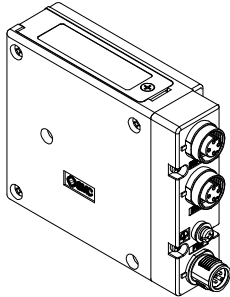




ORIGINAL INSTRUCTIONS

Instruction Manual  
Fieldbus device - SI unit for PROFINET  
EX260-SPN3-X238 & Input block EX9-IE3-X32



The intended use of this SI unit and input block is for the control of pneumatic valves and I/O while connected to the PROFINET network.

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.

<sup>\*)</sup>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.

	<b>Danger</b>	Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious 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>Caution</b>	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.

**Caution**

- **Provide grounding to assure the 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 Common specifications

Item	Specifications
Ambient temperature	-10 to +50 °C
Ambient humidity	35 to 85%RH (No condensate)
Ambient storage temperature	-20 to +60 °C
Operating environment	No corrosive gas
Enclosure	IP67
Weight	SI unit - 200 g or less Input block - 90 g or less

2 Specifications (continued)

2.2 SI unit 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 1.0 A or less, according to the solenoid valve station specification
Solenoid valve specification	Output type	PNP (negative common) / source
	Output condition during communication error	HOLD / CLEAR / Force ON
	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
Applicable Input block	EX9-IE3-X32	4 x 3-wire M8 sockets per one Input block. Max. 8 Input blocks.

2.3 SI unit Communication specifications

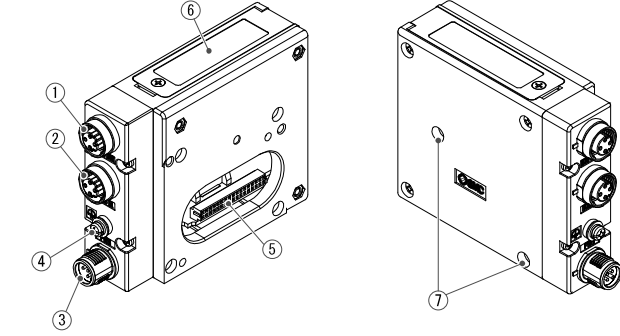
Item	Specifications
Protocol	PROFINET IO
Transmission medium	Standard Ethernet cable (CAT5) (100BASE-TX)
Transmission speed	100 Mbps
Number of Outputs	16 outputs
Number of Inputs	32 inputs
Vendor ID	0083 hex
Device ID	0001 hex
Conformance class	Class C (only for IRT switch function)
Applicable function	FSU (Fast Start Up) MRP (Media Redundancy Protocol)
Configuration file	GSDML file

2.4 Input block Electrical specifications

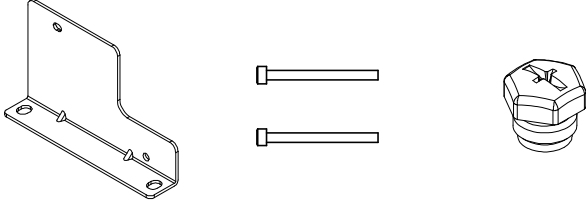
Item	Specifications
Part number	EX9-IE3-X32
Input point	4 points
Input connector	3-pin M8 socket
Corresponding sensors	Current source type (PNP output) or Current sink type (NPN output) / selectable using a switch
Rated voltage	19.2 to 28.8 VDC
Logic“1” input voltage VH	11 to 30 V
Logic“0”input voltage VL	-3 to +5 V
Logic“1”input current IH	8 mA Typ.
Two wire sensor connection	Possible
Logic“0”allowable current IL	Max. 2.5 mA
Input delay time	3 msec. Typ
Sensor supply current	Max. 120 mA / Input block (30 mA / sensor)
Short-circuit protection	yes

3 Name and function of parts

3.1 EX260-SPN3-X238 – SI unit



Accessories

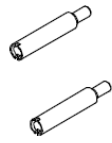
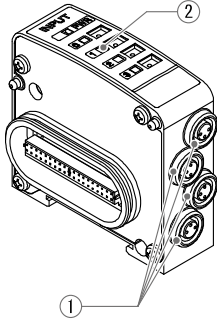


No	Part	Description
1	Fieldbus connector (BUS OUT)	PROFINET connection PORT2 (M12 4-pin socket, D-coded)
2	Fieldbus connector (BUS IN)	PROFINET connection PORT 1 (M12 4-pin socket, D-coded)
3	Power supply connector	Power supply for valves and operation of SI unit (M12 5-pin plug, A-coded)
4	Ground terminal	Functional Earth (M3)
5	Output connector	Output signal interface for valve manifold
6	LED display	Bus status specific and SI unit status LED's
7	Mounting hole	Hole for connection to valve manifold

Accessories

Part	Description
Bracket plate	For mounting unit (1 pc.)
Hex. socket cap screw	M3 x 35 screw for mounting valve manifold. (2 pcs.)
Seal cap	For unused connector (BUS OUT) (1 pc.)

