

Before Use

Fieldbus device

EX250-SPR1



Thank you for purchasing an SMC EX250-SPR1 Fieldbus device. 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 the operation manual about this product and control unit, 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.

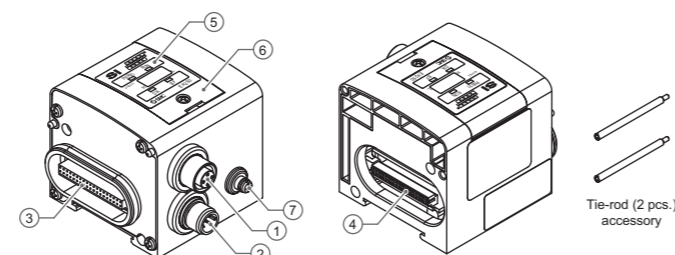
Warning: WARNING indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

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 maintenance 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



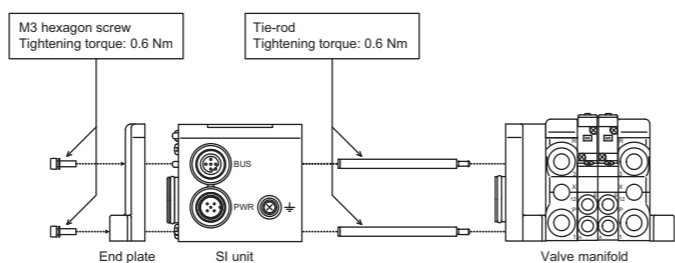
No.	Description	Function
1	Communication connector	Connect with PROFIBUS DP communication line.
2	Power supply connector	Supplies power to the solenoid valve, the Output block, SI unit and the Input block.
3	Input block connector	Connects the Input block.
4	Output block connector	Connects the solenoid valve, Output block etc.
5	Display window	LED display shows the SI unit status.
6	Switch protective cover	Sets the address etc. with the switch inside.
7	Grounding terminal (FE)	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 valve manifold. When an input block is not required, connect the end plate directly to the SI unit.

Assembly and disconnection of unit



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

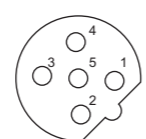
- Be sure to turn-off all power supplies.
- Be sure that there is no foreign object in any of units.
- Be sure that gasket is lined properly.
- Be sure that tightening torque is according to specification.

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



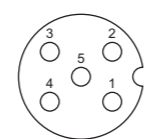
M12 5-pin Socket B-code (reverse)		
No.	Description	Function
1	VP	Supply voltage for terminating resistor
2	RXD/TXD-N	Minus to send/receive data
3	DGND	Ground for terminating resistor
4	RXD/TXD-P	Plus to send/receive data
5	-	Unused

Example of connected Bus Tee: TURCK VB2-FSW-FKW-FSW45 etc.

Power supply wiring

Power supply line inside the unit has individual power supplies for valve actuation (SV power supply) and for Control parts and Input (SI-SW power supply). Supply 24 VDC for each of them. Either single or dual power supply is available.

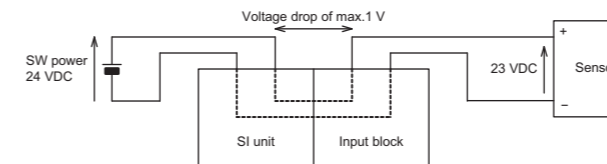
- Communication connector



M12 5-pin Plug A-code		
No.	Description	Function
1	SV24 V	+24 V for valve
2	SV0 V	0 V for valve
3	SW24 V	+24 V for SI unit and input
4	SW0 V	0 V for SI unit and input
5	FE	Ground

Example of connected cable: SMC EX500-AP□-S etc.

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)



Setting

Address setting

Be sure to turn power supply off before setting the switches off before setting the switches of SI unit. Switch installed in cover of SI unit is available for setting of address.



Software setting mode

Address is set in network by using ET200 hand held unit or PG (programming tool). Once address is set, it is saved even if power is cut. Setting range: 1 to 125 (10 dec.) Value set on shipment: 125.

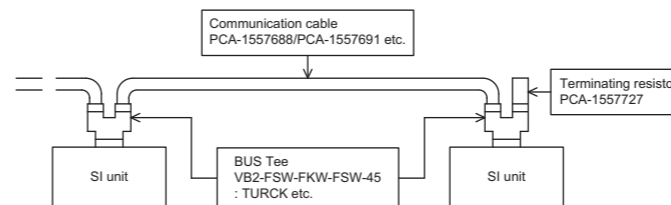
Hardware setting mode

Address of unit is set with address setting switches. There are two decimal rotary switches for address setting; one for ten's place and the other for unit's. Setting range: 1 to 99 (10 dec.) Example: Address27 (10 dec.)

*: When software setting mode is selected, address setting switches are not effectual. Moreover, software setting mode and hardware setting mode differ in ID numbers of units.

Terminating resistors

It is necessary to attach bus terminating resistance to the units located at the ends of transmission line.



*: Contact each manufacture about Communication cable and Bus Tee.

