Installation & Maintenance Manual
SI unit - PROFIBUS DP compatible
Type EX245-SPR1/2-X35

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), Japan Industrial Standards (JIS) and other safety regulations.
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.

⚠ **Caution**	Operator error could result in injury or equipment damage.
⚠ **Warning**	Operator error could result in serious injury or loss of life.
⚠ **Danger**	In extreme conditions, there is a possibility of serious injury or loss of life.

⚠ Warning

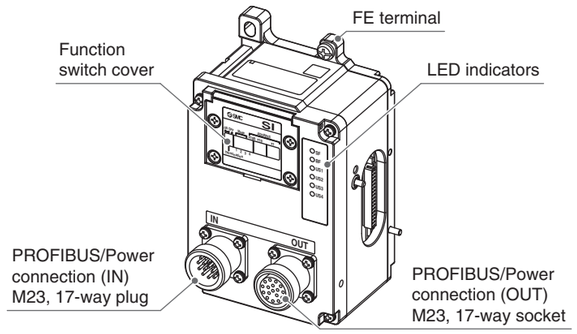
•Do not disassemble, modify (including changing of printed circuit board) or repair.
An injury or failure can result.
•Do not operate the product outside of the specifications.
Do not use for flammable or harmful fluids.
Fire, malfunction, or damage to the product can result.
Verify the specifications 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

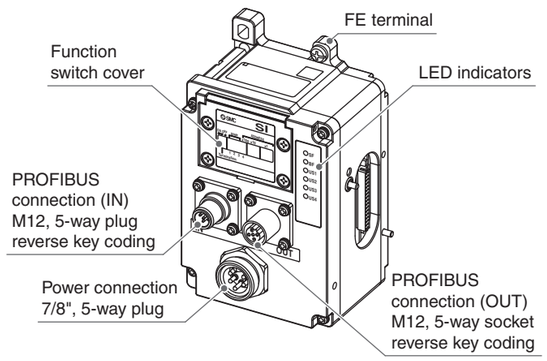
•After maintenance is complete, perform appropriate functional inspections.
Stop operation if the equipment does not function properly.
Safety cannot be assured in the case of unexpected malfunction.
•Provide grounding to assure the safety and noise resistance of the SI unit.
Individual grounding should be provided close to the product with a short cable.

Names and Functions of Individual Parts

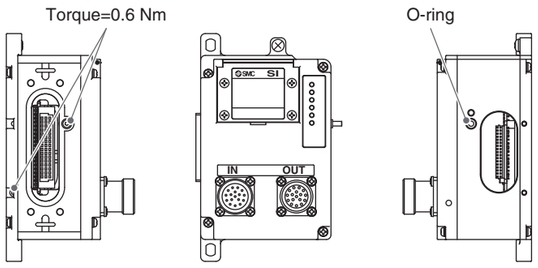
Parts and description
EX245-SPR1-X35



EX245-SPR2-X35



Valve manifold connection
Connect the valve manifold with the 2 screws on the SI Unit.
(hexagonal socket wrench size 2.5 mm)



⚠ Caution

For a protection rating of IP65 to be ensured, apply the recommended tightening torque and make sure that the O-ring is positioned correctly on the screw.

LED indicators
The LED indicators are arranged on the SI Unit as shown below.

Designation	Description		Colour
	SPR1	SPR2	
SF	System fault		Red
BF	Bus fault		Red
US1	Supply for the logic/sensors		Green
US2	Supply for the valves/loads		Green
US3	Reserved	First additional	Green
US4	The additional supplies for the loads (US3, US4, etc.)	Other additional supplies for the loads (US4, US5, etc.)	Green

SF and BF indicators

SF	BF	Meaning
OFF	OFF	The connection to the DP master is OK.
OFF	Flashing	The SI Unit recognizes the baud rate but is not addressed by the DP master.
OFF	ON	•The connection to the DP master has broken down. •The SI Unit does not recognize the baud rate. •Bus interruption. •The DP master is faulty.
ON	OFF	The connection to the DP master is OK but a diagnostic event occurred.
ON	Flashing	The configuration data sent by the DP master does not match the actual layout.
ON	ON	The PROFIBUS address set on the SI Unit is 0 or more than 126.

US1 indicators

US1	Meaning
OFF	US1 is not present or is below the dropout level (< 17 VDC approx).
Flashing	US1 is below the permissible level but above the dropout level (17 to 20.4 VDC).
ON	US1 is present (> 21.6 VDC approx).

US2 indicators

US2	Meaning
OFF	US2 is not present or is below the dropout level (< 17 VDC approx).
Flashing	US2 is below the permissible level but above the dropout level (17 to 21.6 VDC).
ON	US2 is present (> 22.8 VDC approx).

