



Installation and Maintenance Manual

SI unit - PROFIBUS-DP compatible

Type EX240-SPR1



1 Safety Instructions

- This manual contains essential information for the protection of users and others from possible injury and/or equipment damage.
- Read this manual before using the product, to ensure correct handling, and read the manuals of related apparatus before use.
- Keep this manual in a safe place for future reference.
- These instructions indicate the level of potential hazard by label of "DANGER", "WARNING" or "CAUTION", followed by important safety information which must be carefully followed.
- To ensure safety of personnel and equipment the safety instructions in this manual and the product catalogue must be observed, along with other relevant safety practices.

| | |
|------------------|--|
| ⚠ DANGER | In extreme conditions, there is a possibility of serious injury or loss of life. |
| ⚠ WARNING | If instructions are not followed there is a possibility of serious injury or loss of life. |
| ⚠ CAUTION | If instructions are not followed there is a possibility of injury or equipment damage. |

⚠ WARNING

- Do not disassemble, modify (including change of printed circuit board) or repair the product.**
An injury or product failure may result.
- Do not operate the product beyond the specification range.**
Fire, malfunction or equipment damage may result. Use the product only after confirming the specifications.
- Do not use the product in the presence of flammable, explosive or corrosive gas.**
Fire, explosion or corrosion may result. This product does not have an explosion proof construction.
- When using the product as part of an interlocking system:**
 - Provide a double interlocking system, for example a mechanical system.
 - Check the product regularly to ensure proper operation.
- Before performing maintenance, be sure of the following:**
 - Turn off the power supply.
 - Stop the air supply, exhaust the residual pressure and verify the release of air from the system.

⚠ CAUTION

- Always perform a system check after maintenance.**
Do not use the product if any error occurs.
Safety cannot be assured if caused by un-intentional malfunction.
- Provide grounding to ensure correct operation and to improve noise resistance of the product.**
This product should be individually grounded using a short cable.
- Follow the instructions given below when handling the product. Failing to do so may result in product damage.**
 - Maintenance space should always be provided around the product.
 - Do not remove labels from the product.
 - Do not drop, hit or apply excessive shock to the product.
 - Follow all specified tightening torques.

1 Safety Instructions (continued)

- Do not bend, apply tensile force, or apply force by placing heavy loads, on the cables.
- Connect wires and cables correctly, and do not connect while the power is ON.
- Do not route wires and cables together with power or high-voltage cables.
- Check the insulation of wires and cables.
- Take proper measures against noise, such as noise filters, when the product is incorporated in equipment or devices.
- Select the required protection (IP) rating according to the environment of operation.
- Take sufficient shielding measures when the product is to be used in the following conditions:
 - where noise due to static electricity is generated.
 - where electro-magnetic field strength is high.
 - where radioactivity is present.
 - where power lines are located.
- Do not use the product in a place where electric surges are generated.
- Use suitable surge protection when a surge generating load such as a solenoid valve are to be directly driven.
- Prevent any foreign matter from entering this product.
- Do not expose the product to vibration or impact.
- Use the product within the specified ambient temperature range.
- Do not expose the product to any heat radiation.
- Use a precision screwdriver with flat blade to adjust the DIP switch.
- Close the cover over the switches before power is applied.
- Do not clean the product with chemicals such as benzene or thinners.

• Power Supply selection

A UL approved direct current (DC) power supply should be used with this product, as follows:

- A limited voltage / current supply in accordance with UL508.
A circuit from which power is supplied by the secondary coil of a transformer according to the following:
Maximum voltage (no load) : Less than 30Vrms (42.4V peak)
Maximum current : (1) Less than 8A (including when short circuited)
(2) Limited by circuit protection (such as a fuse) with the following rating.

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

- A Class 2 power supply unit in accordance with UL1310, or a power supply circuit of maximum 30Vrms (42.4V peak) or less, using a Class 2 transformer in accordance with UL1585 as power source.

2 Specifications

Communication specifications

| | |
|---------------------|--|
| Protocol | PROFIBUS-DP (EN50170 Volume 2) |
| Bus interface | EIA RS-485 |
| Baud rate | 9.6/19.2/93.75/187.5/500kbps 1.5/3/6/12Mbps |
| Freeze function | Available |
| Slave (branch) type | Available |
| Input | 32 points (not dependant on number of DI units) |
| Input | 32 points (not dependant on points of solenoid valves) |
| ID number | 1402hex (in software setting mode) 1403hex (in hardware setting mode) |

