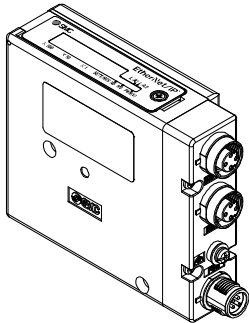




ORIGINAL INSTRUCTIONS

Instruction Manual
Fieldbus device - SI unit for EtherNet/IP™
EX260-PEN1



The intended use of this SI unit is for the control of pneumatic valves and I/O while connected to the EtherNet/IP™ 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) ⁽¹⁾, and other safety regulations.

⁽¹⁾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.
- Refer to the operation manual on the SMC website (URL: <https://www.smworld.com>) for further Safety Instructions.

2 Specifications

2.1 General specifications

Item	Specifications
Ambient temperature	0 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 (between FE and terminals)
Insulation resistance	500 VDC, 10 MΩ or more (between FE and terminals)
Operating atmosphere	No corrosive gas
Enclosure protection class	IP67 (IEC 60529)
Weight	200 g or less
Dimensions (W x L x H) mm	28.2 x 102.4 x 76.5

2.2 Electrical specifications

Item		Specifications
For logic / inputs (PWR) *1	Operating voltage	24 VDC +20% / -15%
	Internal current consumption	100 mA or less
For output (PWR(V))	Operating voltage	24 VDC +20% / -15%
	Under voltage detection	18 VDC approx.
Protection against polarity reversal		Yes (PWR and PWR(V))
Galvanic isolation		Yes (between PWR and PWR(V))

2.3 Solenoid valve specifications

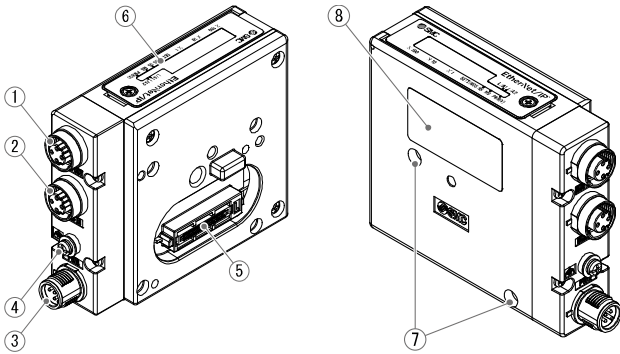
Item		Specifications
Applicable valve		JSY series: Valve manifold integrated with ejector system
Pressure sensor (input)	Max. number of inputs	5
	Load	Digital pressure sensor with built-in manifold
Valve (output)	Max. number of valve outputs	24
	Load	Solenoid valve with voltage suppressor of 24 VDC, 0.5 W or less (SMC)
	Output type	Source / PNP (Negative common)
	Over current detection / protection	Yes (per 1 output)

*1: This is the power supply voltage for the SI unit. Refer to the operation manual for the solenoid valve for the solenoid valve specifications.

2.4 Communication specifications

Item	Specifications
Bus protocol	EtherNet/IP™
Conformance test	Revision CT20
Communication medium	Standard Ethernet cable (CAT5 or more) (100BASE-TX)
Communication speed	10 Mbps / 100 Mbps (auto negotiation)
Communication method	Full duplex / Half duplex (auto negotiation)
Vendor ID	7h (SMC Corporation)
Product type	2Bh (Generic device)
Product code	10Dh
Network topology	Linear or Ring.
DLR function	Yes (beacon based)
QuickConnect™ function	Yes (Class A: <=350 ms)
Web server function	Yes
Configuration (EDS) file	ex260_pen1_24_v***.eds (download from the SMC website)

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 PORT1 (M12 4-pin socket, D-coded).
3	Power supply connector (PWR)	Power supply for valves and logic of the SI unit (M12 4-pin plug, A-coded).
4	Ground terminal	Functional Earth terminal (M3).
5	Manifold connector	For communication to valve manifold.
6	LED display	LED display to indicate the SI unit status.
7	Mounting holes	For mounting on to valve manifold.
8	Product label	Label to indicate the SI unit MAC address, serial number, etc.