In case of EX245-SPR1-X35
US3 indicators
Reserved

US4 indicators
This indicator shows the status of all the additional supplies for the loads in common. If several EX245-DY2-X37 are present in the manifold, this indicator shows the worst status.

US4	Meaning
OFF	At least one of the additional supplies for the loads is not present or is below the dropout level (< 17 VDC approx).
Flashing	At least one of the additional supplies for the loads is below the permissible level but above the dropout level (17 to 21.6 VDC).
ON	All the additional supplies for the loads are present (> 22.8 VDC approx).

In case of EX245-SPR2-X35
US3 indicators
This indicator shows the status of the first additional supply for the loads.

US3	Meaning
OFF	First additional supply for the loads is not present or below the dropout level (< 17 VDC approx).
Flashing	First additional supply for the loads is below the permissible level but above the dropout level (17 VDC to 21.6 VDC).
ON	First additional supply for the loads is present (> 22.8 VDC approx).

US4 indicators
This indicator shows the status of all the additional supplies for the loads excluding the first one in common. If several EX245-DY2-X37 are present in the manifold, this indicator shows the worst status.

US4	Meaning
OFF	At least one of all the additional supplies for the loads excluding the first one is not present or below the dropout level (< 17 VDC approx).
Flashing	At least one of all the additional supplies for the loads excluding the first one is below the permissible level but above the dropout level (17 to 21.6 VDC).
ON	All the additional supplies for the loads excluding the first one are present (> 22.8 VDC approx).

Wiring

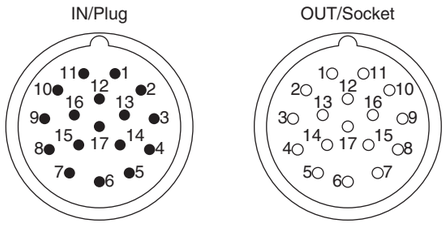
Bus/Power connection
EX245-SPR1-X35
For the SI Unit all power and signal lines are installed in one cable and connected to the Bus/Power (IN).
The Bus/Power (OUT) is used for looping through connections. If the bus cable is not looped through, cover the Bus/Power (OUT) connector with a covering cap so that the protection rating of IP65 is ensured.

⚠ Caution

•For reasons of EMC a secure connection to the cable shield must be established on the Bus/Power (IN/OUT).
•Power and bus lines must be installed correctly.
•To prevent manifold components of the EX245 from being damaged, the supply lines for the electronics and for the load voltage must be protected externally with a fuse.
•The Bus/Power (OUT) is used for looping through connections. The Bus/Power (IN) and the Bus/Power (OUT) connector can carry a maximum of 8 A. (applies only to US1 and US2, Pins 1 to 4)

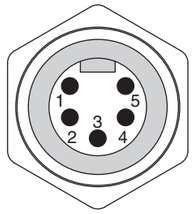
Wiring (continued)

Pin allocation of Bus/Power connector



IN			OUT	Remarks
0 V (US1)	1	1	0 V (US1)	0 V for logic/sensors
0 V (US2)	2	2	0 V (US2)	0 V for valves/loads
24 V (US2)	3	3	24 V (US2)	24 VDC for valves/loads
24 V (US1)	4	4	24 V (US1)	24 VDC for logic/sensors
Shield	5	5	Shield	Shield
Bus_B	6	6	Bus_B	PROFIBUS B (galvanically isolated)
–	7	7	–	Not used
–	8	8	–	Not used
–	9	9	–	Not used
–	10	10	–	Not used
Bus_A	11	11	Bus_A	PROFIBUS A (galvanically isolated)
–	12	12	–	Not used
–	13	13	–	Not used
–	14	14	–	Not used
–	15	15	N.C.	Not used
–	16	16	N.C.	Not used
–	17	17	–	Not used

Pin allocation of Power connector



Pin	Remarks
1	0 V (US2)
2	0 V (US1)
3	FE
4	24 V (US1)
5	24 V (US2)

FE terminal

The SI Unit must be connected to FE (Functional Earth) to divert electromagnetic interference.
Connect to the grounding cable with FE terminal screw on the SI Unit (M5, torque=1.5 Nm). The other end of the grounding cable should be terminated to ground potential.

Bus/Power connection

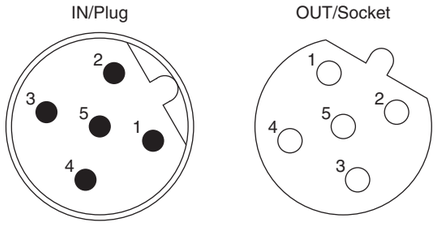
EX245-SPR2-X35

The Bus (OUT) is used for looping through connections. If the bus cable is not looped through, cover the Bus (OUT) connector with a covering cap so that the protection rating of IP65 is ensured.

