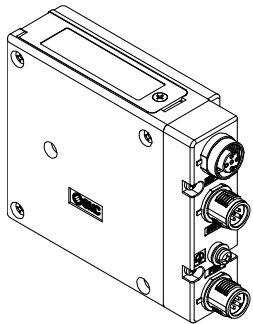




Instruction Manual  
Fieldbus device - SI unit for PROFIBUS DP  
EX260-SPR1 to -SPR8



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)<sup>\*)</sup>, and other safety regulations.

\*) 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.

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

**Caution**

- **Provide grounding to assure the safety and noise resistance of the Fieldbus system.**  
Individual grounding should be provided close to the product using a short cable.
- **When conformity to UL is required the SI unit must be used with a UL1310 Class 2 power supply.**

2 Specifications

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
Operating atmosphere	No corrosive gas
Enclosure rating	EX260-SPR1 / 2 / 3 / 4: IP67 EX260-SPR5 / 6 / 7 / 8: IP40
Weight	200 g or less

2.2 Electrical specifications

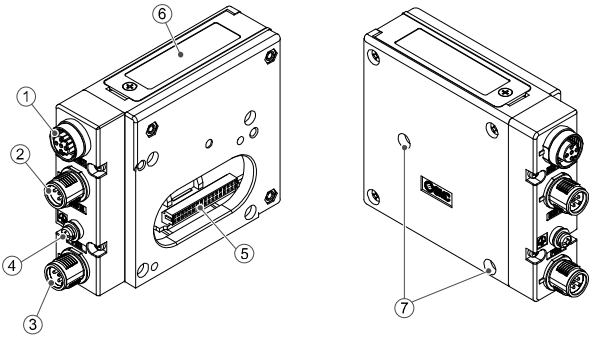
Item		Specifications
Power supply voltage range / current consumption	Controller power supply	21.6 to 26.4 VDC 0.1 A max.
	Solenoid valve power supply	22.8 to 26.4 VDC 2.0 A max., according to solenoid valve stations / specification.
Solenoid valve specification	Output type	EX260-SPR1 EX260-SPR3 EX260-SPR5 EX260-SPR7 PNP (negative common) / source
		EX260-SPR2 EX260-SPR4 EX260-SPR6 EX260-SPR8 NPN (positive common) / sink
		Output condition at the time of communication error
	Connected load	Output HOLD / CLEAR
	Insulation type	Solenoid valve with surge voltage suppressor of 24 VDC and 1.5 W or less (manufactured by SMC)
Residual voltage		Photo coupler 0.4 VDC or less

2.3 Communication specifications

Item		Specifications
Protocol		PROFIBUS DP (EN50170, EN50254)
Transmission speed (kbps)		9.6, 19.2, 45.45, 93.75, 187.5, 500, 1500, 3000, 6000, 12000
Device Type		DP slave
Number of outputs	EX260-SPR1 / -SPR2 EX260-SPR5 / -SPR6	32 outputs
	EX260-SPR3 / -SPR4 EX260-SPR7 / -SPR8	16 outputs
Configuration file	EX260-SPR1 / -SPR2	Smc_1430.gsd
	EX260-SPR3 / -SPR4	Smc_1431.gsd
	EX260-SPR5 / -SPR6	Smc_1432.gsd
	EX260-SPR7 / -SPR8	Smc_1433.gsd

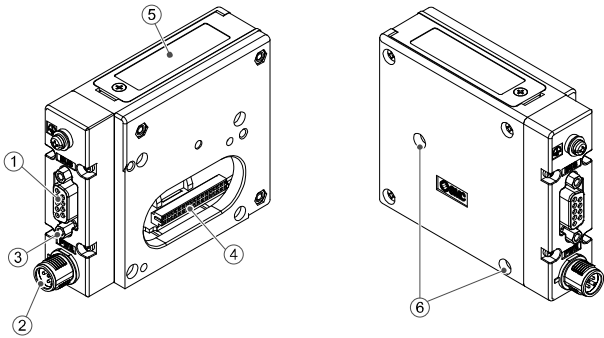
3 Name and function of parts

EX260-SPR1 / -SPR2 / -SPR3 / -SPR4



No	Part	Description
1	Fieldbus connector (BUS OUT)	PROFIBUS connection (M12 5-pin socket, B-coded)
2	Fieldbus connector (BUS IN)	PROFIBUS connection (M12 5-pin plug, B-coded)
3	Power supply connector	Power supply for valves and operation of SI unit (M12 5-pin plug, A-coded)
4	Ground terminal	Functional Earth (M3)
5	Output connector	Output signal interface for valve manifold
6	LED and switches	Bus status specific and SI unit status LED's. Switches for setting node address and operating mode
7	Mounting hole	Mounting hole for connection to the valve manifold