Accessories

Item	Description
Hexagon socket head cap screw	M3 x 30 mm, 2 pcs. For valve manifold connection.
Seal cap	Seal cap (1 pc.) for M12 unused connector.

4 Installation

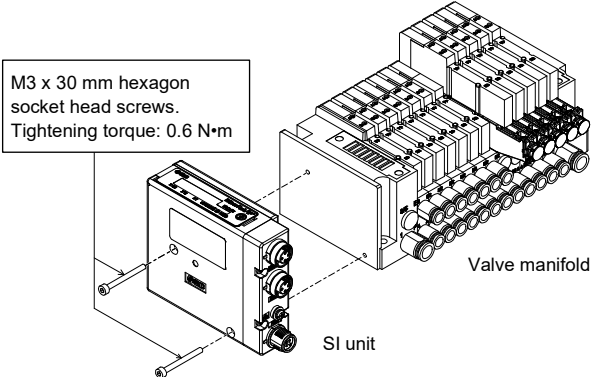
4.1 Installation

Warning

- Do not install the product unless the safety instructions have been read and understood.
- Assemble the SI unit to the valve manifold using the 2 screws supplied (Hexagonal socket wrench size 2.5 mm).
- Tighten the screws while holding the SI unit and the valve manifold so that there is no gap between them.
- Tighten the screws with the tightening torque specified: 0.6 N•m. For a protection rating of IP67 to be ensured, apply the recommended tightening torque.

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



4 Installation (continued)

4.3 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 specifications.
- Do not use in a place where the product could be splashed by oil or chemicals.
- Do not use in an area where surges are generated.
- Do not operate close to a heat source, or in a location exposed to radiant heat.
- Do not use the product in an environment that is exposed to temperature cycles.
- Do not expose the product to direct sunlight or UV light.

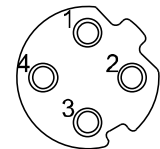
5 Wiring

5.1 Communication Connectors (BUS IN and BUS OUT)

Select the appropriate cable (SMC Part No. EX9-AC###EN-####) to mate with the EtherNet/IP™ connectors mounted on the SI unit.

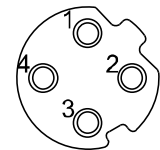
• Fieldbus connector

BUS IN / PORT1 Type MDI:
M12 4-pin socket, D-coded



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

BUS OUT / PORT2 Type MDI-X:
M12 4-pin socket, D-coded

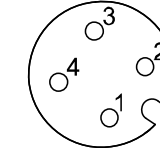


No.	Designation	Description
1	RD+	Receive Data +
2	TD+	Transmit Data +
3	RD-	Receive Data -
4	TD-	Transmit Data -

5.2 Power supply connector

- Select the appropriate cable (SMC Part No. EX500-AP0#0-#) to mate with the power supply connector mounted on the SI unit.

PWR: M12 4-pin plug, A-coded



No.	Designation	Description
1	24 V (PWR)	+24 V for control
2	24 V (PWR(V))	+24 V for output
3	0 V (PWR)	0 V for control
4	0 V (PWR(V))	0 V for output

- The power supply for control (PWR) and the power supply for output (PWR(V)) are isolated. Be sure to supply power respectively. Either single source power supply or two different power supplies can be used.
- The 24 VDC supply for control (PWR) and the 24 VDC supply for output (PWR(V)) should be protected with an external fuse.

The M12 connector cable for 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.

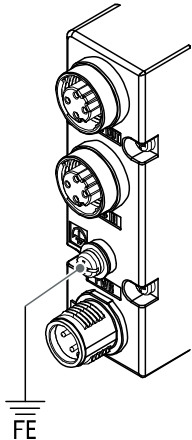
Warning

- 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.

