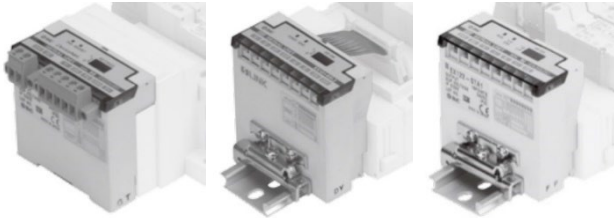




Instruction Manual
Fieldbus device - SI unit for DeviceNet®
EX120-SDN1 / EX121-SDN1 / EX122-SDN1 /
EX124U-SDN1 / EX124D-SDN1



The intended use of this product is to control pneumatic valves and I/O while connected to the DeviceNet® 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) ⁽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 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.smcworld.com>) for further Safety Instructions.
- Special products (-X) might have specifications different from those shown in the specifications section. Contact SMC for specific drawings.

2 Specifications

2.1 General specifications

Item	Specifications
Ambient temperature	0 to +55 °C (with 8 valves ON) 0 to +50 °C (with 16 valves ON)
Ambient humidity	35 to 85%RH (No condensation)
Storage temperature	-20 to +60 °C
Withstand voltage	1000 VAC applied for 1 minute
Insulation resistance	2 MΩ or more 500 VDC
Operating atmosphere	No corrosive gas
Enclosure	IP20 (EX124U/D-SDN1: IP65)
Weight	EX120-SDN1: 110 g EX121-SDN1: 140 g EX122-SDN1: 130 g EX124U/D-SDN1: 240 g

2.2 Electrical specifications

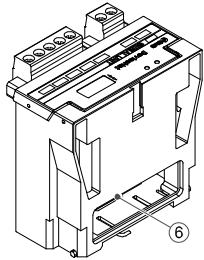
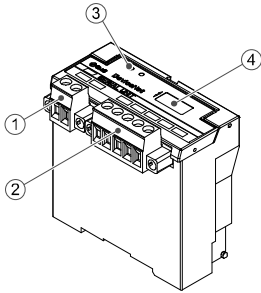
Item		Specifications
Rated voltage		24 VDC
Power supply voltage range		Power supply for DeviceNet® communication: 11 to 25 VDC
		Solenoid Valve power supply: 24 VDC +10/-5%
Current consumption		Power supply for communication DeviceNet®: 0.1 A or less
Solenoid valve (output)	Output type	NPN (positive common) / sink
	Number of outputs	16 outputs
	Connected load	Solenoid valve with surge voltage suppressor of 24 VDC and 1 W or less (manufactured by SMC)
	Output at time of communication error	HOLD / CLEAR
	Insulation type	Photo coupler insulation
	Residual voltage	0.4 VDC or less

2.3 Communication specifications

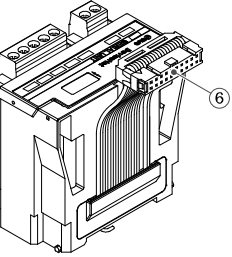
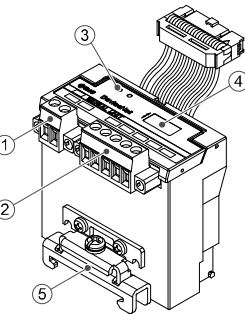
Item		Specifications		
Applicable system		DeviceNet® Volume I (release 1.2) Volume II (release 1.1)		
MAC ID set range		0 to 63		
Slave type		Group 2 Only Server		
Connection type		T branch, Multi drop		
Device type		16		
Product code		288		
Vendor ID		7 (SMC Corporation)		
Occupied area		2 bytes		
Applicable message		Polled command (I/O message), Explicit message		
Configuration file		EDS file		
Baud rate (transmission speed)		125 kbps	250 kbps	500 kbps
Max. Network length	Thick cable	500 m or less	250 m or less	100 m or less
	Thin cable	100 m or less		
Branch line length		6 m or less		
Total length of branch line		156 m or less	78 m or less	39 m or less

