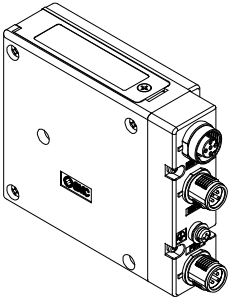




Instruction Manual
Fieldbus device - SI unit for DeviceNet®
EX260-SDN1 / SDN2 / SDN3 / SDN4



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 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 rating	IP67
Weight	200 g or less

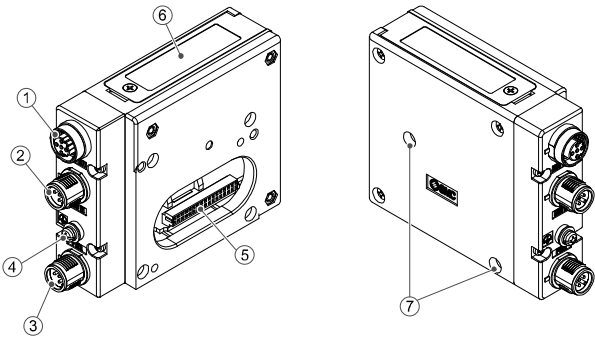
2.2 Electrical specifications

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 max., according to solenoid valve stations / specification.	
Solenoid valve specification	Output type	EX260-SDN1 EX260-SDN3	PNP (negative common) / source
		EX260-SDN2 EX260-SDN4	NPN (positive common) / sink
	Number of outputs	EX260-SDN1 EX260-SDN2	32 outputs
		EX260-SDN3 EX260-SDN4	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		DeviceNet® Volume 1 (Edition 3.5) Volume 3 (Edition 1.5)
Slave type		Group 2 Only Server
Device Type		1Bh (Pneumatic Valve)
Product code		92h: EX260-SDN1 98h: EX260-SDN2 96h: EX260-SDN3 99h: EX260-SDN4
Vendor ID		7h (SMC Corporation)
Applicable message		Duplicate MAC ID Check message. Unconnected Explicit message. Explicit message. Poll I/O message (predefined M/S connection set).
Node address setting range		0 to 63
Data rate		125 kbps / 250 kbps / 500 kbps
Configuration file		EDS file (download from SMC website)
Occupied area (Number inputs / outputs)	EX260-SDN1 EX260-SDN2	0 / 32
	EX260-SDN3 EX260-SDN4	0 / 16

3 Name and function of parts



No	Part	Description
1	Fieldbus connector (BUS OUT)	DeviceNet® connection. (M12 5-pin socket, A-code)
2	Fieldbus connector (BUS IN)	DeviceNet® connection. (M12 5-pin plug A-code)
3	Power supply connector	Power supply with load voltage for valves. (M12 4-pin plug, A-code)
4	Ground terminal	Functional Earth (M3)
5	Output connector	Output signal interface for valve manifold
6	LED and switches	Bus status specific and SI unit status LED's. Switches for setting node address and operating mode
7	Mounting hole	Mounting hole for connection to the valve manifold

Accessories

Hexagon socket head cap screw	M3 x 30 screw for connection to the valve manifold (2 pcs.).
Seal cap	Seal cap for unused fieldbus interface connector (BUS OUT) (1 pc.).

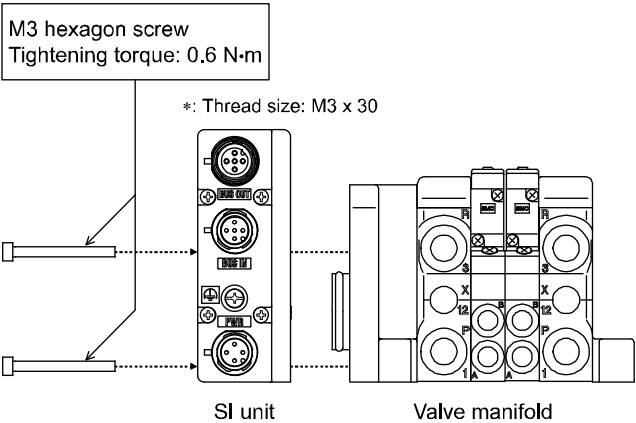
4 Installation

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 Fieldbus Interface connector

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

BUS IN: M12 5-pin plug, A-code (SPEEDCON)

BUS OUT: M12 5-pin socket, A-code (SPEEDCON)

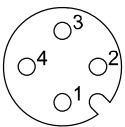
No.	Designation	Contact layout	
		BUS IN	BUS OUT
1	DRAIN		
2	V+		
3	V−		
4	CAN_H		
5	CAN_L		

- The BUS IN and BUS OUT communication connectors are connected inside the SI unit as shown in the circuit diagram below.
- The DeviceNet® BUS OUT connector is provided as an option and can be used to connect subsequent slaves to the network.
- *: It is possible to connect to the next SI unit using the BUS OUT connector; however this is not recommended in the DeviceNet® specifications. A DeviceNet® tap and drop cable is the preferred option.
- Connect terminating resistors to both ends of the DeviceNet® trunk line.

