Installation & Maintenance Manual
Fieldbus system - SI unit
Type 56-EX600-SPR1A / 56-EX600-SPR2A

CE Ex II 3G Ex nA II T4 X -10 ºC≤Ta≤50 ºC
II 3D tD A22 IP67 T82 ºC X

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.

⚠ **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.

This product is class A equipment that is intended for use in an industrial environment.
There may be potential difficulties in ensuring electromagnetic compatibility in other environments due to conducted as well as radiated disturbances.

⚠ 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

- **When handling, assembling or replacing the unit:**
  - Avoid touching any sharp metal parts of the connectors for connecting units.
  - When assembling units, take care not to get any fingers caught between units. Injury can result.
  - When disassembling units, take care to avoid excessive force. The connection parts of the unit are firmly joined with seals and injury can result.
- **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.

Safety Instructions (Continued)

⚠ Caution (Continued)

- **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.

ATEX Marking Description

II 3G Ex nA II T4 X -10 ºC≤Ta≤50 ºC
II 3D tD A22 IP67 T82 ºC X

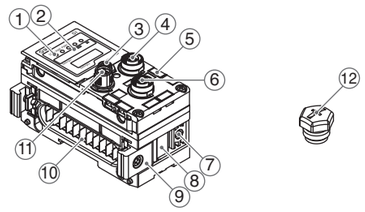
Equipment Group II	tD - protected by enclosure
Category 3	A22 - for zone 22
Gas (G) and Dust (D) environment	IP67 - protection structure
Ex - European standards apply	Ta - ambient temperature
nA - Non-sparking apparatus	T82 ºC - max. surface temperature
II - For all types of gas	X - special conditions apply, see instructions
T4 - Temperature classification	

○Special Conditions Notes

The SI unit should be used within the range of specifications given below and in the product catalogue.
If labelled with X special conditions apply:

1. Protect the SI unit from sources of heat which can generate surface temperatures higher than the temperature classification.
2. Protect the SI unit and cables against all impact or mechanical damage using a suitable ATEX compliant enclosure.
3. Protect the SI unit from direct sunlight or UV light using a suitable protective cover.
4. Do not disconnect the M12 connectors before first switching off the power supply.
5. Use only ATEX approved M12 connectors and use only shielded cable to provide grounding.
6. Use only a damp cloth to clean the SI unit body, to avoid an electrostatic charge.

Summary of Product parts

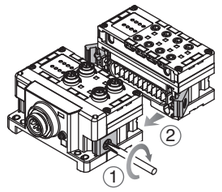


No.	Description	Function
1	Status display LED	Displays the status of the unit.
2	Display cover	Open to access the setting switches.
3	Display cover screw	Screw to open the display cover.
4	Connector (BUS OUT)	Connector for Fieldbus outputs.
5	Marker groove	Groove for an identification marker.
6	Connector (PCI)	Connector for handheld terminal.
7	Valve plate mounting hole	Holes for fixing the valve plate.
8	Valve plate mounting groove	Groove for mounting the valve plate.
9	Joint bracket	Bracket for joining adjacent units.
10	Unit connector (Plug)	Connector for signals and power supplies to adjacent units.
11	Connector (BUS IN)	Connector for Fieldbus inputs.
12	Seal cap (2 pcs.)	Fitted to unused connectors. (BUS OUT and PCI)

Assembly

○Assembling the unit as a manifold

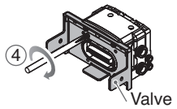
(1) Connect a unit to the end plate.
Digital and Analogue I/O units can be connected in any order.
Tighten the joint brackets to a torque of 1.5 to 1.6 Nm.



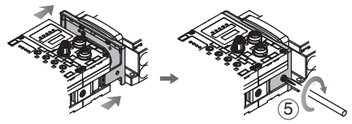
(2) Add more I/O units.
Up to 10 units (including the SI unit) can be connected to one manifold.

(3) Connecting the SI unit.
After connecting the required I/O units, connect the SI unit.
The method is as above in (1), (2).

(4) Mounting the valve plate.
Mount the valve plate (EX600-ZMV□) to the valve manifold using the valve set screws. (M3x8)
Apply 0.6 to 0.7 Nm tightening torque to the screws.



(5) Connect the SI unit to the valve manifold.
Insert the valve plate into the valve plate mounting groove on the side of the SI unit.
Fix using the valve plate screws (M4x6) supplied, to a torque of 0.7 to 0.8 Nm.

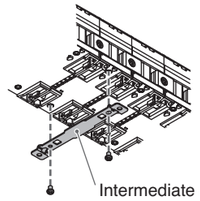


Mounting and Installation

■Installation

•Direct mounting

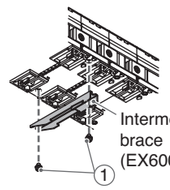
(1) When joining six or more units, fix the middle part of the complete EX600 unit with an intermediate reinforcing brace (EX600-ZMB1) before mounting, using 2-M4x5 screws.
Tightening torque: 0.7 to 0.8 Nm.



