

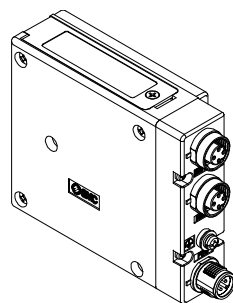


ORIGINAL INSTRUCTIONS

## Instruction Manual

## Fieldbus device - SI unit for EtherNet/IP™

## EX260-SEN1 / SEN2 / SEN3 / SEN4



The intended use of this product is to control pneumatic valves and I/O while connected to the EtherNet/IP™ 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>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.

**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	IP67
Weight	200 g or less

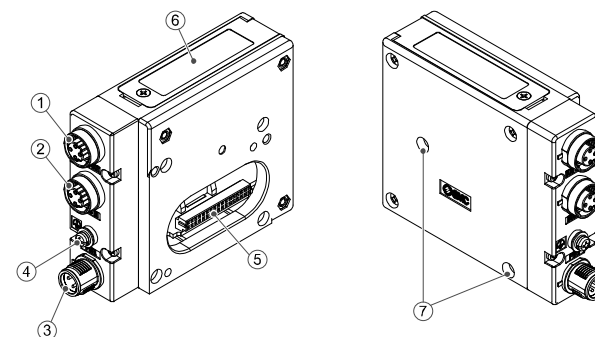
## 2.2 Electrical specifications

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 or less, according to the solenoid valve station specification
Solenoid valve specification	Output type	EX260-SEN1/3 PNP (negative common) / source
		EX260-SEN2/4 NPN (positive common) / sink
	Number of outputs	EX260-SEN1/2 32 outputs
		EX260-SEN3/4 16 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	

## 2.3 Communication specifications

Item	Specifications
Protocol	Ethernet (IEEE802.3)
Transmission medium	Standard Ethernet cable (CAT5 or more) (100BASE-TX)
Transmission speed	10 Mbps / 100 Mbps (Auto negotiation)
Transmission method	Full duplex / Half duplex (Auto negotiation)
Fieldbus protocol	EtherNet/IP™ Volume1 (Edition 3.17) Volume2 (Edition 1.18)
Vendor ID	7h (SMC Corporation)
Product type	1Bh (Pneumatic Valve)
Product code	9Ch
Network topology	Star, Linear Bus or Ring (including DLR).
IP address setting range	Manual setting using switches in SI unit: 192.168.0.1 to 254 or 192.168.1.1 to 254 Via DHCP server: Arbitrary address
Configuration file	EDS file (download from the SMC website)
Occupied area (number of inputs / outputs)	EX260-SEN1 / SEN2: 16 inputs / 32 outputs
	EX260-SEN3 / SEN4: 16 inputs / 16 outputs

## 3 Name and function of parts



No	Part	Description
1	Fieldbus connector (BUS OUT)	EtherNet/IP™ connection PORT2 (M12 4-pin socket, D-coded)
2	Fieldbus connector (BUS IN)	EtherNet/IP™ connection PORT 1 (M12 4-pin socket, D-coded)
3	Power supply connector	Power supply for valves and operation of SI unit (M12 4-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	Mounting hole for connection to the valve manifold

## 4 Installation

## 4.1 Installation

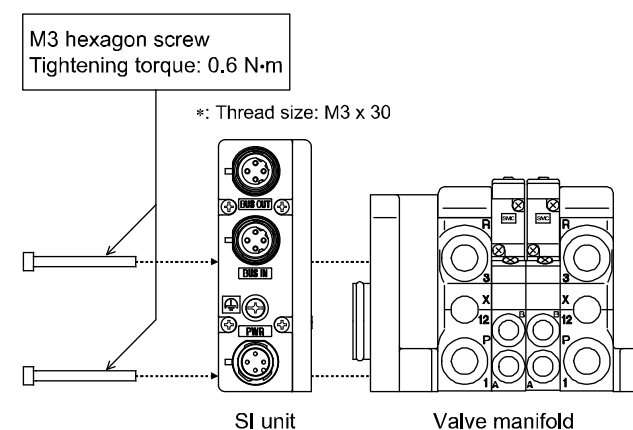
**Warning**

- 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

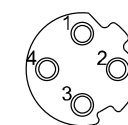
- Be sure to switch off the power.
- Check there is no foreign matter inside the SI unit.
- Check there is no damage and no foreign matter stuck to the gasket.
- Be sure to tighten the screws with the specified torque.
- If the SI unit is not assembled properly, the internal PCBs may be damaged or liquid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

## 4.4 Connecting Cables

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

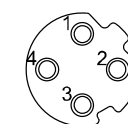
- Fieldbus interface connector layout**

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 -

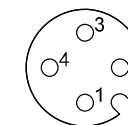
BUS IN: M12 4-pin socket, D-coded (SPEEDCON)



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	SI24 V	+24 V for SI unit operation
2	SV24 V	+24 V for solenoid valve
3	SI0 V	0 V for SI unit operation
4	SV0 V	0 V for solenoid valve

