Fieldbus device
Operation Manual

EX250 Series for DeviceNet™

Thank you for purchasing an SMC EX250 Series Fieldbus device (Hereinafter referred to as "SI unit").
Please read this manual carefully before operating the product and make sure you understand its capabilities and limitations.
Please keep this manual handy for future reference.

To obtain more detailed information about operating this product, please refer to the SMC website (URL http://www.smcworld.com) or contact SMC directly.

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.

⚠ Caution: CAUTION indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

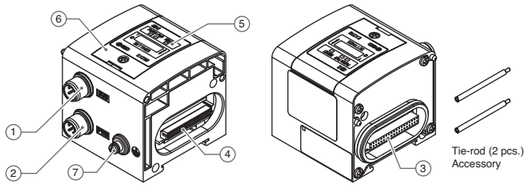
⚠ Warning: WARNING indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

⚠ Danger: DANGER indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

Operator

- This operation manual is intended for those who have knowledge of machinery using pneumatic equipment, and have sufficient knowledge of assembly, operation and maintenace of such equipment. Only those persons are allowed to perform assembly, operation and maintenance.
- Read and understand this operation manual carefully before assembling, operating or providing maintenance to the product.

Summary of Product elements



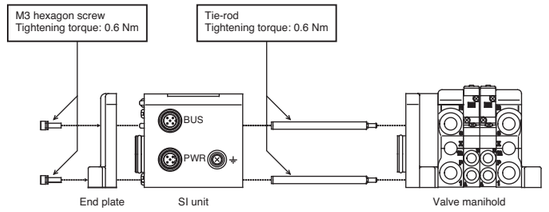
No.	Description	Function
1	Communication connector	Connect with DeviceNet™ communication line.
2	Power supply connector	Supplies power to the solenoid valve, the Output block, SI unit and the Input block.
3	Input block connector	Connects the Input block.
4	Output block connector	Connects the solenoid valve, Output block and etc.
5	Display	LED display shows the SI unit status.
6	Switch protective cover	Set MAC ID and Baud rate by using the switches under the cover.
7	Grounding terminal	Used for grounding.

Mounting and Installation

■Installation

The SI unit does not have mounting holes, so it cannot be installed alone. Make sure to connect the solenoid valve. When an input block is not required, connect the end plate directly to the SI unit.

○Assembly and disassembly of the SI unit



■Safety Instructions

⚠ Warning

■Do not disassemble, modify (including changing the printed circuit board) or repair.
An injury or failure can result.

■Do not operate the product outside of the specifications.
Do not use for flammable or harmful fluids.
Fire, malfunction, or damage to the product can result.
Verify the specifications before use.

■Do not operate in an atmosphere containing flammable or explosive gases.
Fire or an explosion can result.
This product is not designed to be explosion proof.

■If using the product in an interlocking circuit:
•Provide a double interlocking system, for example a mechanical system.
•Check the product regularly for proper operation.
Otherwise malfunction can result, causing an accident.

■The following instructions must be followed during maintenance:
•Turn off the power supply.
•Stop the air supply, exhaust the residual pressure and verify that the air is released before performing maintenance.
Otherwise an injury can result.

⚠ Caution

■After maintenance is complete, perform appropriate functional inspections.
Stop operation if the equipment does not function properly.
Safety cannot be assured in the case of unexpected malfunction.

■Provide grounding to assure the safety and noise resistance of the Fieldbus system.
Individual grounding should be provided close to the product with a short cable.

■NOTE

- When conformity to UL is necessary the SI unit must be used with a UL1310 Class2 power supply.

Exchange of SI unit
•Remove screws from End Plate and release connection of each unit.
•Replace old SI unit with new one. (Tie rod does not need to be removed.)
•Connect Input Block and End Plate and tighten removed screws by specified tightening torque. (0.6 Nm)

Assembly and disconnection of unit
Addition of Input Block
•Remove screws from End Plate.
•Mount attached tie rod.
•Connect additional Input Block.
•Connect End Plate and tighten removed screws by specified tightening torque. (0.6 Nm)

Caution for maintenance
(1) Be sure to turn-off all power supplies.
(2) Be sure that there is no foreign object in any of units.
(3) Be sure that gasket is lined properly.
(4) Be sure that tightening torque is according to specification.

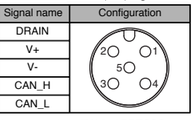
If these items are not kept, it may lead to the breakage of substrate or intrusion of liquid or dust into the units.

■Wiring

○Communication wiring

•Communication connector

M12 5-pin plug A-code

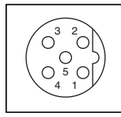
Pin No.	Signal name	Configuration
1	DRAIN	
2	V+	
3	V-	
4	CAN_H	
5	CAN_L	

Example of the cable with connector: PCA-1557633
EX500-AC□-DN

○Power supply wiring
Refer to "Safety Instructions" on this manual when selecting the power supply.

•Power supply connector

M12 5-pin B-code (reverse)

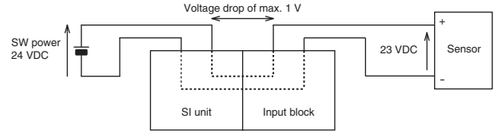


No.	Description	Function
1	SV24 V	+24 V for solenoid valve.
2	SV0 V	0 V for solenoid valve
3	SW24 V	+24 V for input block
4	SW0 V	0 V for input block
5	FE	Ground

Example of the cable with connector: EX9-AC□-1

○FE connection
Connect the ground terminal to the ground. Resistance to the ground should be 100 Ω or less.