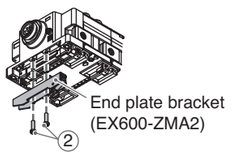
(2) Mount and tighten the end plate at one end of the unit. (M4)
Tightening torque: 0.7 to 0.8 Nm.
Fix the end plate at the valve side while referring to the operation manual of the corresponding valve manifold.

•DIN rail mounting
(Not available for SY series valves. Refer to the SY catalogue.)

(1) When joining six or more units, fix the middle part of the complete EX600 unit with an intermediate reinforcing brace (EX600-ZMB2) before mounting, using 2-M4x6 screws.
Tightening torque: 0.7 to 0.8 Nm.

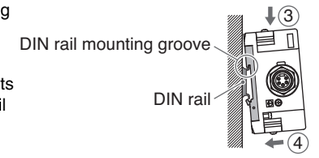


(2) Mount the end plate bracket (EX600-ZMA2) to the end plate at the opposite end to the valves, using 2-M4x14 screws.
Tightening torque: 0.7 to 0.8 Nm.



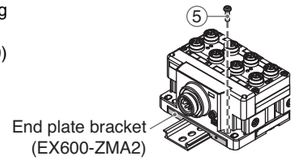
Mounting and Installation (Continued)

(3) Hook the DIN rail mounting groove on to the DIN rail.



(4) Press the manifold using its side hooked to the DIN rail as a fulcrum until the manifold is locked.

(5) Fix the manifold by tightening the DIN rail fixing screws of the EX600-ZMA2. (M4x20)
Tightening torque:
0.7 to 0.8 Nm.
The tightening torque at the valve side depends on the valve type.
Refer to the operation manual of the corresponding valve manifold.



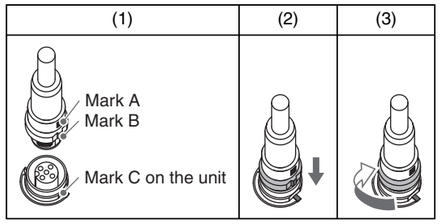
■Wiring

•Connect the M12 connector cable.
The M12 SPEEDCON connector connection method is explained below.

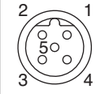
(1) Align mark B on the metal bracket of the cable connector (plug/socket) with mark A.

(2) Align with mark C on the unit and insert the connector vertically. If they are not aligned, the connector cannot be connected correctly.

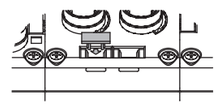
(3) When mark B has been turned 180 degrees (1/2 turn), wiring is complete. Confirm that the connection is not loose. If turned too far, it will become difficult to remove the connector.



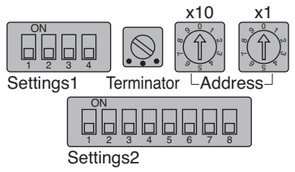
•Connector pin assignment

Configuration		Pin number	Signal name
BUS IN	BUS OUT		
		1	NC
		2	RXD/TXD-N
		3	NC
		4	RXD/TXD-P
		5	Shield

•Identification marker
The signal name of the input or output devices and unit address can be written on the marker, and can be installed on each unit.
Mount the marker (EX600-ZT1) into the marker groove as required.



Setting and Adjustment



•Address setting switch: Set the PROFIBUS DP node address.

Settings2	Address		Node Address
8	X10	X1	
OFF	0	0	0 (Default setting)
	0	1	1
	:	:	:
	9	9	99
ON	0	:	100
	:	5	:
	2	5	125

•V_SEL switch: The number of outputs (size) occupied by the SI unit is selected.

Settings1		Content	SI unit output data size
1	2		
OFF	OFF	Number of valves = 32 outputs	4 byte (Default setting)
OFF	ON	Number of valves = 24 outputs	3 byte
ON	OFF	Number of valves = 16 outputs	2 byte
ON	ON	Number of valves = 8 outputs	1 byte

•HOLD/CLEAR switch: Sets the output status when the fieldbus has a communication error or is in idling state.

Settings2	Content
4	
OFF	Clears the output. (Default setting)
ON	Holds the output.

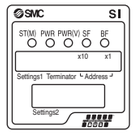
•Termination switch: Selects the terminating resistor for the PROFIBUS DP communication line.

Setting of the terminating resistor		
Terminating resistor ON	Terminating resistor OFF (Default setting)	Terminating resistor OFF

Refer to the SMC website (URL http://www.smcworld.com) to obtain more detailed information about setting and adjustment.

LED Display

The status display LED displays the power supply and communication status.



