

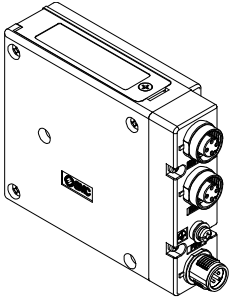


ORIGINAL INSTRUCTIONS

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)^{*)}, and other safety regulations.
^{*)}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.

| | | |
|--|----------------|--|
| | Danger | Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury. |
| | Warning | Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury. |
| | Caution | 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 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 |

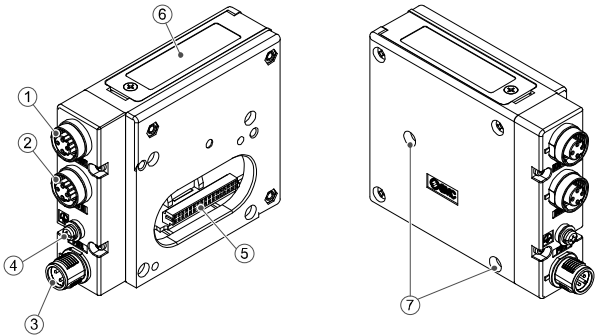
2.2 Electrical specifications

| 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

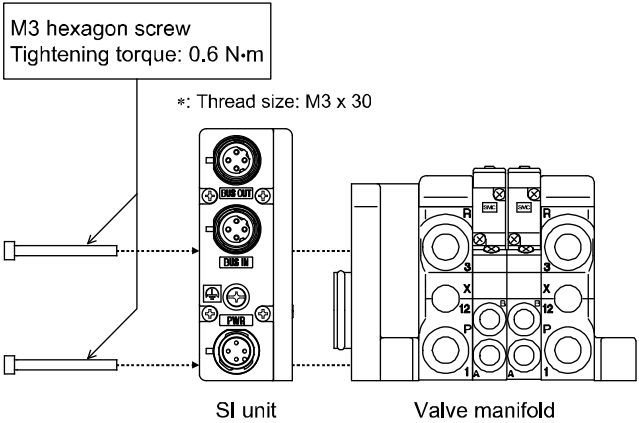
Warning

- 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

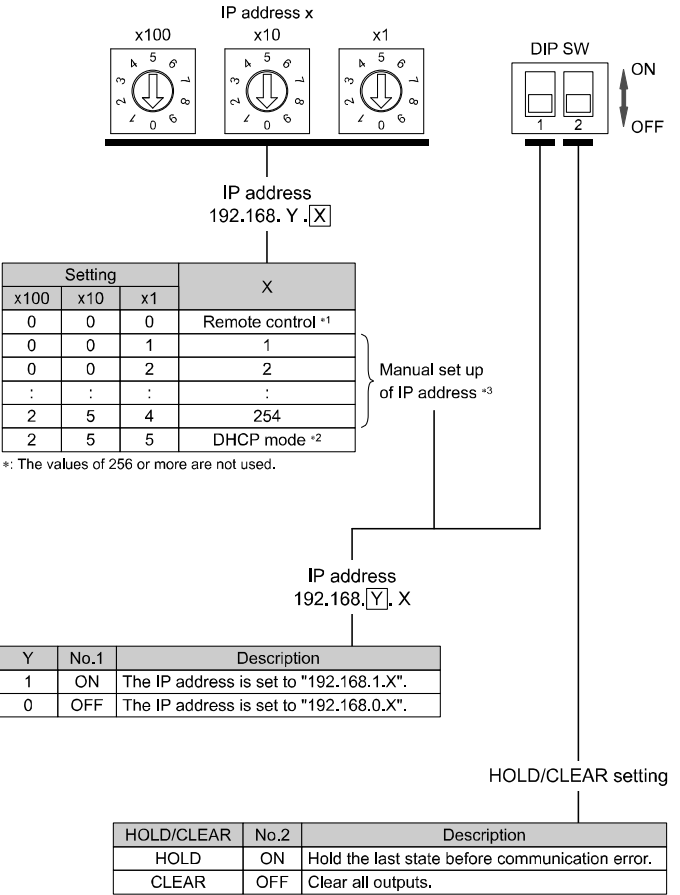
Warning

- 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

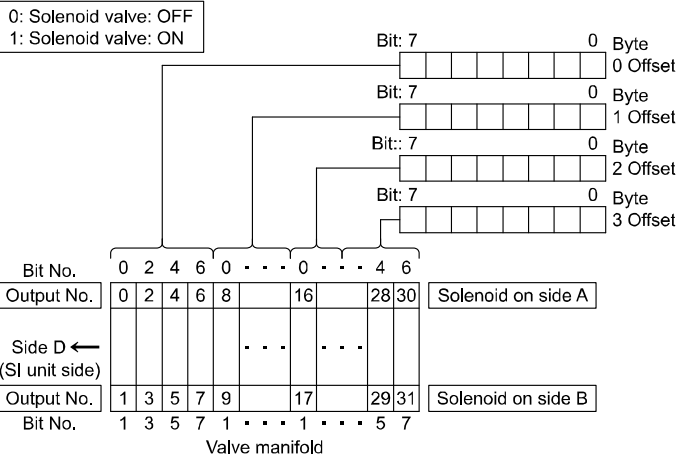
In order to configure the SI unit for the EtherNet/IP™ network, the appropriate device master file (EDS file) for the SI unit will be required. Technical documentation giving detailed configuration information and the EDS file can be found on the SMC website (URL: <https://www.smcworld.com>).

5.3 EDS File

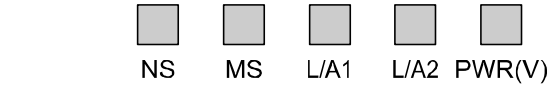
| Product number | EDS file and icon |
|----------------|--------------------------------------|
| EX260-SEN1 | ex260_sen1_24_v**.eds ex260-sen1.ico |
| EX260-SEN2 | ex260_sen2_24_v**.eds ex260-sen2.ico |
| EX260-SEN3 | ex260_sen3_24_v**.eds ex260-sen3.ico |
| EX260-SEN4 | ex260_sen4_24_v**.eds ex260-sen4.ico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

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 or 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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