3 Name and function of parts

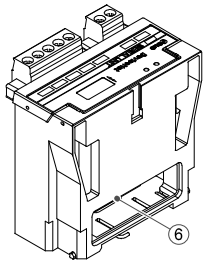
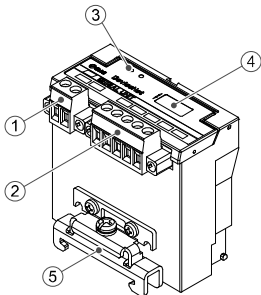
EX120-SDN1



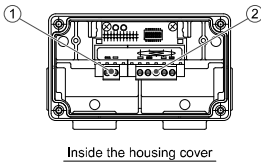
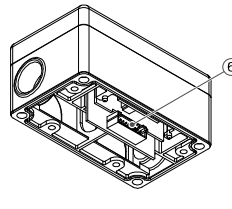
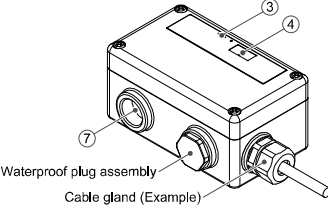
EX121-SDN1



EX122-SDN1



EX124U/D-SDN1



No.	Part	Description
1	Power supply connector	Power supply connector used to supply the power for the solenoid valves.
2	Communication connector	Communication connector used to connect to the DeviceNet® line.
3	LED Display	LED display to indicate the status of the SI unit.
4	Switch setting	Switches for performing the address and communication speed setting.
5	Mounting bracket	For mounting to a DIN rail.
6	Output connector	Output connector used to connect to the valve manifold.
7	Wiring entry (4 places)	For connecting the communication and power supply cables to the SI unit (EX124U/D-SDN1 only). For wiring, use a G1/2 cable gland to ensure an enclosure rating of IP65. Use waterproof plug (Part number AXT100-B04A) for unused wire entries.

4 Installation

4.1 Installation

Warning

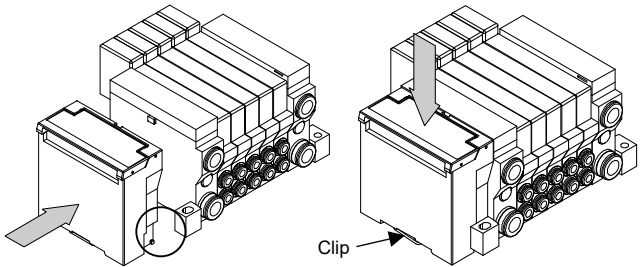
- Do not install the product unless the safety instructions have been read and understood.
- Applicable valve series: SV, SY, VQ series.

Caution

- Be sure to turn OFF the power.
- Check there is no foreign matter inside the SI unit.
- If the SI unit is not assembled properly, the internal PCBs may be damaged or liquid and/or dust may enter into the unit.
- Refer to the catalogue or operation manual for the applicable valve manifold on the SMC website (URL: <https://www.smcworld.com>) for further assembly details.

4.2 Mounting (EX120-SDN1)

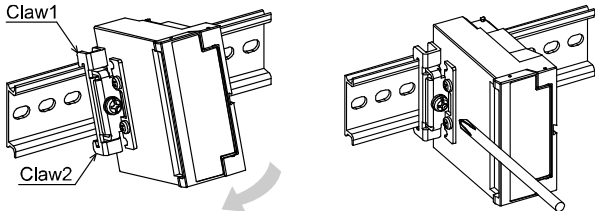
- 1) Align the raised part on the manifold side of the SI unit (at the bottom) with the groove on the manifold and press it in evenly.
- 2) Confirm that the SI unit and manifold are securely locked together and slide the SI unit downwards.



- 3) For removal lift the clip at the bottom of the SI unit using a flat blade screwdriver. By lifting the clip the hook will be removed from the manifold to release the SI unit.
- 4) Slide the SI unit upwards with the clip pulled out.

