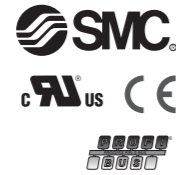


Fieldbus device Operation Manual



EX250 Series for PROFIBUS DP

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 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.

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.

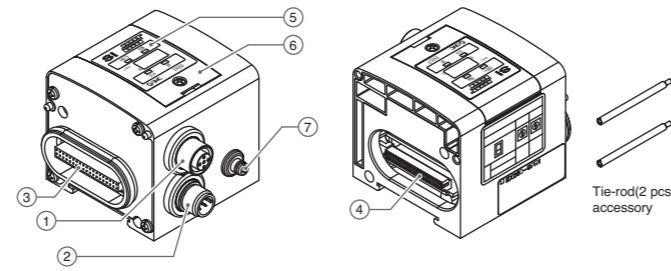
Caution

- 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.

Summary of Product elements



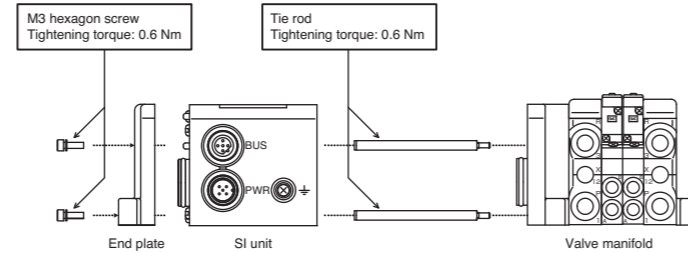
No.	Description	Function
1	Communication connector	Connect with PROFIBUS DP communication line.
2	Power supply connector	Supplies power to the solenoid valve, the Output block, SI unit and the Input block.
3	Input block connector	Connects the Input block.
4	Output block connector	Connects the solenoid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

Mounting and Installation

Installation

Not having mounting hole, it can't be set to BUS independently. Be sure to connect manifold to SI unit for setting. And if Input block is unnecessary, connect End plate directly to 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

- (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 5pin reverse (Socket)
Example of connected Bus Tee: TURCK VB2/FSW/FKW/FSW45 etc.

Pin No.	Description	Function
1	VP	Supply voltage for Terminating Resistor
2	A-N	Minus to send/receive data
3	DGND	Ground for Terminating Resistor
4	B-P	Plus to send/receive data
5	-	Unused

- Power supply wiring

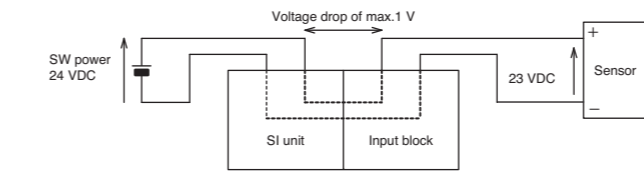
Power supply line inside the unit has individual power supplies for solenoid valve actuation (SV power supply) and for Control parts and Input block (SI-SW power supply). Supply 24 VDC for each of them. Either single or dual power supply is available.

- Communication connector

M12 5pin (Plug)
Example of connected cable: SMC EX500-AP0-0-S etc.

Pin 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 SI unit and Input Block
4	SW0 V	0 V for SI unit and Input Block
5	FE	Ground

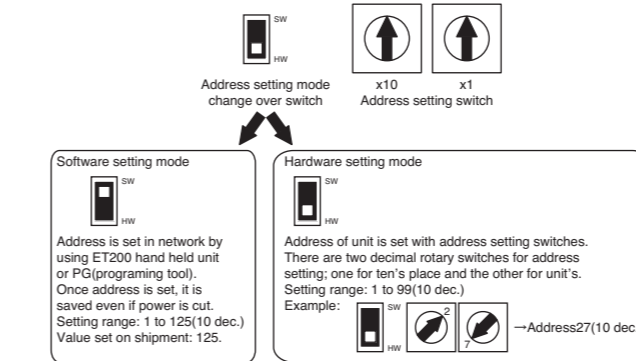
Power for sensor is supplied to sensor connected with Input block. Select sensor concerning voltage drop up to maximum 1 V inside the unit at this moment. If sensor requires 24 V, it is necessary to lower power supply voltage for sensor slightly or secure power supply for sensor separately without going through SI unit so that sensor input voltage can be 24 V with actual loading (allowable voltage of power supply: 19.2 V to 28.8 V) or dual power supply is available.



Setting

Address setting

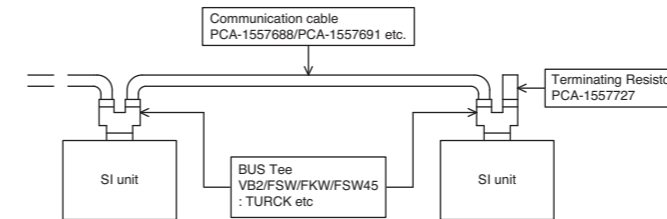
Be sure to turn power supply off before setting the switches off before setting the switches of SI unit. Switch installed in cover of SI unit is available for setting of address.



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

Terminator

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



Configuration

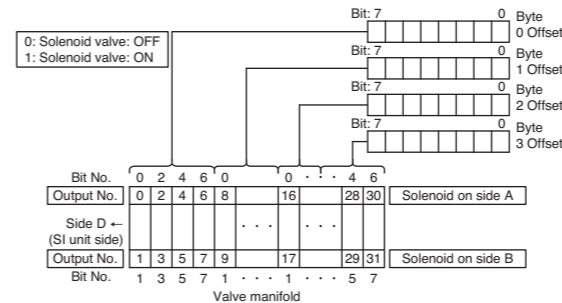
In PROFIBUS DP, a device database file called the Generic Station Description (GSD) file provides configuration information specific to the device (ID number, data format, baud rate...).

The GSD file of the product depends on the address setting mode (selected by the address setting mode switch).

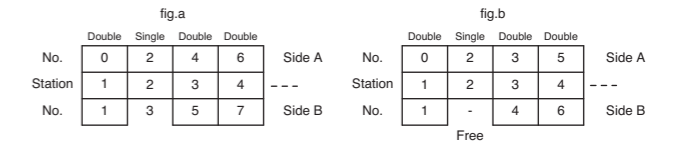
GSD file : SMCA1409.gsd (In hardware setting mode)
SMCA1408.gsd (In software setting mode)

Assignment of I/O No.

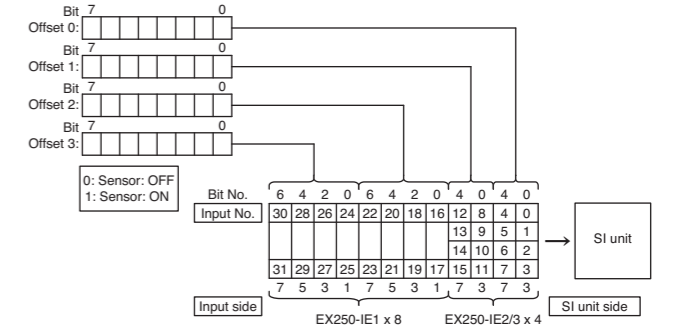
- Correspondence between output data and valve manifold
- Output data



- *: Output numbers are assigned to stations from side D to U of manifold in order. (See 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 Solenoid valve power supply voltage	It detects when the voltage of the solenoid 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

Indication	Content
PWR(V)	Green lights up when power supply for solenoid valves is turned on. Disappear when solenoid 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 Block: 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 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>).

SMC Corporation URL <http://www.smcworld.com>
Akihabara UDX 15F, 4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101-0021, JAPAN
Phone: +81 3-5207-8249 Fax: +81 3-5298-5362
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