



ORIGINAL INSTRUCTIONS

Instruction Manual
Fieldbus device - SI unit for DeviceNet®
EX180-SDN3# / SDN4# / SDN5# / SDN6#



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

	Caution	Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
	Warning	Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
	Danger	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 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	-10 to +50 °C
Ambient humidity	35 to 85%RH (No condensation)
Storage temperature	-20 to +60 °C
Withstand voltage	500 VAC applied for 1 minute (between FG and external terminal)
Insulation resistance	10 MΩ or more (500 VDC, between FG and external terminal)
Operating atmosphere	No corrosive gas, no dust
Enclosure	IP20
Weight	110 g

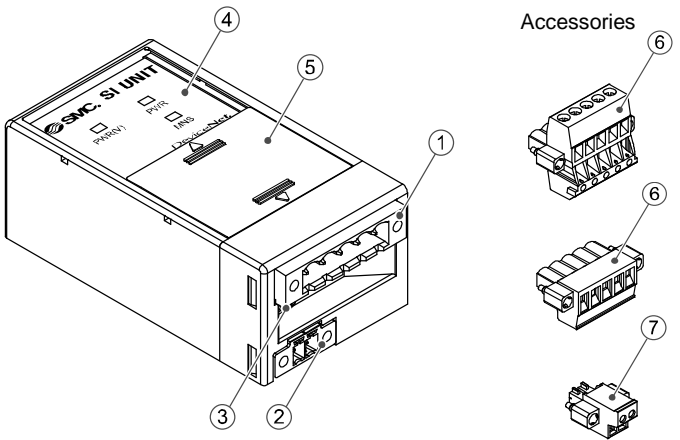
2.2 Electrical specifications

Item		Specifications
Rated voltage		24 VDC
Power supply voltage range		Communication power supply for DeviceNet®: 11 to 25 VDC
		Solenoid Valve power supply: 24 VDC +10/-5%
Current consumption		Communication power supply for DeviceNet®: 0.1 A or less
Output specification	Output type	EX180-SDN3 / 4: NPN (positive common) / sink
		EX180-SDN5 / 6: PNP (negative common) / source
	Number of outputs	EX180-SDN3 / 5: 32 points
		EX180-SDN4 / 6: 16 points
	Connection load	Solenoid valve with surge voltage suppressor of 24 VDC and 1 W or less (manufactured by SMC)
Output setting at communication error	Hold / Clear (switch setting)	

2.3 Communication specifications

Item	Specifications
Applicable system	DeviceNet® Volume1 (Edition2.1) Volume3 (Edition1.1)
Slave type	Group2 Only Server
Device type	27 (Pneumatic valve)
Product code	87h (135): EX180-SDN3 88h (136): EX180-SDN4 89h (137): EX180-SDN5 8Ah (138): EX180-SDN6
Vender ID	7 (SMC Corp.)
Applicable message	Duplicate MAC ID Check Message Unconnected Explicit Message Explicit Message
MAC ID set range	0 to 63
Data rate	125 kbps 250 kbps 500 kbps
Max. length of the network	Thick cable: 500 m or less 250 m or less 100 m or less Thin cable: 100 m or less
Total main and branch line length	156 m or less 78 m or less 39 m or less *: Max. length of branch line is 6 m.
Occupied bytes	EX180-SDN3 / 5: Output 4 bytes, Input 0 bytes EX180-SDN4 / 6: Output 2 bytes, Input 0 bytes

3 Name and function of parts



No.	Part	Description
1	Fieldbus interface connector (BUS)	Connector for DeviceNet® (6) used to connect to the DeviceNet® bus line.
2	Power supply connector (PWR(V))	The connector for the power supply (7) used to supply power for the solenoid valves.
3	FE terminal	Functional Earth connection.
4	Display	LED diagnostic display.
5	Switch setting part	Switch to configure the MAC ID / communication speed.
6	Communication connector	Communication connector for: EX180-SDN3/4/5/6 (EX180-CDN1). EX180-SDN3A/4A/5A/6A (EX180-CDN2).
7	Power supply connector	Power supply connector (Part No. EX180-CP1).

4 Installation

4.1 Mounting

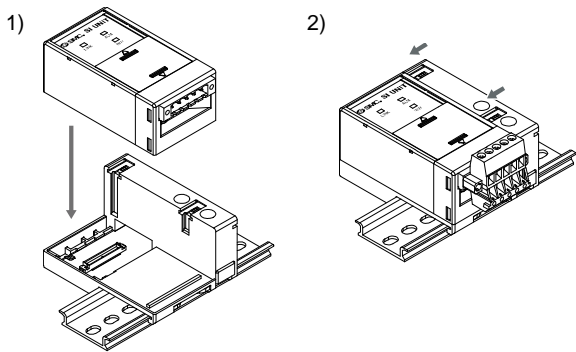
Warning

- Do not install the product unless the safety instructions have been read and understood.
- Applicable valve series: SJ2000, SJ3000, S0700

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.

- 1) Mount the SI unit to the valve manifold so that the mounting guide of the SI unit case mates with the manifold groove.
- 2) Secure the SI unit using the two sliding locks.



Caution

The EX180-SDN3/4/5/6 cannot be mounted on the valve manifold for the EX180-SDN1/2 and vice versa.