4.3 DIN rail mounting (EX121-SDN1, EX122-SDN1)

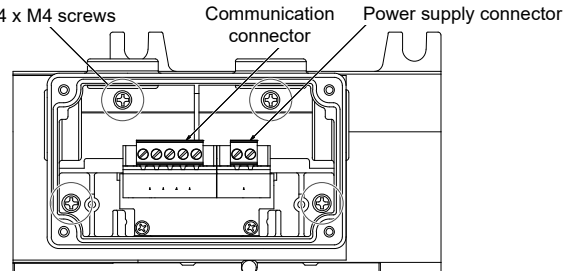
- 1) Hook claw 1 to the upper side of the DIN rail and claw 2 to the lower side.
- 2) Tighten the mounting bracket screw to fix the SI unit to the DIN rail (Tightening torque: 0.6 N·m).



- 3) For removal loosen the mounting bracket screw and remove the SI unit by unhooking claw 2 then claw 1.

4.4 Mounting (EX124#-SDN1)

- 1) Connect the SI unit wiring to the valve manifold. Ensure the cable does not get caught between the SI unit and the valve manifold.
- 2) Mount the SI unit to the manifold, then connect the communication connector and power supply connector. Tighten the 4 x M4 screws diagonally so that the SI unit is securely fixed (Tightening torque: 0.6 N·m).



4 Installation (continued)

- 3) Mount the cover to the SI unit after setting the switches.
Tighten the 4 x M4 screws diagonally so that the cover unit is securely fitted (Tightening torque: 0.6 N•m).

4.5 Environment

Warning

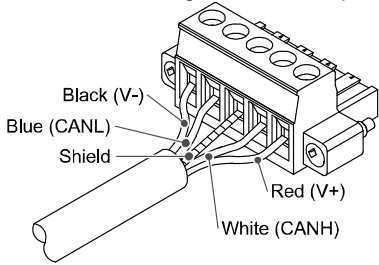
- Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
- Do not use in an explosive atmosphere.
- Do not expose to direct sunlight. Use a suitable protective cover.
- Do not install in a location subject to vibration or impact in excess of the product's specifications.
- Do not mount in a location exposed to radiant heat that would result in temperatures in excess of the product's specifications.

5 Wiring

5.1 Communication Connector

Wiring of the DeviceNet® cable and communication connector is shown below.

- Connect the signal lines to the assigned pins (shown below).
- The connector (Phoenix Contact Part No. MSTB2, 5/5-STF-5, 08AU) is suitable for use with wire sizes from AWG24 to AWG12 (0.2 mm² to 2.5 mm²).
- The terminal screws should be tightened to a torque of 0.5 to 0.6 N•m.



Pin.	Wire colour	Description
V-	Black	Power supply for DeviceNet® (-)
CANL	Blue	Communication low side
FG	Shield	Functional Earth
CANH	White	Communication high side
V+	Red	Power supply for DeviceNet® (+)

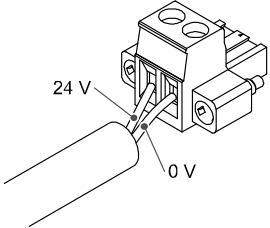
- When assembling the connector to the SI unit tighten the connector fixing screws (M2.5 screws) to a tightening torque of 0.2 to 0.3 N•m.

5.2 Terminating Resistor

- A bus termination resistor is required at each end of the DeviceNet® trunk line.
- Terminating resistors should not be installed at the end of a drop line, only at the two ends of the trunk line.
The specification of the terminating resistor is 121 Ω ±1%, 1/4 W.