4.5 Power supply connector layout

PWR: M12 4-pin plug, A-code (SPEEDCON)

PWR: M12 4-pin plug, A-code (SPEEDCON)



No.	Designation	Description
1	-	Not used
2	SV 24 V	+24 V for solenoid valve
3	-	Not used
4	SV 0 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.

The M12 connector cable has two types, SPEEDCON compatible and standard. If both plug and sockets have connectors for SPEEDCON, the cable can be inserted and connected by turning it a 1/2 of a rotation.
A standard connector can be connected to a SPEEDCON connector as well as a standard M12.

Warning

- Be sure to fit a seal cap (EX9-AWTS) on any unused M12 connectors. Proper use of the seal cap enables the enclosure to maintain IP67 specification.

4.6 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 Installation (continued)

4.7 Environment



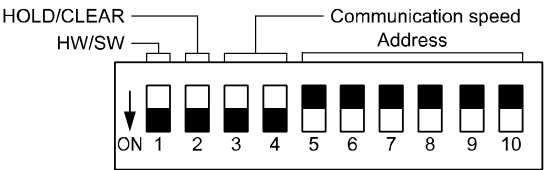
Warning

- 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 switches with a small flat blade screwdriver.
- Set the switches before use.



5.1.1 Address setting

- The DeviceNet® address (MAC ID) is binary coded and can be set from 0 to 63 (using switch 5 to 10).
- The factory default setting is 63.

Switch No.	5	6	7	8	9	10
MAC ID	32	16	8	4	2	1
	0	0	0	0	0	0
	1	0	0	0	0	1
	2	0	0	0	1	0
	:	:	:	:	:	:
	62	1	1	1	1	0
	63	1	1	1	1	1

5.1.2 Communication speed setting

- The DeviceNet® communication speed is binary coded and can be set to 125 kbps, 250 kbps and 500 kbps (using switch 3 and 4).
- The factory default setting is 125 kbps.

Switch No.	No.3	No.4
Communication speed	125 kbps	0
	250 kbps	0
	500 kbps	1
	-	1

5.1.3 HOLD / CLEAR setting

- Set the reaction of outputs to the communication error. All outputs will be set under the same conditions (using switch 2).
- The factory default setting is CLEAR.
- Each output can be set individually over the network.

Switch No.	No.2	Description
HOLD/CLEAR	CLEAR	0
	HOLD	1

5.1.4 HW / SW setting

- Modifications to the address and speed can be made locally (using switch 1) or over the network.
- Local setting: Hardware mode (referred to as "HW mode")
- Network setting: Software mode (referred to as "SW mode")
- The factory default setting is "HW mode".

Switch No.	No.1	Description
HW/SW	HW	0
	SW	1

∗: Refer to Setting over the DeviceNet® network section for the setting method through the network.

5 Setting (continued)

5.1.5 Setting over the DeviceNet® network

The DeviceNet® node address (MAC ID), DeviceNet® communication speed and fail safe mode, i.e. reaction of outputs to the communication error, of the SI unit can be set over the DeviceNet® network in accordance with the procedure below.

Node address setting, communication speed setting

- 1) Set the switch No. 1 of the 10-element switch to ON (SW mode).
- 2) Change the instance / attribute value in the DeviceNet® Class as follows.

Class	Instance	attribute	Description	Value
03h (DeviceNet)	01h	01h	MAC ID (Node address)	0 to 63
	01h	02h	Baud_Rate (communication speed)	0: 125 kbps 1: 250 kbps 2: 500 kbps

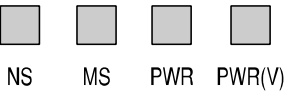
- The MAC ID and communication speed set by SW mode on the SI unit will be saved and still valid after the DeviceNet® has been switched off.
- When DeviceNet® power is applied to the SI unit in HW mode, the MAC ID and communication speed set by Software mode is no longer valid and the switch setting is valid instead.

5.2 Configuration

In order to configure the SI unit for the DeviceNet® network, the appropriate device master file (EDS file) for the SI unit will be required.

Technical documentation giving detailed configuration information and the GSD file can be found on the SMC website (URL: <https://www.smcworld.com>).

6 LED Display



LED	Description
NS	Network status
MS	SI unit status
PWR	LED is ON green when the network power supply is ON.
PWR (V)	LED is ON green when the load voltage for the valve is supplied. LED is OFF when the load voltage for the valve is not supplied or outside of the specification (19 V or less).

<Indication of communication status>

NS	MS	Description
Green ON	Green ON	On-line status, The device has connections in the established state.
OFF	Green ON	Off-line status, The device has not completed the Dup_MAC ID test yet.
Green flashing	Green ON	On-line status, The device has no connections in the established state.
OFF	Red ON	Off-line status, Watchdog timer error.
OFF	Red flashing	Wrong switch setting, Parameter writing error.
Red ON	Green ON	Bus-off status, Duplicate MAC ID.
Red flashing	Green ON	I/O Connection is in the Timed-Out state.
OFF	OFF	No network power present.

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)
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