- 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

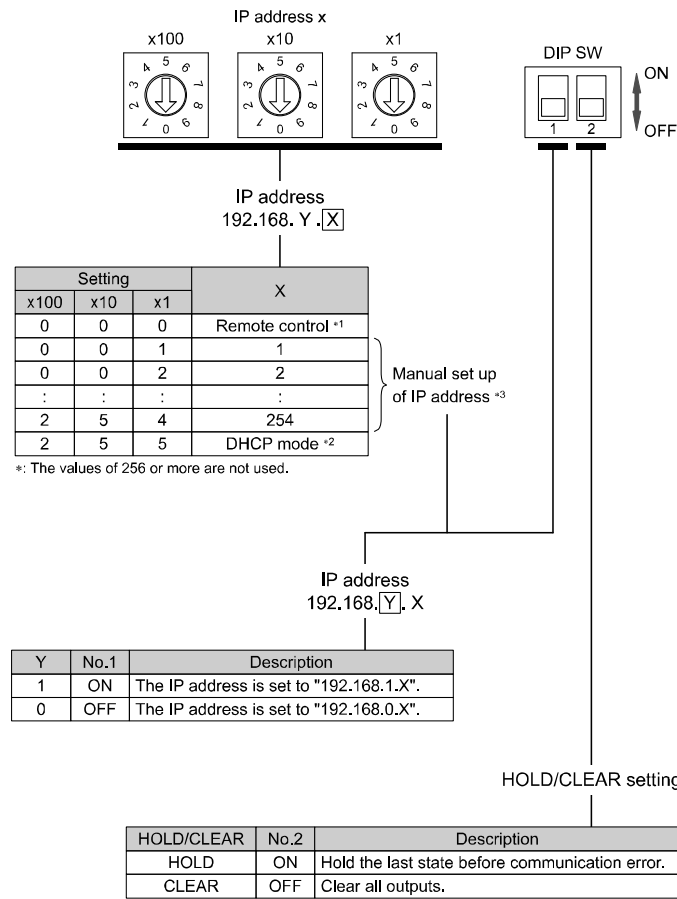
**Warning**

- 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 rotary switches and DIP switch with a small flat blade screwdriver.



### 5.2 Configuration

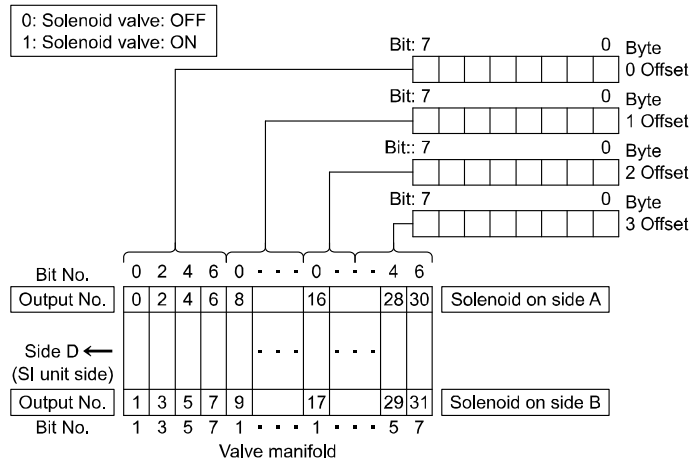
In order to configure the SI unit for the EtherNet/IP™ network, the appropriate device master file (EDS file) for the SI unit will be required. Technical documentation giving detailed configuration information and the EDS file can be found on the SMC website (URL: <https://www.smcworld.com>).

### 5.3 EDS File

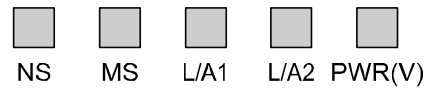
Product number	EDS file and icon
EX260-SEN1	ex260_sen1_24_v**.eds ex260-sen1.ico
EX260-SEN2	ex260_sen2_24_v**.eds ex260-sen2.ico
EX260-SEN3	ex260_sen3_24_v**.eds ex260-sen3.ico
EX260-SEN4	ex260_sen4_24_v**.eds ex260-sen4.ico

### 5.4 Output number assignment

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



## 6 LED Display



LED	Status	Description
NS	OFF	SI unit operating voltage not supplied or IP address is not set.
	Green ON	EtherNet/IP™ communication established.
	Green Flashing	EtherNet/IP™ communication not established.
	Red Flashing	EtherNet/IP™ communication time out.
	Red ON	IP address duplicated.
MS	OFF	SI unit operating voltage not supplied.
	Green ON	Operating normally.
	Green Flashing	Setting Error.
	Red Flashing	Recoverable Error.
	Red ON	Unrecoverable Error.
L/A1	OFF	BUS IN: No Link, No Activity
	Green ON	BUS IN: Link, No Activity
	Green Flashing	BUS IN: Link, Activity
L/A2	OFF	BUS OUT: No Link, No Activity
	Green ON	BUS OUT: Link, No Activity
	Green Flashing	BUS OUT: Link, Activity
PWR(V)	Green ON	Load voltage for valves supplied.
	OFF	Load voltage for valves not supplied or outside tolerance range (19 V or less).

## 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](http://www.smcworld.com) or [www.smc.eu](http://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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