EX250-TFI75GB

SMC

Installation & Maintenance Manual

SI unit - Profibus DP compatible

Type EX250-SPR1

CE

EMC Directives 89/336/EEC
EN61000-6-2:2001 Electromagnetic Compatibility (EMC). Generic standards - Immunity for industrial environments.
EN55011 A1+A2:2001 Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical radio-frequency equipment and light industrial environments.

Safety Instructions

The unit and this manual contain essential information to protect users and others from possible injury and property damage and to ensure correct handling.
Please confirm that you fully understand the meaning of the following messages (signs) before reading the text, and always follow the instructions.
Please read the Installation & Maintenance Manual for related apparatus and understand it before operating the actuator.

IMPORTANT MESSAGES	
Read this manual and follow the instructions. Signal words such as WARNING, CAUTION and NOTE, will be followed by important safety information that must be reviewed carefully.	
⚠WARNING	Indicates a potentially hazardous situation which could result in death or serious injury if you do not follow instructions.
⚠CAUTION	Indicates a potentially hazardous situation which if not avoided, may result in minor injury or moderate injury.
NOTE	Provides you helpful information.

⚠WARNING

Do not disassemble, modify (including change of printed circuit board) or repair.
An injury or failure can result.

Do not operate outside of the specification range.
Fire, malfunction or damage can result.
Please use it after confirming the specification.

Do not use the product in environments with possible presence of flammable, explosive or corrosion gas.
Otherwise fire, explosion or corrosion can result.
The product is not designed to be explosion proof.

Do not apply voltages exceeding 250V between a lead wire and a metal fitting.
Pay attention to perform an insulation test because it could damage the insulation of the lead wire and cause failure.

These instructions must be followed when using the product in an interlocking circuit:
.Provide double interlocking through another system such as mechanical protection.
.Check the product regularly to ensure proper operation.
Otherwise malfunction can cause an accident.

These instructions must be followed when performing maintenance work:
.Turn off the power supply
.Stop the air supply, exhaust the residual pressure and verify that the air is released before performing maintenance work.
Otherwise it can cause injury.

Safety Instructions (continue)

⚠CAUTION

Perform a proper functional check after completing maintenance work.
Stop operation when an abnormality is observed or the product is not working properly.
Safety cannot be assured due to unexpected malfunctions.

NOTE

The direct-current power supply should be a UL authorized power supply.
1.Limited voltage current circuit in accordance with UL508
A circuit to which power is supplied by the secondary coil of a transformer that meets the following conditions.
·Max. voltage(with no load): less than 30Vrms(42.4V peak)
·Max. current:(1)less than 8A(including when short circuited)
(2)limited by circuit protector (such as fuse) with the following ratings

No load voltage (V peak)	Max.current rating (A)
0 to 20 [V]	5.0
Above 20 to 30 [V]	100 / peak voltage

2.UL1310 compatible class 2 power supply unit or circuit of max. 30Vrms (42.4V peak) or less using a UL1585 compatible class 2 transformer as power supply. (Class 2 circuit)

Follow the instructions given below when handling the product.
Failure to follow instructions may damage the unit.
·Operate the product within the specified voltage range.
·Reserve a space around the unit for maintenance.
·Do not remove labels.
·Do not drop, hit or apply excessive shock to the product.
·Do not bend or apply tensile force to cables, or apply a force by placing a heavy load on them.
·Connect wires and cables correctly.
·Do not connect wires while the power is on.
·Do not lay wires or cables with the same wiring route as a power line or high-voltage line.
·Verify the insulation of the wiring.
·Take proper measures against noise such as a noise filter when the product is incorporated in equipment or devices.
·Select an operation environment according to enclosure(IP67).
·Take sufficient shielding measures when installing the product at the following place.
(1)A place where a noise due to static electricity etc. is generated
(2)A place of high electric field strength
(3)A place possibly exposed to radioactivity
(4)A place near power cable
·Do not use the product nearby a place where an electric surge is generated.
·Use the product equipped with a surge absorber when a surge-generating load such as a solenoid valve is driven directly.
·Prevent foreign matter such as remnant of wires from entering the product.
·Do not expose the product to vibration and impact.
·Keep the specified ambient temperature range (+5 to +45℃).
·Do not expose the product to heat radiation from a heat source located nearby.
·Use a precision screw driver with small flat blade when setting rotary switch and DIP switch.
·Perform maintenance and check at regular intervals.
·Perform a proper functional check.
·Do not clean the product with chemicals such as benzine and thinner.

