



ORIGINAL INSTRUCTIONS

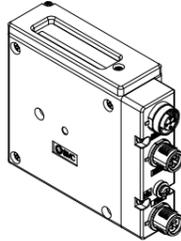
## Instruction Manual

## Fieldbus device - SI unit for PROFIBUS DP

## Series 56-EX260-SPR1-X42



II 3G Ex ec IIC T4 Gc -10°C ≤ Ta ≤ 50°C  
II 3D Ex tc IIIC T61°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)<sup>1)</sup>, and other safety regulations.

- <sup>1)</sup> 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.

Ex Marking Description	
II 3G Ex ec IIC T4 Gc -10°C ≤ Ta ≤ 50°C II 3D Ex tc IIIC T61°C Dc IP67	
Equipment Group II	tc - protected by enclosure
Category 3	IIC - for all types of dust
Gas (G) and Dust (D) environment	T61°C - Max. surface temperature
Ex - European standards apply	Gc/Dc - Equipment Protection Level
ec - Increased safety	X - special conditions, see instructions
IIC - for all types of gas	Ta - ambient temperature
T4 - Temperature classification	IP67 - Protection structure

Based on the conformity assessment carried out by SMC Corporation.

Certificate Number: SMC 21.0007 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 higher 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 only shielded cable to provide grounding.
- Use only a damp cloth to clean the product to avoid electrostatic discharge.

## 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
Operating atmosphere	No corrosive gas
Enclosure	IP67
Weight	260 g max.

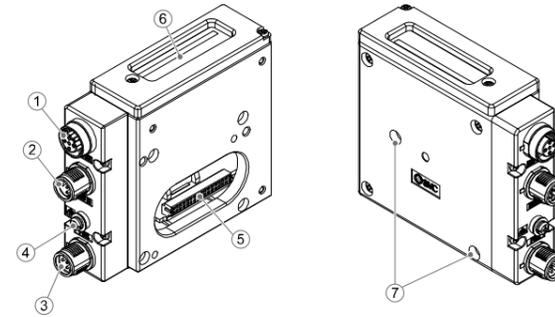
## Electrical specifications

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	PNP (negative common) / source
	Number of Outputs	32 outputs
	Output condition at the time of communication error	Output HOLD / CLEAR
	Connected load	Solenoid valve with surge voltage suppressor of 24 VDC and 1.5 W or less (manufactured by SMC)
	Insulation type	Photo coupler
	Residual voltage	0.4 VDC or less

## 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	32 outputs
Configuration file	Smc_1430.gsd

## 3 Name and function of Individual parts



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	FE 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

## 4 Installation

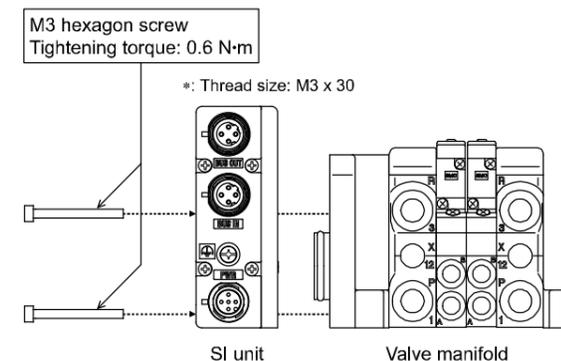
## 4.1 Installation

**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**



## 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 Installation (continued)

## 4.3 Assembly Precautions

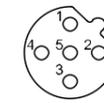
- Be sure to switch off the power.
- Check there is no foreign matter inside the SI unit.
- Check there is no damage and no foreign matter stuck to the gasket.
- Be sure to tighten the screws with the specified torque.
- If the SI unit is not assembled properly, the internal PCBs may be damaged or liquid and/or dust may enter into the unit.

## 4.4 Connecting Cables

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

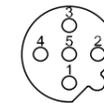
**Fieldbus interface connector layout**

## 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

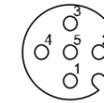
## BUS IN: M12 5-pin plug, B-coded (SPEEDCON)



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

**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.

**NOTE**

When conformity to UL is required the SI unit must be used with a UL1310 Class 2 power supply.

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 of a rotation, leading to a reduction in man hours. 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.

## 4.5 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.

## 4.6 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	
	-	64	32	16	8	4	2	1	
ADDRESS	1	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)>

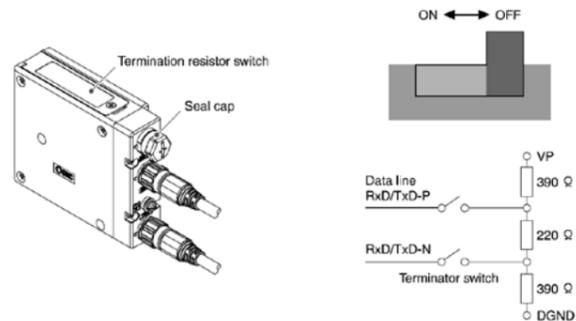
- The PROFIBUS DP address is binary code and can be set from 1 to 125 using the 8-element switch.
- The factory default setting is Address 1.

<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 terminator switch is built in to the 56-EX260-SPR1/2.
- Switch it ON if the SI unit is at the end of the bus segment.

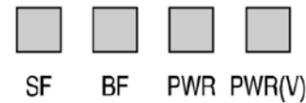


### 5.3 Configuration

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 can not 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 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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