3.2 EX9-IE3-X32 – Input block



Tie-rod (2 pcs.)  
Accessory

No	Part	Description
1	Input equipment connector	Connects the input equipment such as sensor, etc.
2	Operation display LED	Displays the status of the power supply and input.

4 Installation

4.1 Installation

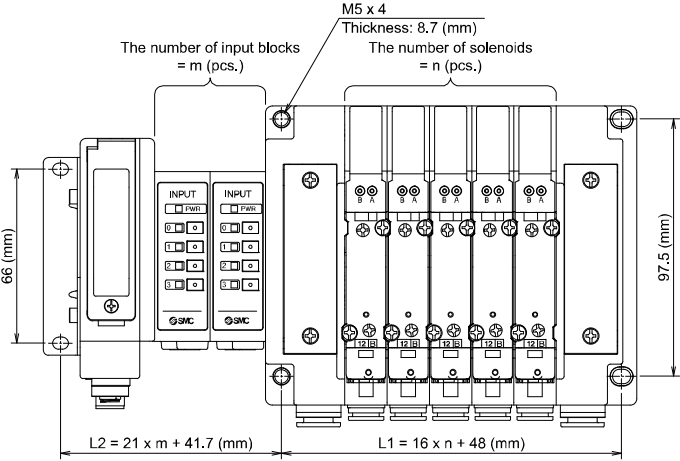
**Warning**

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

• **General instructions on installation and maintenance**

Connect valve manifold to the SI unit or to the last Input block between SI unit and valve manifold.

• **Dimension for installation**



- The above figure shows dimensions as an example for the SY5000 series valve manifold.
- Input blocks are placed between the SI unit and valve manifold (max. 8 pcs. for max. 32 Inputs).
- Max. number of valves / outputs: 16 single-solenoid or 8 double-solenoid.
- Tighten the screws with the specified tightening torque. (0.6 N•m).

4.2 Assembly Precautions

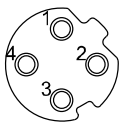
- Be sure to switch off the power.
- Check there is no foreign matter inside the SI unit.
- Check there is no damage and no foreign matter stuck to the gasket.
- If the SI unit is not assembled properly, the internal PCBs may be damaged or liquid and/or dust may enter into the unit.

4.3 SI unit connecting details

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

• **Fieldbus interface connector layout**

BUS OUT: M12 4-pin socket, D-coded (SPEEDCON)



No.	Designation	Description
1	TD+	Transmit Data +
2	RD+	Receive Data +
3	TD-	Transmit Data -
4	RD-	Receive Data -

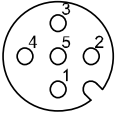
BUS IN: M12 4-pin socket, D-coded (SPEEDCON)



No.	Designation	Description
1	TD+	Transmit Data +
2	RD+	Receive Data +
3	TD-	Transmit Data -
4	RD-	Receive Data -

• **Power supply connector layout**

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



No.	Designation	Description
1	SV24V	+24 V for solenoid valve
2	SV0V	0 V for solenoid valve
3	SI24V	+24 V for SI unit operation
4	SI0V	0 V for SI unit operation
5	-	Not used

4 Installation (continued)

- 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 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 an M12 seal cap (EX9-AWTS) on any unused connectors. Proper use of the seal cap enables the enclosure to maintain IP67 specification.
- Tighten the seal cap to the recommended tightening torque (0.1 N·m for M12).

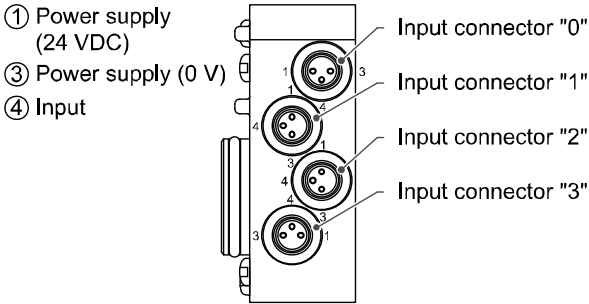
4.4 Ground Terminal

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

4.5 Input block connection details

- Align the key groove with the input connector (socket) of Input block and plug in the 3-wire cable (plug).
- Tighten the lock nut on the cable by turning it clockwise.
- Confirm that the connector is secure.

Pin layout of M8 sensor connector



- Be sure to check the cable connector specifications and the input signal when wiring the sensor. It may cause the malfunction. Mind the position of the mounting key when selecting the sensor.

Warning

- Be sure to fit an M8 seal cap (EX9-AWES) on any unused connectors. Proper use of the seal cap enables the enclosure to maintain IP67 specification.
- Tighten the seal cap to the recommended tightening torque (0.05 N·m for M8).