EX260-SPR5 / -SPR6 / -SPR7 / -SPR8



No	Part	Description
1	Fieldbus interface connector	PROFIBUS DP connection. (D-sub 9-pin socket)
2	Power supply connector	Power supply with load voltage for valves and operating voltage for SI unit. (M12 5-pin plug, A-code)
3	Ground terminal	Functional earth. (M3 screw)
4	Output connector	Output signal interface for valve manifold.
5	LED and switches	LED display to indicate the status of the SI unit. Switches for setting of node address and operating mode.
6	Mounting hole	Mounting hole for connection to the valve manifold.

Accessories

Hexagon socket head cap screw	M3 x 30 screw for connection to the valve manifold (2 pcs.).
Seal cap	Seal cap for unused fieldbus interface connector (BUS OUT) (1 pc.).

4 Installation

4.1 Installation

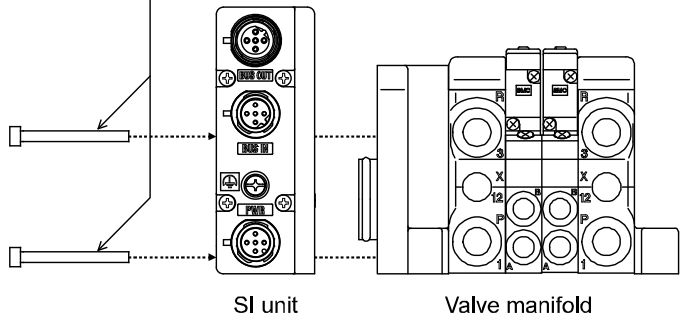
**Warning**

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

- **General instructions on installation and maintenance**  
Connect the valve manifold to the SI unit.
- **Assembly and disassembly of the SI unit**

M3 hexagon screw  
Tightening torque: 0.6 N·m

\*: Thread size: M3 x 30



4.2 Replacement of the SI unit

- Remove the M3 hexagon screws from the SI unit and release the SI unit from the valve manifold.
- Replace the SI unit.
- Tighten the screws with the specified tightening torque. (0.6 N·m)

4.3 Assembly Precautions

- Be sure to switch off the power.
- Check there is no foreign matter inside the SI unit.
- Check there is no damage and no foreign matter stuck to the gasket.

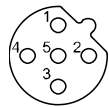
- Be sure to tighten the screws with the specified torque.
- If the SI unit is not assembled properly, the internal PCBs may be damaged or liquid and/or dust may enter into the unit.

4.4 Fieldbus Interface connector

Select appropriate cables to mate with the connectors on the SI unit.

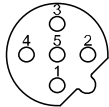
EX260-SPR1 / -SPR2 / -SPR3 / -SPR4

BUS OUT: M12 5-pin socket, B-coded (SPEEDCON)



No.	Designation	Description
1	-	Not used
2	RXD / TXD-N	Receive / Transmit data, negative
3	-	Not used
4	RXD / TXD-P	Receive / Transmit data, positive
5	-	Not used

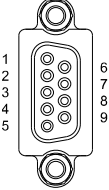
BUS IN: M12 5-pin plug, B-coded (SPEEDCON)



No.	Designation	Description
1	-	Not used
2	RXD / TXD-N	Receive / Transmit data, negative
3	-	Not used
4	RXD / TXD-P	Receive / Transmit data, positive
5	-	Not used

EX260-SPR5 / -SPR6 / -SPR7 / -SPR8

BUS IN: D-sub 9-pin socket



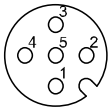
No.	Designation	Description
1	-	Not used
2	-	Not used
3	RXD/TXD-P	Receive / transmit data, positive
4	-	Not used
5	DGND	Data ground (reference potential to VP)
6	VP	Power supply plus (P5V)
7	-	Not used
8	RXD/TXD-N	Receive / transmit data, negative
9	-	Not used

Note: The D-sub connector fixing screws threads are #4-40

4 Installation (continued)

4.5 Power supply connector layout

PWR: M12 4-pin plug, A-coded (SPEEDCON)



No.	Designation	Description
1	SV 24 V	+24 V for solenoid valve
2	SV 0 V	0 V for solenoid valve
3	SI 24 V	+24 V for SI unit operation
4	SI 0 V	0 V for SI unit operation
5	-	Not used

- The power supply for the solenoid valve and SI unit operation are isolated. Be sure to supply power respectively. Either single source power or two different power supplies can be used.

