



## Installation and Maintenance Manual

### SI unit - PROFIBUS-DP compatible

#### Type EX240-SPR1



EMC Directive 89/336/EEC  
EN61000-6-2:2001: Electromagnetic Compatibility (EMC) - Immunity  
EN55011+A1,A2:2001: Electromagnetic Compatibility (EMC) - Emission

## 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 ISO4414: Pneumatic Fluid power and JIS B 8370: Pneumatic System principles must be observed, along with other relevant safety practices.

<b>⚠ DANGER</b>	In extreme conditions, there is a possibility of serious injury or loss of life.
<b>⚠ WARNING</b>	If instructions are not followed there is a possibility of serious injury or loss of life.
<b>⚠ CAUTION</b>	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

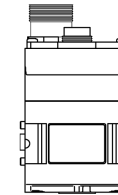
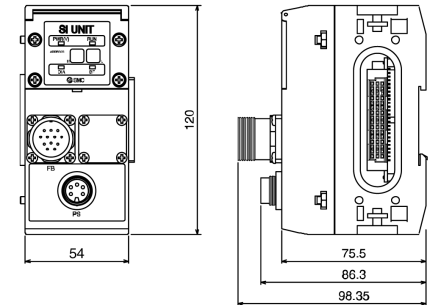
Dimension (W x H x D)	54 x 98.35 x 120 *1
Weight	400g *1
Ambient temperature	0 to 50°C
Ambient humidity	30 to 95%RH (without condensation)
Applicable altitude	Less than 1000m above sea
Vibration proof	10 57Hz 0.35mm (constant amplitude)
Shock resistance	57 150Hz 5G (constant speed)
Enclosure	IP65

\*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	AC1500V 1min. (between PE-external terminal package)
Insulation resistance	10M Ω or more (DC500V 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)

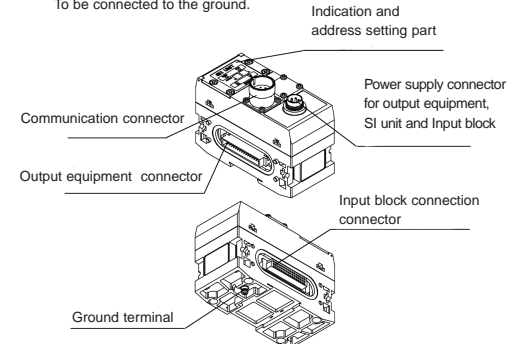
## 3 Outline dimensions (mm)



## 4 Names / Functions of Individual Parts

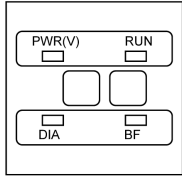
### Body

- 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

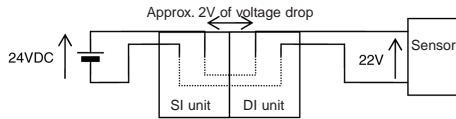


Indication	Contents
PWR(V)	LED is ON when power for solenoid valve is supplied. LED is OFF at lower than 19V of power supply voltage.
RUN	LED is ON during operation (while SI units is energized).
DIA	LED is ON if any problem is detected by diagnosis.
BF	LED is ON if bus has any problem.

## 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.

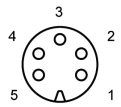
If sensor requires 24V, it is necessary to lower power supply voltage for SI/DI unit slightly or secure power supply for sensor separately without going through SI unit so that sensor input voltage can be 24V with actual loading (allowable voltage of SI/DI unit power supply: 19.2V to 28.8V).



### Power supply connector

DIN type 5 pins (Plug)

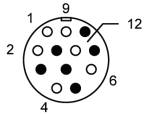
Connector example for cable: Franz Binder 72309-0114-70-15



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

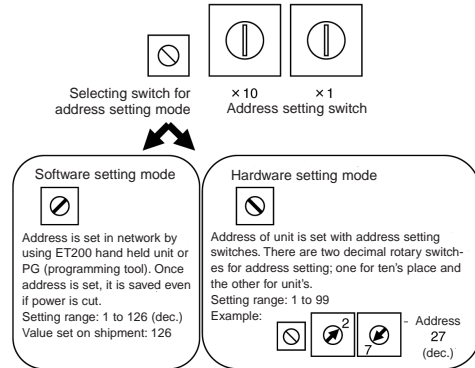


No.	Description	Function
1	M5V	GND for termination
2	A	Signal - N
4	B	Signal - P
6	+5V	+ 5V for termination
9	SHIELD	Earth for shield
12	RTS	For optical fiber (Reserved)

## 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) 2262-62 280	ITALY	(39) 02-92711
BELGIUM	(32) 3-355 1464	NETHERLANDS	(31) 20-531 8888
CZECH REP.	(420) 5-414 24611	NORWAY	(47) 67 12 90 20
DENMARK	(45) 70 25 29 00	POLAND	(48) 22-548 50 85
FINLAND	(358) 207-513 513	PORTUGAL	(351) 2 610 89 22
FRANCE	(33) 1-64 76 1000	SPAIN	(34) 945-18 4100
GERMANY	(49) 6103 4020	SWEDEN	(46) 8-603 0700
GREECE	30) 1- 342 6076	SWITZERLAND	(41) 52-396 3131
HUNGARY	(36) 1-371 1343	TURKEY	(90) 212 221 1512
IRELAND	(353) 1-403 9000	UNITED KINGDOM	(44) 1908-56 3888

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