5.3 Power supply connector

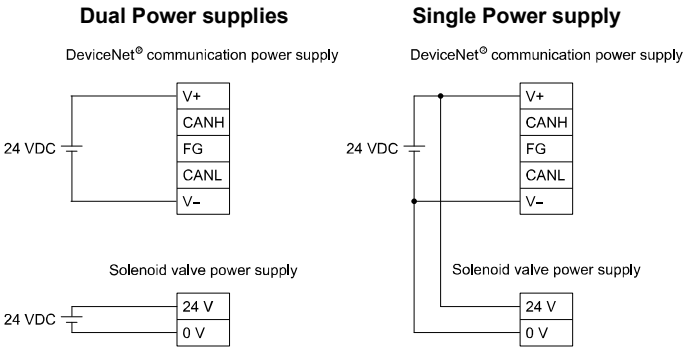
- Connect the power supply wiring to the power supply connector.
- The power supply connector (Phoenix Contact Part No. MSTB2, 5/2-STF-5, 08AU) is suitable for use with wire sizes from AWG28 to 16 (0.14 mm² to 1.5 mm²).
- Connect the wires to the assigned pins (shown below).
- The terminal screws should be tightened to a torque of 0.5 to 0.6 N•m.



5 Wiring (continued)

Pin.	Wire colour	Description
24V	-	Solenoid valve power supply (+)
0V	-	Solenoid valve power supply (-)

- Within the SI unit there are separate power supplies for the solenoid valves and for the DeviceNet® communications.
- Supply 24 VDC to each of them.
- Power can be supplied from a single power supply or from dual power supplies.



5.4 Ground Connection

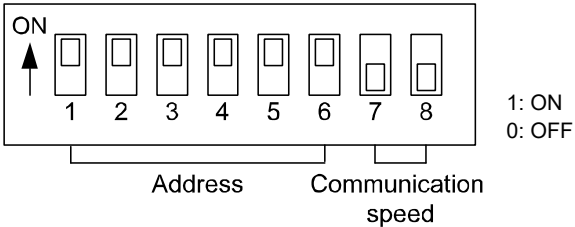
- Connect the ground (FG) terminal to Functional Earth. Individual grounding should be provided close to the product. Resistance to ground should be 100 ohms or less.

6 Setting

6.1 Switch Settings

- 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. Close the cover after setting.

- Set the switches before use.



6.1.1 Address setting

- The DeviceNet® node address can be set from 0 to 63 using Switch SW1 to SW6. The factory default setting is 63 (all switches ON).

MAC ID	SW1	SW2	SW3	SW4	SW5	SW6
	1	2	4	8	16	32
0	0	0	0	0	0	0
1	1	0	0	0	0	0
2	0	1	0	0	0	0
⋮	⋮	⋮	⋮	⋮	⋮	⋮
62	0	1	1	1	1	1
63	1	1	1	1	1	1

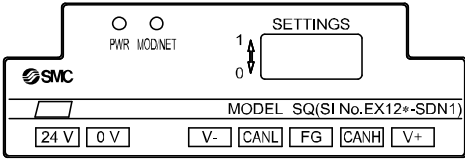
6.1.2 Communication speed setting

- The DeviceNet® communication speed can be set using Switch No. SW7 and SW8. The default setting is 125 kbps (both switches OFF).

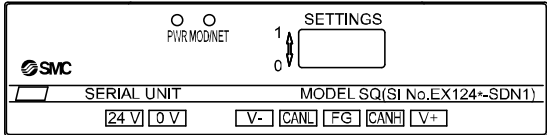
SW7	SW8	Communication speed
0	0	125 kbps
1	0	250 kbps
0	1	500 kbps
1	1	-

7 LED display

EX120-SDN1 / EX121-SDN1 / EX122-SDN1



EX124D-SDN1 / EX124U-SDN1



LED		Description
POWER	ON	Power supply for communication is supplied.
	OFF	Power supply for communication is not supplied.
MOD / NET	OFF	Power supply for communication is OFF, the unit is off-line or a node address duplication is present.
	Green flashing	Connection stand-by (on-line status)
	Green ON	Connection established (on-line status)
	Red flashing	Connection time-out (recoverable communication error)
	Red ON	MAC ID duplication error or BUS OFF error (major communication error).

8 How to Order

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

9 Outline Dimensions (mm)

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

10 Maintenance

10.1 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.

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