General specifications

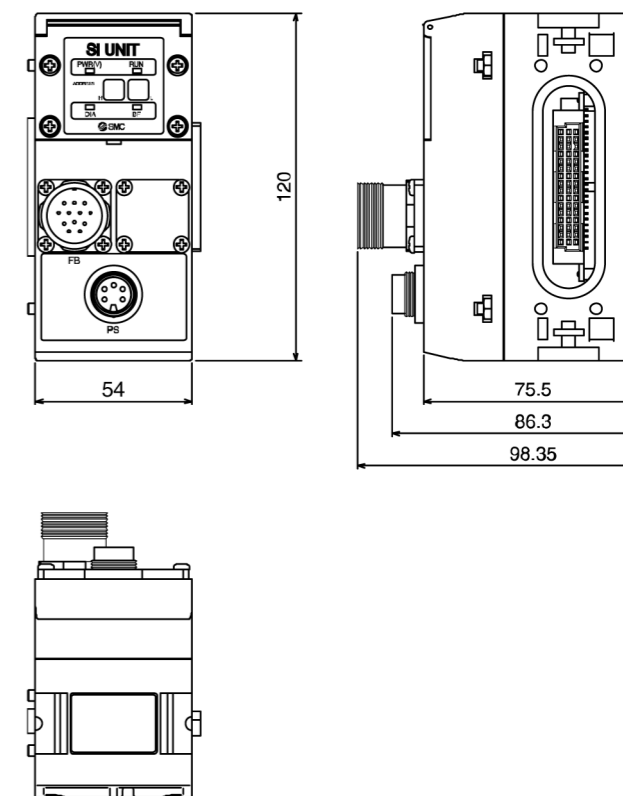
| | |
|-----------------------|--|
| Dimension (W x H x D) | 54 x 98.35 x 120 *1 |
| Weight | 400g *1 |
| Ambient temperature | 0 to 50°C |
| Ambient humidity | 30 to 95%RH (without condensation) |
| Applicable altitude | Less than 1000m above sea |
| Vibration proof | 10 to 57Hz 0.35mm (constant amplitude) |
| Shock resistance | 57 to 150Hz 5G (constant speed) |
| Enclosure | IP65 |

*1) Attachments excluded.

Electrical specifications

| | |
|------------------------------------|--|
| Rated voltage | 24VDC |
| Power supply voltage | For solenoid valve: 21.6 to 26.4V (warning of voltage drop given lower than approx. 19V) For SI/DI units: 19.2 to 28.8V |
| Current consumption | Power supply for solenoid valve : depends on solenoid valve specifications and no. of stations Power supply for SI/DI unit: 200mA (at rated voltage) + sensor supply current |
| Withstand voltage | 1500VAC 1min. (between PE-external terminal package) |
| Insulation resistance | 10M Ω or more (500VDC meg. between PE-external terminal package) |
| Momentary power failure | 1ms (power supply for SI/DI units) |
| Applicable load | Solenoid valve with 2.1W or less of light and surge voltage suppressor |
| Driving current / Residual voltage | 100mA / 0.3V Max. (at ON) |
| Driving circuit | P-ch MOS-FET open drain (PNP) |

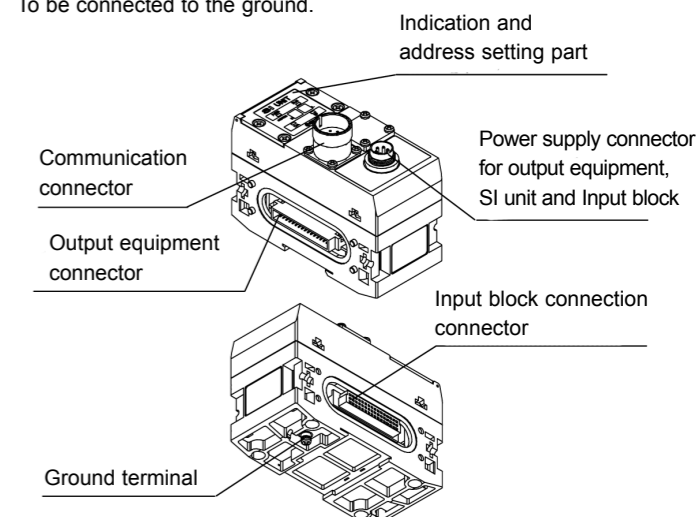
3 Outline dimensions (mm)



4 Names / Functions of Individual Parts

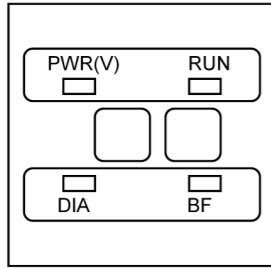
Body

- 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 connection connector**
To connect the output equipment such as a solenoid valve and output block.
- Input block connection connector**
To connect the input block.
- Indication and address setting part**
To provide LED's to indicate the condition of the unit, and the setting of address mode.
- Ground terminal**
To be connected to the ground.