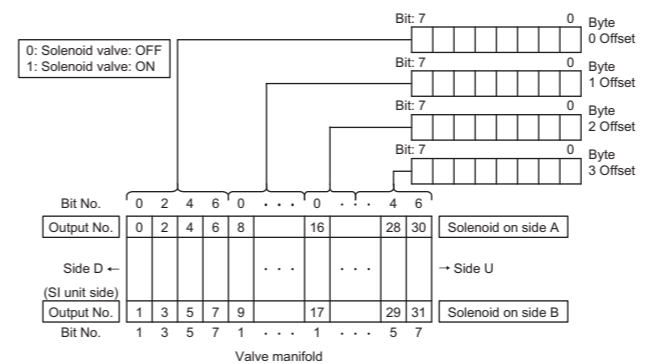
Configuration

In PROFIBUS DP, a device database file called the Generic Station Description (GSD) file provides configuration information specific to the device (ID number, data format, baud rate etc.). The GSD file of the product depends on the address setting mode (selected by the address setting mode switch).

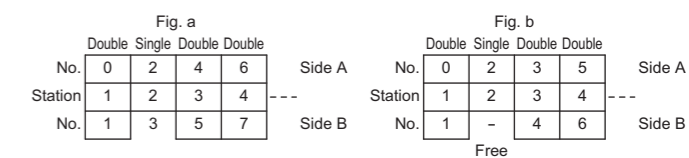
GSD file: SMCA1409.gsd (In hardware setting mode)
SMCA1408.gsd (In software setting mode)

Assignment of I/O No.

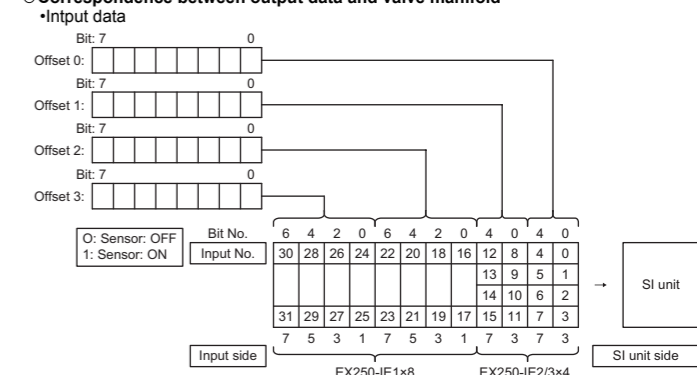
Correspondence between output data and valve manifold
•Output data



- Output numbers are assigned to stations from side D to U of manifold in order. (Refer to manual of each valve manifold for the directions of side D and U)
- Standard manifold is wired in double. Output numbers are assigned to side A and B alternatively. In case of single solenoid valve, output on side B is free. (Refer to Fig. a)
- Mixed (single and double) wiring is available as long as wiring specifications designate it. This allows output numbers to be specified without having free output. (Refer to Fig. b)
- Each bit of data sent from master (4 bytes) shows ON/OFF (0: OFF, 1: ON) of solenoid valve. Starting from LSB of the first byte (Offset 0), output numbers are assigned to all the bits in numeric order.



Correspondence between output data and valve manifold



- Input numbers are assigned to stations from SI unit side to input side in order.
- Each bit of data read into master 4bytes shows ON/OFF of sensor connected to input block. Starting from LSB of first byte (Offset 0), input numbers are assigned to all bits in numeric order.

Diagnosis information

Diagnosis information of the SI unit is composed of 6 bytes standard diagnosis information and 7 bytes SI unit status information, 13 bytes in total, as specified in PROFIBUS DP. When the SI unit is in a non-standard state, it will send an error message to the master as diagnosis information, and light up the DIA display.

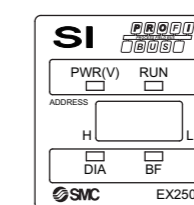
SI unit status information is as follows

Function	Contents
Surveillance of valve power supply voltage	It detects when the voltage of the valve lowers to approximately 19 V or less.
Input block open fuse surveillance	Detection of communication error in A to D on the input side due to the broken fuse of the Input block.

Refer to PROFIBUS specifications and manual of the master, etc. for how to refer to diagnosis information on the master.

Technical documentation giving detailed diagnosis information and set-up steps information can be found on the SMC website (URL <http://www.smcworld.com>).

LED indication



LED	Content
PWR(V)	Green lights up when power supply for valves is turned on. Disappear when valve power supply voltage decreases below 19 V.
RUN	Green lights up during operation (when power supply for SI unit is turned on).
DIA	Red lights up when some failure is detected by self-diagnosis.
BF	Red lights up when bus failure is detected.

Troubleshooting

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

Specifications

Power for SI unit/input: 24 VDC ±20%, 1.1 A or less
(Inside of SI unit: 0.1 A or less
Input block: 1 A or less (Depending on number of connecting sensors and specifications))

Power for 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: +5 to +45 °C
Storage ambient temp: −20 to +60 °C
*1: Input terminal are not isolated from Power source.
*2: Do not connect outside Power source to Input and Output terminals.

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>).

SMC Corporation URL <http://www.smcworld.com>

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Note: Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.
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