Specification

General specification

Item	Specification
Operating ambient temp.	+5 to +45℃
Operating ambient humidity	35 to 85% RH (No dew condensation)
Storage ambient temp.	-20 to +60℃
Vibration proof	10 to 57Hz 0.35mm (Constant amplitude) 57 to 150Hz 50m/s² (Constant acceleration)
Impact proof	150m/s² (peak), 11ms × three times in each direction ± X, Y and Z.
Noise immunity	Normal mode : ±1500V Pulse duration 1us Common mode : ±1500V Pulse duration 1us Radiation : ±1000V Pulse duration 1us
Withstand voltage	500V AC for 1min.
Insulation resistance	500V DC min10M ohm
Operating environment	No corrosive gas and no dust

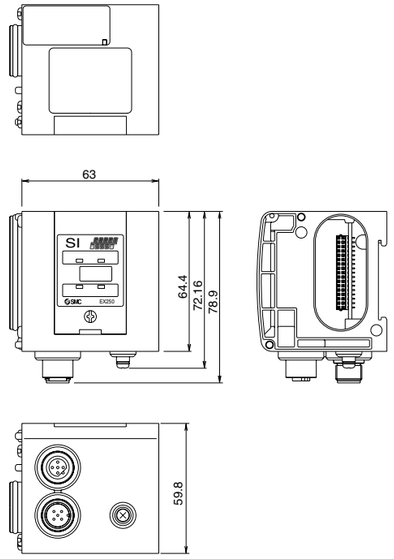
Electrical and network

Item		Specification
Power voltage range Current consumption	Power for SI/Input Block Current consumption	19.2 to 28.8V DC Max. 1.1A or less Depending on the number of Input Block stations and sensor specifications.
	Power for solenoid valve Current onsumption	22.8 to 26.4V DC Max 2.0A or less Depending on the number of solenoid valve stations and specifications.
Solenoid valve connection spec.	Output type	P-ch MOS-FET Open drain type
	Connection load	Solenoid valve with protection circuit for 24V DC and 1.5W or less surge voltage. (made by SMC)
	Insulation type	Opto coupler type
	Residual voltage	0.3V DC or less

Communication specification

Item	Specification
Protocol	PROFIBUS-DP(EN50170,EN50254)
BUS interface	EIA RS485
Comunication from	Token passing
Transmission rate	9.6, 19.2, 93.75, 187.5, 500,1500,12000(kbps)
Transmission media	STP cable
Connect node	Max. 125 station
Network topology	Bus, tree, star
Cable length	Max. 23km(Repeater needed)
Freeze mode	Available
Sync mode	Available
Input point	Max. 32 points
Output point	Max. 32 points
ID number	1408hex(SW setting mode) 1409hex(HW setting mode)

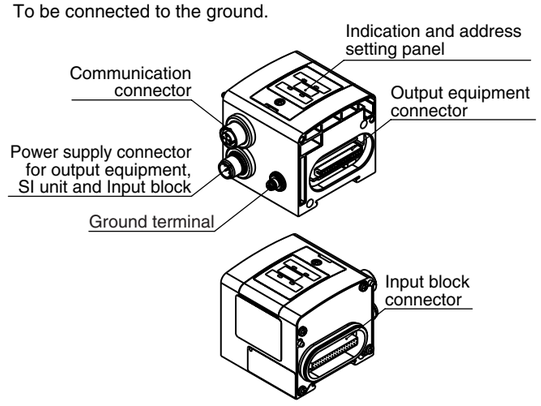
Outline with Dimensions (in mm)



Names and Functions of Individual Parts

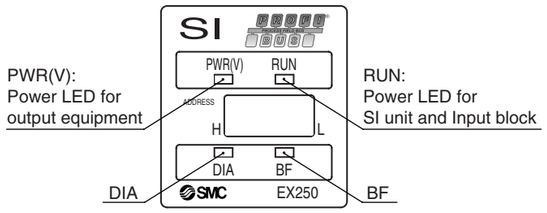
Body

· Communication connector
To send and receive communication signals through PROFIBUS-DP line.
· Power supply connector for output equipment, SI unit and Input block
To supply power to the output equipment such as a solenoid valve, and output block, SI unit and Input block.
· Output equipment connector
To connect the output equipment such as a solenoid valve and output block.
· Input block connector
To connect the Input block.
· Indication and address setting panel
To provide LED's to indicate the condition of the unit, and the setting of the address mode.
· Ground terminal
To be connected to the ground.