4 Installation (continued)

4.2 Environment

Warning

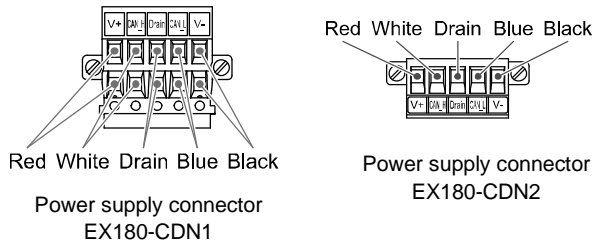
- Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
- Do not use in an explosive atmosphere.
- Do not expose to direct sunlight. Use a suitable protective cover.
- Do not install in a location subject to vibration or impact in excess of the product's specifications.
- 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 communication connector is suitable for use with wire sizes from AWG24 to AWG12 (0.2 mm² to 2.5 mm²).
- The wire terminal screws tightening torque is 0.5 to 0.6 N•m.

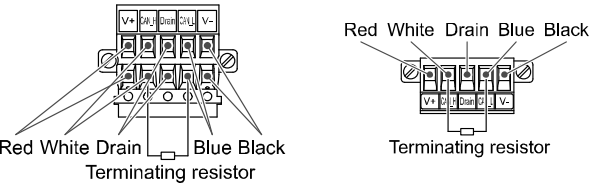


- When assembling the connector to the SI unit tighten the connector fixing screws (M2.5 screws) to a tightening torque of 0.2 to 0.3 N•m.

5.2 Bus Terminator

- A bus termination is required at both ends of the DeviceNet® bus segment (shown below).

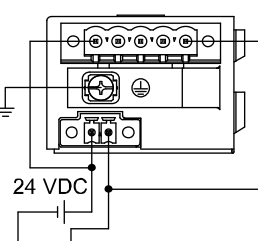
The specification of the terminating resistor is 121 Ω ±1%, 1/4 W.



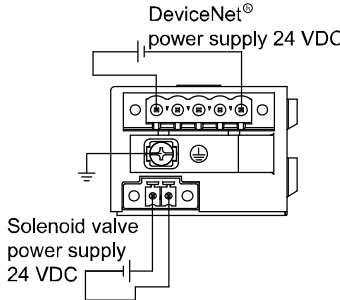
5.3 Power supply connector

- Connect the power supply wiring to the power supply connector (Part No. EX180-CP1).
- The power supply connector is suitable for use with wire sizes from AWG28 to 16 (0.14 mm² to 1.5 mm²).
- The EX180 power supply structure consists of two systems. These systems can operate using a single or dual power supply.
- Connect the wires to the assigned pins (shown below).
- When assembling the connector to the SI unit tighten the wiring screws (M2 slotted head screws) firmly with a tightening torque of 0.22 to 0.25 N•m.

Single Power Supply



Dual Power Supply



5 Wiring (continued)

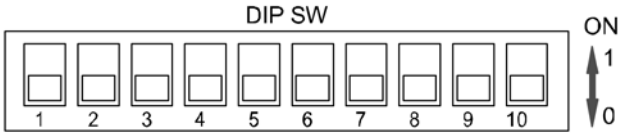
5.4 Ground Connection

- 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. Tighten the FG terminal (M3 round head combination screw) firmly with a tightening torque of 0.3 N•m.

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 (MAC ID) setting

- The DeviceNet® address (MAC ID) can be set from 0 to 63 (using Switch No. 1 to 6). The factory default setting is 63 (all switches ON).

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

6.1.2 Communication speed setting

- The DeviceNet® communication speed can be set to 125, 250 or 500 kbps (using Switch No. 7 and 8). The default setting is 125 kbps.

Communication speed	SW7	SW8
125 kbps	0	0
250 kbps	1	0
500 kbps	0	1
Not used	1	1

6.1.3 HOLD / CLEAR setting

- Set the reaction of outputs to a communication error (using Switch No. 9). The factory default setting is CLEAR.

Status	SW9	Description
CLEAR	0	Clear all outputs.
HOLD	1	Hold the last state before communication error.

It is possible to set the output behaviour in the event of a communication error individually via the DeviceNet® network. In that case the DIP switch No. 9 becomes invalid.

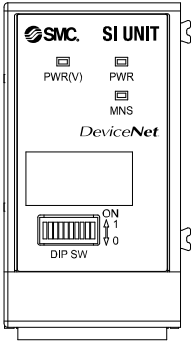
6.1.4 HW / SW setting

- Modifications to the address and speed can be made locally (HW mode using switch 10) or over the network (SW mode). The default setting is "HW mode".

SW10	Mode	Desription
0	HW	Set the address and speed locally using the SI unit switches 1 to 8.
1	SW	Set the address and speed over the DeviceNet® network. (switch setting is invalid).

If HW mode is selected then the settings stored using SW mode will be replaced by the HW settings.

7 LED display



LED		Description
PWR(V)	ON	Solenoid valve power supply is supplied at the specified voltage.
	OFF	Solenoid valve power supply is not supplied at the specified voltage.
PWR	ON	Communication power supply for DeviceNet® is supplied.
	OFF	Communication power supply for DeviceNet® is not supplied.
MNS	OFF	Communication power supply for DeviceNet® is OFF, off-line or a MAC ID address duplication is present.
	Green flashing	I/O connection is waiting (On line status).
	Green ON	I/O connection is established (On line status).
	Red flashing	I/O connection / time out (Minor communication error).
	Red ON	MAC ID duplication error or BUS OFF error (Serious 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, 4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101-0021, Japan
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