Display	Content
ST(M)	Displays the diagnostic status of the unit.
PWR	Displays the status of the power supply voltage for control and input.
PWR(V)	Displays the status of the power supply voltage for outputs.
SF	Displays system fault.
BF	Displays bus fault.

•SI unit common status

LED display	Content
ST(M) PWR PWR(V) OFF.	The power supply for control and input is OFF.
ST(M) PWR PWR(V) Green LEDs are ON.	The unit is in normal operation.
ST(M) PWR PWR(V) Red ST(M) LED is ON.	A component failure inside the SI unit.
ST(M) PWR PWR(V) Red PWR LED is ON.	The power supply voltage for control and input is abnormal.
ST(M) PWR PWR(V) Red PWR(V) LED is ON.	The power supply voltage for output is abnormal.
ST(M) PWR PWR(V) Green ST(M) LED is flashing.	A unit other than the SI unit has been detected.
ST(M) PWR PWR(V) Red ST(M) LED is flashing.	Either of the following conditions: •The valve ON/OFF counter has exceeded the set value. •The valve is short circuited or disconnected.
ST(M) PWR PWR(V) Red/Green ST(M) LED is flashing alternately.	Connection error between units has occurred.

LED Display (Continued)

•PROFIBUS DP status

LED display	Content
SF BF OFF.	The communication with the master has been established, or the power supply for control and inputs is OFF.
SF BF Red SF LED is ON.	The communication with the master has been established, but a diagnostic error has occurred.
SF BF Red BF LED is ON.	Either of the following conditions: •The cable between the master and SI unit is not connected. •The SI unit cannot recognize the communication speed. •The master or the SI unit has failed.
SF BF Red BF and SF LEDs are both ON.	The address of the SI unit is set to 0, or above 126.
SF BF Red SF LED is ON and Red BF LED is flashing.	The configuration data of the master and device are not consistent.
SF BF Red BF LED is flashing.	The SI unit has recognized the communication speed, but the address setting of the master is incorrect.

Maintenance

•Maintenance should be performed according to the Safety Instructions.
•Perform regular maintenance and inspections.
There is a risk of unexpected malfunction.
•Do not use solvents such as benzene, thinner etc. to clean each unit.
They could damage the surface of the body and erase the markings on the body.
Use a soft cloth to remove stains.
For heavy stains, use a cloth soaked with diluted neutral detergent and fully squeezed, then wipe up the stains again with a dry cloth.

Refer to the SMC website (URL http://www.smcworld.com) to obtain more detailed information about maintenance.

Troubleshooting

Refer to the LED Display. Refer to the SMC website (URL http://www.smcworld.com) to obtain more detailed information about troubleshooting.

Specification

Power supply	Control and input	24 VDC, 2 A
	Output	24 VDC, 2 A
Connected load		24 VDC 1.5 W (SMC) Solenoid valve with LED and circuit protection
Operating temperature range		-10 to 50 °C (Max. surrounding air temperature rating: 50 °C)
Storage temperature range		-20 to 60 °C
ATEX Classification		II 3G Ex nA II T4 X -10 °C≤Ta≤50 °C II 3D tD A22 IP67 T82 °C X
Pollution degree		For use in Pollution Degree 2 Environment
Vibration resistance		10 to 57 Hz: constant amplitude 0.75 mm p-p 57 to 150 Hz: constant acceleration 49 m/s² for 2 hours each in direction X, Y and Z respectively (De-energized)
Impact resistance		147 m/s² 3 times each in directions of X, Y and Z respectively (De-energized)

Refer to the product catalogue or SMC website (URL http://www.smcworld.com) to obtain more detailed information about product specifications.

Commissioning

•Parameter Setting
•Hardware Configuration (GSD file)
•I/O Map

Refer to the SMC website (URL http://www.smcworld.com) to obtain more detailed information about these settings.

Diagnostic

Refer to the SMC website (URL http://www.smcworld.com) to obtain more detailed information about diagnostics.

Outline with Dimensions

Refer to the product catalogue or SMC website (URL http://www.smcworld.com) to obtain more detailed information about outline dimensions.

Contacts

AUSTRIA	(43) 2262 62280-0	LATVIA	(371) 781 77 00
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BULGARIA	(359) 2 974 4492	NETHERLANDS	(31) 20 531 8888
CZECH REP.	(420) 541 424 611	NORWAY	(47) 67 12 90 20
DENMARK	(45) 7025 2900	POLAND	(48) 22 211 9600
ESTONIA	(372) 651 0370	PORTUGAL	(351) 21 471 1880
FINLAND	(358) 207 513513	ROMANIA	(40) 21 320 5111
FRANCE	(33) 1 6476 1000	SLOVAKIA	(421) 2 444 56725
GERMANY	(49) 6103 4020	SLOVENIA	(386) 73 885 412
GREECE	(30) 210 271 7265	SPAIN	(34) 945 184 100
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