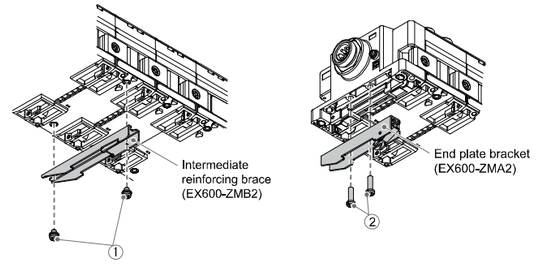
(2) Mount and tighten the end plate at one end of the unit and mount the intermediate reinforcing brace if required using M4 screws (Tightening torque: 0.7 to 0.8 N•m).
Fix the end plate at the valve side while referring to the operation manual for the applicable valve series.

- **DIN rail mounting**

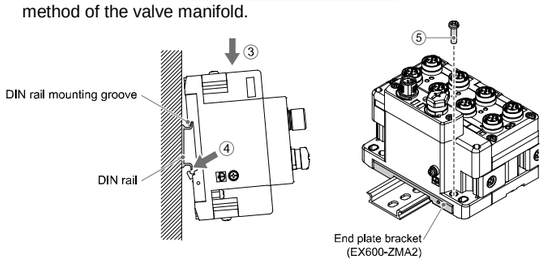
(1) When assembling six or more units, the middle part of the complete assembly must be fitted with an intermediate reinforcing brace for DIN rail mounting (EX600-ZMB2), using 2-M4 x 6 screws.
(Tightening torque: 0.7 to 0.8 N•m).

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.

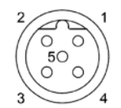


5.1 Wiring connections

- **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.

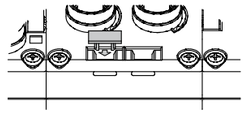
⚠ Warning

- 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

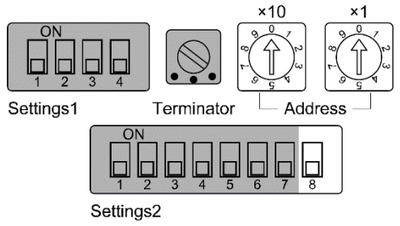
- Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
- Do not install in a location subject to vibration or impact in excess of the product's specifications.
- Do not mount in a location exposed to radiant heat that would result in temperatures in excess of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

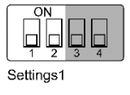


Address setting

Settings2	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.

- Baud rate setting switch
- HOLD / CLEAR setting switch
- Terminator switch

6 Setting (continued)

6.2 Configuration

An applicable EDS 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 EDS 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 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.

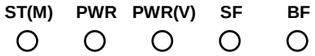
9 Maintenance

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



- SI unit status

LED	Description
OFF	Power supply for control and input is OFF.
Green LED's ON	The SI unit is operating normally.
ST(M) Red ON	Component failure inside the SI unit.
PWR Red ON	Power supply voltage for control and input is abnormal.
PWR(V) Red ON	Power supply voltage for outputs is abnormal.
ST(M) Green flashing	A unit other than the SI unit is detected.
ST(M) Red flashing	• The valve ON/OFF counter has exceeded the set value. • The valve is short circuited or disconnected.
ST(M) Red/Green flashing alternately	• Connection error between units. • Configuration memory error has occurred.

- Communication status

LED	Description
OFF	Communication with the master has been established, or the power supply for control and input is OFF.
SF Red ON, BF OFF	Communication with the master has been established, but a diagnostic error has occurred.
SF OFF, BF Red ON	• The cable between the master and SI unit is not connected. • The SI unit cannot recognize the communication speed. • The master or SI unit is faulty.
SF and BF Red ON	The address of the SI unit is set to 0, or above 126.
SF Red ON, BF Red flashing	Configuration data of the master and SI unit are not consistent.
SF OFF, BF Red flashing	The SI unit has recognized the communication speed, but the address setting of the master is incorrect.

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

Template DKP50047-F-085M