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

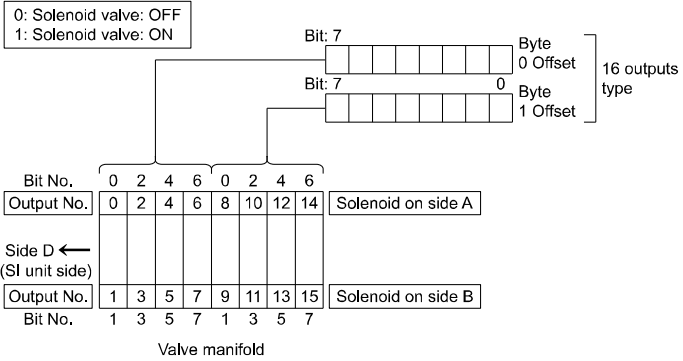
5.1 SI unit configuration

An applicable GSD file is required to configure the SI unit in the PROFINET network.

Product number	GSD file
EX260-SPN3-X238	GSDML-V**.**-SMC-EX260-SPN3-X238-*****.xml

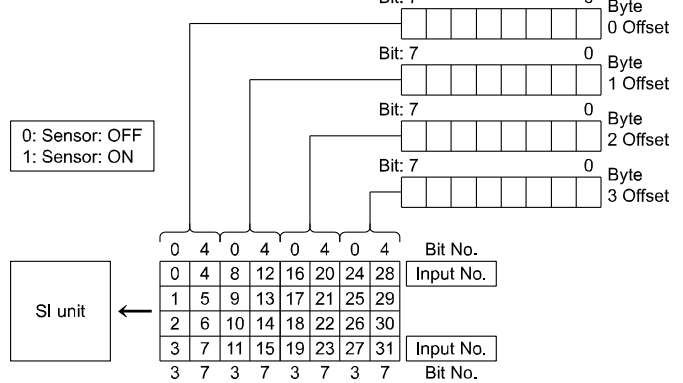
5.2 Output number assignment

Output numbering starts at zero and refers to the solenoid position on the manifold.



5.3 Input number assignment

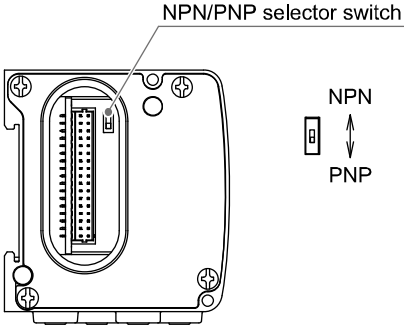
Input data: One EX9-IE3-X32 Input block is provided with 4 Inputs. Max. 8 Input blocks for max. 32 Inputs (sensors) can be connected between SI unit and the valve manifold.



5 Setting (continued)

5.4 Input block setting

- Applicable sensor to the Input Block can be selected to NPN or PNP.
- Remove the input block, then set the switch with a small blade screw driver.
- Install the input block after setting.
- The default switch setting is PNP.



6 How to Order

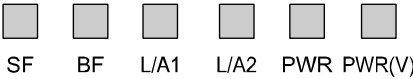
To obtain information about this product, please contact SMC.

7 Outline Dimensions (mm)

To obtain information about this product, please contact SMC.

8 LED Display

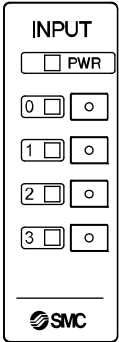
8.1 SI unit



LED	Status	Description
SF	OFF	Operating normally
	Red ON	<ul style="list-style-type: none"><li>• SI unit related diagnostic error detected (load voltage for valve not supplied or outside specification).</li><li>• Configuration data registered in master and the number of output points does not match.</li></ul>
BF	OFF	Operating normally
	Red Flashing	<ul style="list-style-type: none"><li>• PROFINET communication is not established.</li><li>• IP address / device name duplicated.</li><li>• Configuration data registered in master and the profile of the SI unit does not match.</li></ul>
	Red ON	Both BUS IN and BUS OUT are not linked.
L/A1	Green ON	BUS IN: Link
	Green OFF	BUS IN: No Link
	Yellow Flashing	BUS IN: Activity
	Yellow OFF	BUS IN: No Activity
L/A2	Green ON	BUS OUT: Link
	Green OFF	BUS OUT: No Link
	Yellow Flashing	BUS OUT: Activity
	Yellow OFF	BUS OUT: No Activity
PWR	Green ON	SI unit operating voltage supplied
	OFF	SI unit operating voltage not supplied
PWR(V)	Green ON	Load voltage for valves supplied.
	OFF	Load voltage for valves not supplied or outside tolerance range (19 V or less).

8 LED Display (continued)

8.2 Input block



LED	Status	
PWR	Green ON	Power supply for sensor is ON.
	OFF	Power supply for sensor is OFF.
0, 1, 2, 3	Green ON	Sensor signal input corresponding to the number is ON. (Logic "1")
	OFF	Sensor signal input corresponding to the number is OFF. (Logic "0")

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)  
SMC Corporation, 1-5-5, Kyobashi, Chuo-ku, Tokyo 104-0031, JAPAN  
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