4 Names / Functions of Individual Parts (continued)

LED indication

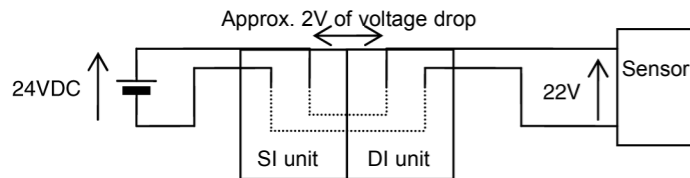


| Indication | Contents |
|------------|---|
| PWR(V) | LED is ON when power for solenoid valve is supplied. LED is OFF at lower than 19V of power supply voltage. |
| RUN | LED is ON during operation (while SI units is energized). |
| DIA | LED is ON if any problem is detected by diagnosis. |
| BF | LED is ON if bus has any problem. |

5 Wiring

Power for SI/DI units is also distributed to sensor connected with DI unit. Select sensor concerning voltage drop inside the unit. It may reach approximately 2V at the maximum.

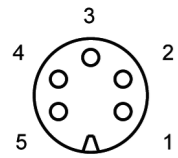
If sensor requires 24V, it is necessary to lower power supply voltage for SI/DI unit slightly or secure power supply for sensor separately without going through SI unit so that sensor input voltage can be 24V with actual loading (allowable voltage of SI/DI unit power supply: 19.2V to 28.8V).



Power supply connector

DIN type 5 pins (Plug)

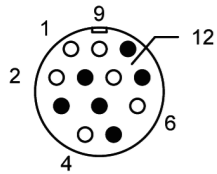
Connector example for cable: Franz Binder 72309-0114-70-15



| No. | Description | Function |
|-----|-------------|--------------------------|
| 1 | SV24V | + 24V for solenoid valve |
| 2 | SV0V | 0V for solenoid valve |
| 3 | PE | Protection earth |
| 4 | SI/DI 24V | + 24V for SI/DI units |
| 5 | SI/DI 0V | 0V for SI/DI units |

Communication connector (Socket)

Connector example for cable: SIEMENS 6ES5 760-2CB11

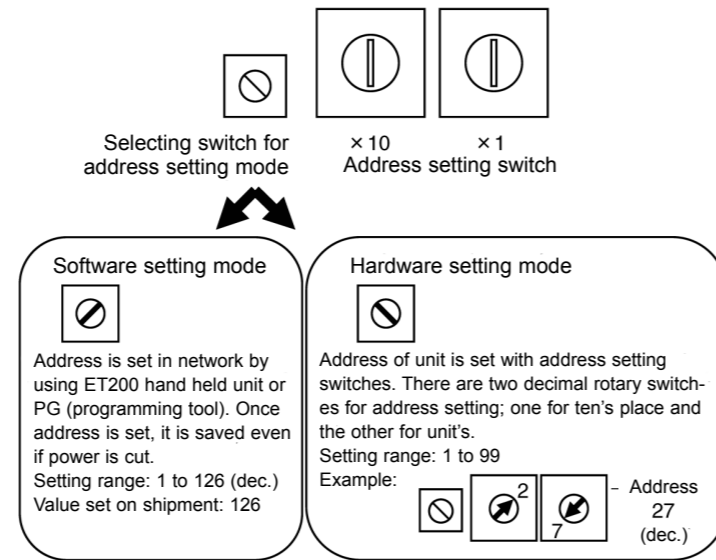


| No. | Description | Function |
|-----|-------------|------------------------------|
| 1 | M5V | GND for termination |
| 2 | A | Signal - N |
| 4 | B | Signal - P |
| 6 | +5V | + 5V for termination |
| 9 | SHIELD | Earth for shield |
| 12 | RTS | For optical fiber (Reserved) |

6 Switch Setting

Address setting

Loosen four screws and open display window of SI unit to set addresses. Do not supply power to SI unit while setting.



*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.

7 Contacts

| | | | |
|------------|-------------------|----------------|-------------------|
| AUSTRIA | (43) 2262 62280 | NETHERLANDS | (31) 20 531 8888 |
| BELGIUM | (32) 3 355 1464 | NORWAY | (47) 67 12 90 20 |
| CZECH REP. | (420) 541 424 611 | POLAND | (48) 22 211 9600 |
| DENMARK | (45) 7025 2900 | PORTUGAL | (351) 21 471 1880 |
| FINLAND | (358) 207 513513 | SLOVAKIA | (421) 2 444 56725 |
| FRANCE | (33) 1 6476 1000 | SLOVENIA | (386) 73 885 412 |
| GERMANY | (49) 6103 4020 | SPAIN | (34) 945 184 100 |
| GREECE | (30) 210 271 7265 | SWEDEN | (46) 8 603 1200 |
| HUNGARY | (36) 23 511 390 | SWITZERLAND | (41) 52 396 3131 |
| IRELAND | (353) 1 403 9000 | UNITED KINGDOM | (44) 1908 563888 |
| ITALY | (39) 02 92711 | | |

SMC Corporation

URL <http://www.smcworld.com> (Global) <http://www.smceu.com> (Europe)

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