5 Wiring (continued)

5.3 Ground Terminal

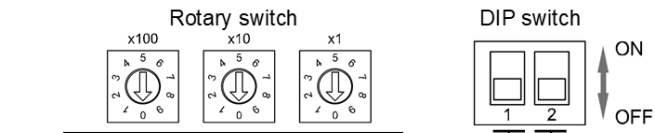
- The SI Unit must be connected to FE (Functional Earth) to divert electromagnetic interference.
- Connect a grounding cable from the FE terminal screw on the SI Unit to the nearest functional earth point. The grounding cable should be as thick and short as possible (tightening torque = 0.6 N•m).
- Resistance to ground should be 100 ohms or less.



6 Settings

6.1 Switch setting

- Switch settings must be made with the power supply turned off.
- Switch settings will be set once power is applied and any changes after power is applied will be ignored.
- Open the cover and set the rotary switches and DIP switches using a small precision screwdriver or similar.



IP address 4th octet: 192.168.Y.X

Rotary switch setting			IP address
x100	x10	x1	
0	0	0	Remote control ^{*1}
0	0	1	192.168.Y.1 ^{*3}
0	0	2	192.168.Y.2 ^{*3}
:	:	:	:
2	5	4	192.168.Y.254 ^{*3}
2	5	5	DHCP mode ^{*2}
2	5	6	Not used
:	:	:	:
8	8	8	Factory reset ^{*6}
8	8	9	Not used
:	:	:	:
9	9	9	Not used

IP address 3rd octet: 192.168.Y.X and default gateway

Setting	IP address	Default gateway	Subnet mask
ON	192.168.1.X	192.168.1.1	255.255.255.0
OFF	192.168.0.X	0.0.0.0	

HOLD / CLEAR setting ^{*5}

Hold/Clear	Setting	Description
Hold	ON	Hold the last output status when a communication error occurs.
Clear	OFF	Settings in Web server are effective (factory default is clear for all outputs).

6 Settings (continued)

- *1: Remote control (set rotary switch for IP address X to 000). Remote control mode is compatible with the IP address setting software EX9-ZSW-IPC1. Using EX9-ZSW-IPC1, the IP addresses can be set for up to 200 x devices while checking the MAC addresses of connected devices. If the IP address is stored in Remote control or the rotary switches were used to set the IP address in the previous power cycle, the device will start with the previous IP Address. If the stored IP address is unknown in the Remote control (e.g., after a factory reset or a DHCP mode from the previous power cycle) then the device will enter DHCP mode when power is applied. The IP address setting software and operation manual can be downloaded from the SMC website (URL: <https://www.smcworld.com>). For details on the setting method, refer to the operation manual. The Factory default is Remote Mode (rotary switches: 000).
- *2: DHCP mode (Set the rotary switch for IP address X to 255). This mode obtains the IP address from a DHCP server. The acquired IP address is lost when the power is turned off. When acquiring the IP address from the DHCP Server, do so when the communication cable is not connected to the PLC or when the PLC is not turned on.
- *3: Manual setting of IP address (set the rotary switch for IP address X to 001...254). Manually set the IP address in the range 192.168.0.1...254 or 192.168.1.1...254 depending on the position of DIP switch No. 1.
- *4: IP address 3rd octet and default gateway (DIP switch No.1). DIP switch No.1 combines the manual setting of the IP address 3rd octet and the default gateway setting. The Factory default is OFF (IP address Y = 0). When the switch is OFF, the IP address of the SI Unit becomes 192.168.0.1...254 and the default gateway address is set to no setting (0.0.0.0). When the switch is ON, the IP address of the SI Unit becomes 192.168.1.1...254 and the default gateway address is set to 192.168.1.1. Because the default gateway is set, a router can be used to connect to different network addresses.