⚠ Caution

- For reasons of EMC a secure connection to the cable shield must be established on the Bus (IN/OUT) and Power.
- Power and bus lines must be installed correctly.
- To prevent manifold components of the EX245 from being damaged, the supply lines for the electronics and for the load voltage must be protected externally with a fuse.

Pin allocation of Bus connector



IN			OUT	Remarks
N.C.	1	1	N.C.	Not used
Bus_A	2	2	Bus_A	PROFIBUS A (galvanically isolated)
N.C.	3	3	N.C.	Not used
Bus_B	4	4	Bus_B	PROFIBUS B (galvanically isolated)
Shield	5	5	Shield	Shield

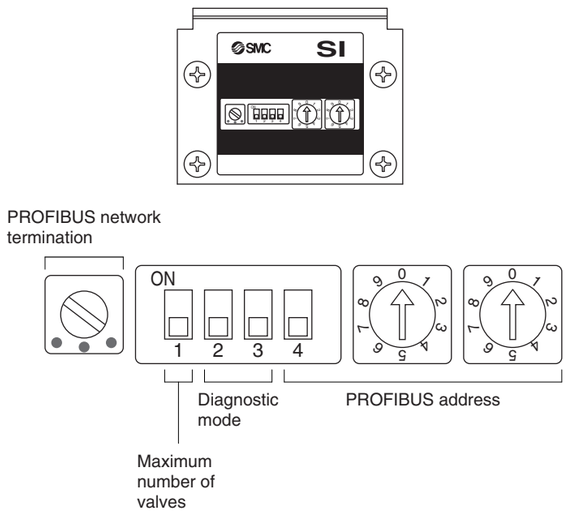
Switch setting

Switch setting

The switches are located inside the SI Unit, behind the Function switch cover on the front.
Setting the DIP/rotary switches:

- Unscrew the cover and hinge it upwards.
- The DIP/rotary switches can be adjusted with a small flat-blade screwdriver. The points of the arrows on the rotary switches should be aligned with the required numbers.
- Tighten the cover again, making sure that the seals are positioned correctly (torque=0.3 Nm).

Setting the DIP/rotary switches

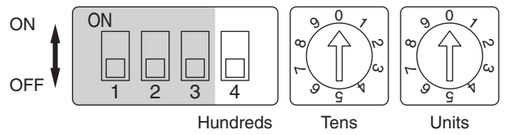


Switch setting (continued)

Setting the PROFIBUS address

Set the PROFIBUS address with the switches. Valid addresses are 1 to 125. Set the hundreds with DIP switch, the tens with the left-hand rotary switch and the units with the right-hand rotary switch. Changing this setting will not take effect until the SI Unit has been powered OFF and then back ON again.

Switches for setting the PROFIBUS address

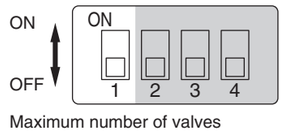


Hundreds		Tens		Units	
Switch setting	Value	Switch setting	Value	Switch setting	Value
ON	1	0 to 9	0 to 9	0 to 9	0 to 9
OFF	0				

Setting the maximum number of valves

Select the maximum number of valves. Changing this setting will not take effect until the SI Unit has been powered OFF and then back ON again.

Switch for setting the maximum number of valves

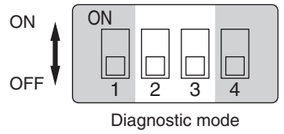


Switch setting	Description
ON	Max. 32 coils
OFF	Max. 16 coils

Setting the diagnostic mode

The SI Unit supports three diagnostic modes. Changing this setting will not take effect until the SI Unit has been powered OFF and then back ON again.

Switches for setting the diagnostic mode

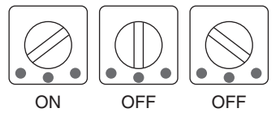


Switch setting		Mode	Description
No. 2	No. 3		
OFF	OFF	Mode 1	Extended diagnostic information consists of only simple device-related diagnostic data.
OFF	ON	Mode 2	Extended diagnostic information consists of detailed device-related diagnostic data.
ON	OFF	Mode 3	Extended diagnostic information consists of device-related, module-related and channel-related diagnostic data.

Setting the PROFIBUS network termination

The end nodes on a PROFIBUS network must be terminated to avoid reflections on the bus lines. The SI Unit is equipped with a switch to enable termination. If the SI Unit is the end node on the network, the termination should be set to ON.

Switch for setting the PROFIBUS network termination



Switch setting	Description
ON	Termination is enabled
OFF	Termination is disabled

Troubleshooting

Refer to the operation manual for this product.

Specifications

Refer to the operation manual for this product.

Outline with Dimensions (in mm)

Refer to the operation manual for this product.

Contact

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		

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