Names and Functions of Individual Parts (continue)

LED indication

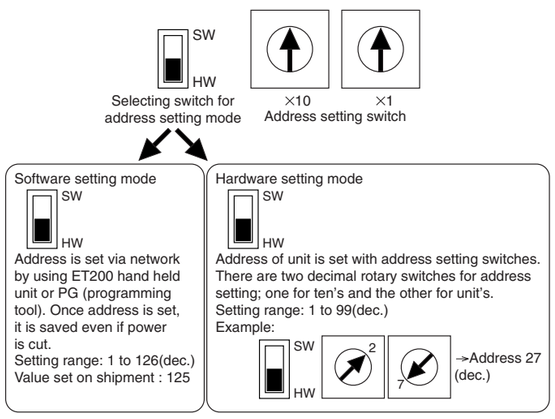


Indication	Contents
PWR (V)	Green Light ON when power for solenoid valves is supplied. Light OFF when supply voltage decreases below 19V
RUN	Green Light ON during normal operation (when power for SI unit is supplied)
DIA	Red Light ON when a failure is detected by self-diagnosis
BF	Red Light ON when a bus failure is detected

SW Setting

SW setting

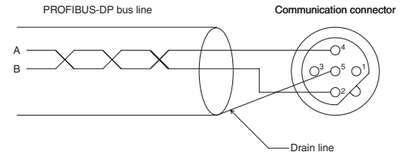
Be sure to turn power supply off before setting the switches of the SI unit. The switches for setting the address are installed under the top cover of the SI unit.



*When software setting mode is selected, the address setting switches have no effect. Also, please note the software setting mode and hardware setting mode differ in the ID numbers available.

Wiring

Communication wiring



Cable: Shielded twisted pair cable(Type-A cable)

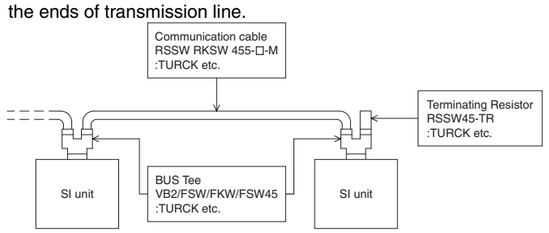
Inpedance	135 to 165 ohm (3 to 20MHz)
Capacity between conductors	30pF/m or less
Conductor resistance	110ohm/km or lless
Cable diameter	0.64mm or more
Conductor area	0.34mm² or more

•Transmission rate & Maximum wiring length

Transmission rate(kbps)	9.6	19.2	93.75	187.5	500	1500	12000
Wiring length(m)	1200			1000	400	200	100

•Terminator

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

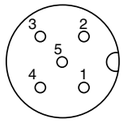


Contact each manufacturer about Communication cable, Bus Tee and Terminating Resistor.

Power supply connector

M12 5pin (Plug)

Example of connected cable : SMC EX500-AP0*0-S etc.

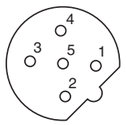


No.	Description	Function
1	SV 24V	For solenoid valve +24V
2	SV 0V	For solenoid valve 0V
3	SW 24V	For SI unit and Input Block +24V
4	SW 0V	For SI unit and Input Block 0V
5	E	Earth

Communication connector

M12 5pin (socket) reverse

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



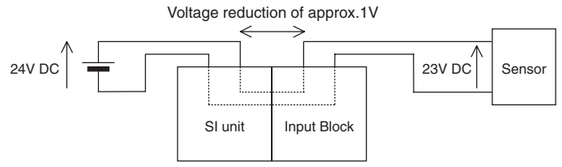
No.	Description	Function
1	VP	Supply voltage for Terminating Resistor
2	A-N	Minus to send/receive data
3	DGND	Ground for Terminating Resistor
4	B-P	Plus to send/receive data
5	SHIELD	Shield

Wiring of power supply

The Power supply connection inside the unit has individual power supplies for solenoid valve actuation (SV power supply) and for Control parts and Sensor(SI•SW power supply). Supply 24V DC for each of them. Either single or dual power supply is available.

Power for a sensor is supplied to the sensor connected to an Input Block. There will be a voltage drop of up to approx. 1V inside the SI unit, therefore select a sensor which will operate with the resultant voltage.

If a sensor requires 24V, it is necessary to lower power supply voltage for sensor slightly or secure a power supply for sensor separately without going through the SI unit so that sensor input voltage can be 24V with actual loading (allowable voltage of sensor power supply : 19.2V to 28.8V).



□To enquire about the product, please contact the following.

SMC Corporation

URL http://www.smcworld.com

Phone

AUSTRIA / (43) 2262-62 280
BELGIUM / (32) 3-355 1464
CZECH REP. / (420) 5-414 24611
DENMARK / (45) 70 25 29 00
FINLAND / (358) 9-859 580
FRANCE / (33) 1-64 76 1000
GERMANY / (49) 6103 4020
GREECE / (30) 1- 342 6076
HUNGARY / (36) 1-371 1343
IRELAND / (353) 1-403 9000
ITALY / (39) 02-92711
NETHERLANDS / (31) 20-531 8888
NORWAY / (47) 67 12 90 20
POLAND / (48) 22-548 50 85
PORTUGAL / (351) 2 610 89 22
SPAIN / (34) 945-18 4100
SWEDEN / (46) 8-603 0700
SWITZERLAND / (41) 52-396 3131
TURKEY / (90) 212 221 1512
UNITED KINGDOM / (44) 1908-56 3888