- The SI Unit can also be used without a router.
- *5: Hold / Clear setting (DIP switch No.2). DIP switch No. 2 sets HOLD or CLEAR for the output status when a communication error occurs. When the switch is ON, the last output status is held in the event of a communication error. When the switch is OFF, settings in Web server are effective. The Factory default is to clear for all outputs.
- *6: Factory reset
Factory reset can be carried out by turning on the power with the rotary switch setting 888. The MS LED will flash red (1 Hz) once reset is completed.

6.2 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>).

- The EDS file and icon file are as follows:
- EDS file : ex260_pen1_24_v***.eds
 - Icon file : ex260_pen.ico

7 LED Display

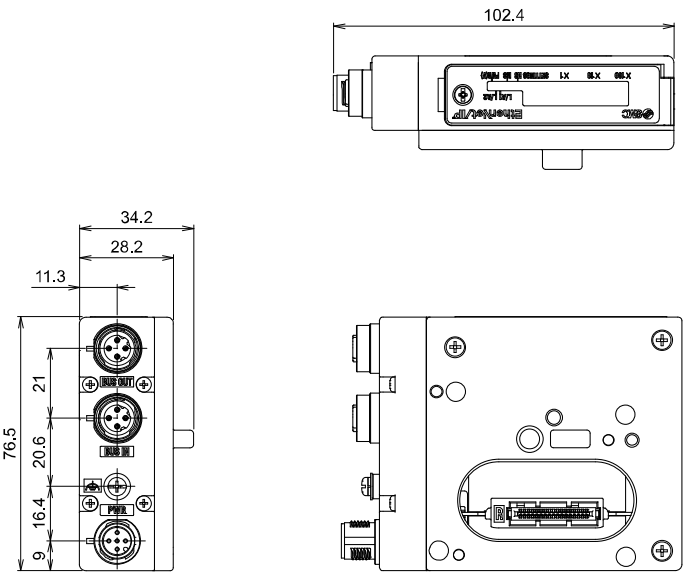


LED	Status	Description
NS	OFF	Power supply for logic/input is not present or IP address not set (no power, no IP address).
	Green ON	EtherNet/IP™ connection established (connected).
	Green flashing	EtherNet/IP™ connection not established (no connection).
	Red flashing	EtherNet/IP™ connection timeout.
	Red ON	Duplicate IP addresses detected.
MS	OFF	Power supply for logic/input is not present.
	Green ON	Operating normally (device operational).
	Green flashing (1 Hz)	One of the following may have occurred. (Standby) <ul style="list-style-type: none">• SI Unit is not configured correctly or during configuration.• The PLC is in the idle status.
	Red flashing (1 Hz)	One of the following may have occurred. (Minor fault) <ul style="list-style-type: none">• Pressure sensor has a short circuit.• Pressure sensor has a failure or a disconnection.• Valve protection function is operating.
	Red ON	Unrecoverable internal fault condition.
L/A1	OFF	Port 1 (BUS IN) : No Link, No Activity
	Green ON	Port 1 (BUS IN) : Link, No Activity
	Yellow flashing	Port 1 (BUS IN) : Link, Activity
L/A2	OFF	Port 2 (BUS OUT) : No Link, No Activity
	Green ON	Port 2 (BUS OUT) : Link, No Activity
	Yellow flashing	Port 2 (BUS OUT) : Link, Activity
PWR(V)	Green ON	Power supply for output (PWR(V)) is present.
	OFF	Power supply for output (PWR(V)) is low (< approx. 18 VDC) or is not present.

8 How to Order

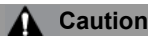
Refer to the operation manual or catalogue on the SMC website (URL: <https://www.smcworld.com>) for How to order information.

9 Outline Dimensions (mm)



10 Maintenance

10.1 General Maintenance



- 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.

11 Limitations of Use

11.1 Limited warranty and Disclaimer/Compliance Requirements

Refer to Handling Precautions for SMC Products.

12 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.

13 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)
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