SW power is supplied to the sensor connected to the input block. There is a voltage drop up to maximum 1 V inside the SI unit when SW power is supplied. Select a sensor taking this voltage drop into consideration. If 24 V must be supplied to the sensor, it is necessary to increase the SW power supply voltage so that the input voltage of the sensor will be 24 V with the actual load. (Allowable SW power supply range: 19.2 V to 28.8 V)

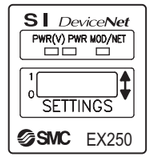


○Terminating resistors
DeviceNet™ requires a terminating resistor to be installed at each end of the trunk.
The resistor requirements are:

•121 Ω
•1% metal film
•1/4 W

Terminating resistors should not be installed at the end of a drop line, only at the two ends of trunk line.

LED indication



LED	Description	
PWR(V)	Green LED is ON when power for solenoid valve is supplied.	
PWR	Green LED is ON when power for DeviceNet™ communication is supplied.	
MOD/NET	OFF	Power supply is off, on-line status or checking for MAC ID duplication.
	Green LED is flashing	I/O connection stand-by (on-line status)
	Green LED is ON	I/O connection established (on-line status)
	Red LED is flashing	I/O connection time-out (minor communication error)
	Red LED is ON	MAC ID duplication error or BUS OFF error (serious communication error)

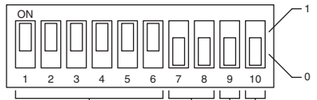
∗: EX250-SDN1 disconnects the I/O connection when the solenoid valve power supply decreases or when the input block fuse is detected to be broken (EX250-SDN1-X102 does not disconnect the I/O connection).

Setting

○Switch setting
Open the protective cover, and set the switches with a small flat blade screwdriver.

Note
1. The power supply should be off while setting the switches.
2. Be sure to set the switches before use.
3. After setting the switches, close the switch cover and tighten the screw to the specified torque. (Tightening torque: 0.6 Nm)

Address setting



Node address (MAC ID) setting

MAC ID	SW1-1 2^0 (1)	SW1-2 2^1 (2)	SW1-3 2^2 (4)	SW1-4 2^3 (8)	SW1-5 2^4 (16)	SW1-6 2^5 (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

Communication speed (Baud Rate)

Communication speed	SW1-7	SW1-8
125 kbps	0	0
250 kbps	1	0
500 kbps	0	1
Unused	1	1

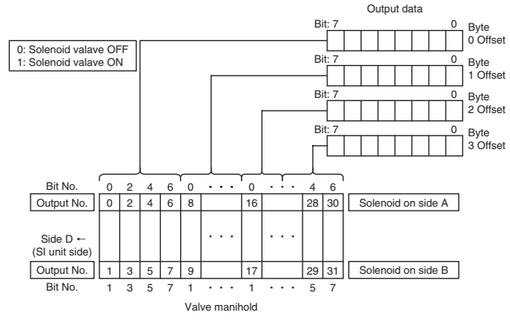
Setting of solenoid output state in communication fault
Solenoid output state: Communication stops (I/O connection time out) or fault message is received.

SW1-9	Solenoid output state	
1	HOLD	All solenoid valve outputs are hold before communication fault.
0	CLEAR	All solenoid valve outputs are reset to zero.

Mode setting

SW1-10	Mode
0	H / W mode
	Set address and communication speed by SW1 to 8.
1	S / W mode
	Set address and communication speed by network1. ∗: SW1-1 to 8 are invalid.

○Output No. assignment
Combinations of output data and valve manifold



∗: Output No. starts from 0, and will be assigned to the valves in order from the SI unit mounted side
∗: Manifold wiring is double wired as standard ("double wiring specification"), and the output numbers are assigned in order from A side to B side. If the mounted valves are single solenoid valves, the output on B side will be empty. (See Figure a)
∗: Special wiring specification with a mixed wiring of single solenoid and double solenoid can be specified with a wiring specification sheet. This makes it possible to specify the output numbers without empty outputs. (See Figure b)
∗: Each bit status, 0 or 1, of the data shows the ON or OFF solenoid valve status (0: OFF, 1: ON), and the output number starting from 0 will be assigned to from the lowest bit of the memory data.

Fig.a

	Double	Single	Double	Double	
No.	0	2	4	6	A
Station	1	2	3	4	- - -
No.	1	3	5	7	B

Fig.b

	Double	Single	Double	Double	
No.	0	2	3	5	A
Station	1	2	3	4	- - -
No.	1	-	4	6	B

Free

○Input No. assignment
The inputs of the Input block are assigned from the SI unit side Input block in the order 0,1,2…maximum of 31.

Troubleshooting

Technical documentation giving detailed troubleshooting information can be found on the SMC website (URL http://www.smcworld.com).

Specifications

Power for SI unit: 11 to 25 VDC, 0.1 A or less
Power for input block: 24 VDC ±20%, 1 A or less (Depending on number of connecting sensors and specifications)
Power for solenoid valve: 24 VDC +10%/-5%, 2 A or less (Depending on number of solenoid valve station and specifications)
Connection load: Solenoid valve with protection circuit for 24 VDC and 1.5 W or less surge voltage. (made by SMC)
Operating ambient temp: -10 to 50 °C Storage ambient temp: -20 to 60 °C
Pollution degree: Pollution degree 3 (UL508)

Technical documentation giving detailed specification information can be found on the SMC website (URL http://www.smcworld.com).

Outline Dimensions

Technical documentation giving detailed outline dimensions information can be found on the SMC website (URL http://www.smcworld.com).

Accessories

Technical documentation giving detailed accessories information can be found on the SMC website (URL http://www.smcworld.com).

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