The M12 connector cable has two types, SPEEDCON compatible and standard. If both plug and sockets have connectors for SPEEDCON, the cable can be inserted and connected by turning it a 1/2 of a rotation.  
A standard connector can be connected to a SPEEDCON connector as well as a standard M12.

Warning

- Be sure to fit a seal cap (EX9-AWTS) on any unused M12 connectors. Proper use of the seal cap enables the enclosure to maintain IP67 specification (for EX260-SPR1/2/3/4).

4.6 Ground Terminal

- Connect the ground terminal to ground.
- Individual grounding should be provided close to the product with a short cable to assure the safety and noise resistance of the Fieldbus system.
- Resistance to ground should be 100 ohms or less.

4.7 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.

5 Setting

5.1 Switch Setting

- The switches should only be set with the power supply turned off.
- Open the cover and set the switches with a small flat blade screwdriver.
- Set the switches before use.



Switch No.		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
ADDRESS	<div></div>	-	64	32	16	8	4	2	1
	1	<div></div>	0	0	0	0	0	0	1
	2		0	0	0	0	0	1	0
	3		0	0	0	0	0	1	1
	4		0	0	0	0	1	0	0
	:		:	:	:	:	:	:	:
	125		1	1	1	1	1	0	1
OUTPUT STATE	CLEAR	0							
	HOLD	1							

<PROFIBUS DP address setting (ADDRESS)>

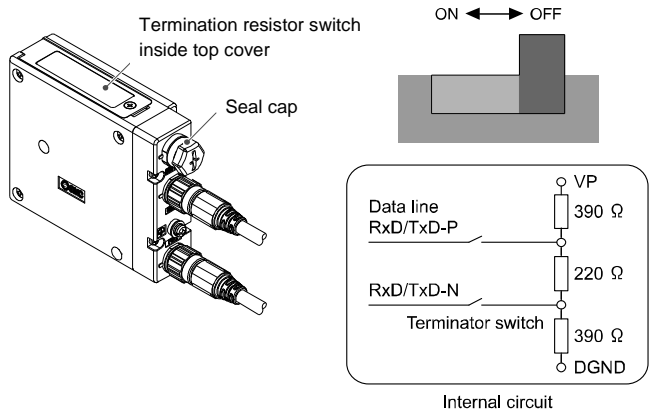
- The PROFIBUS DP address is binary code and can be set from 1 to 125 using the 8-element switch.
- The factory default setting is Address 1.

<Fail safe setting (OUTPUT STATE)>

- Set the reaction of outputs to a communication error.
- CLEAR: Clear all outputs.
- HOLD: Hold the last state before the communication error.
- The factory default setting is CLEAR.

5.2 Terminator

- A bus terminator is required at both ends of the PROFIBUS DP bus segment.
- A bus termination resistor switch is built in to the EX260-SPR1/-SPR2/-SPR3/-SPR4 inside the top cover.
- Switch it ON if the SI unit is at the end of the bus segment.



5.3 Configuration

In order to configure the SI unit for the PROFIBUS DP network, the appropriate device master file (GSD file) for the SI unit will be required.

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

6 LED Display



LED	Description
SF	System fault
BF	BUS fault
PWR	LED is ON green when the SI unit power supply is ON.
PWR (V)	LED is ON green when the load voltage for the valve is supplied. LED is OFF when the load voltage for the valve is not supplied or outside of the specification (19 V or less).

<Indication of communication status>

SF	BF	Description
OFF	OFF	No fault. Communication connection to the master established.
OFF	Red ON	SI unit cannot detect a transmission rate and the connection to the DP master has failed.
OFF	Red flashing	SI unit has detected the transmission rate but is not addressed by the master.
Red ON	OFF	SI unit related diagnostic error is detected (load power for the valve is not supplied or outside of specification).
Red ON	Red ON	SI unit PROFIBUS DP address out of range
Red ON	Red flashing	Configuration data sent from DP master to the SI unit does not agree with the SI unit configuration.

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 Limitations of Use

10.1 Limited warranty and Disclaimer/Compliance Requirements

Refer to Handling Precautions for SMC Products.

11 Product Disposal

This product shall 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.

12 Contacts

Refer to [www.smcworld.com](https://www.smcworld.com) or [www.smc.eu](https://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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Template DKP50047-F-085M