Installation & Maintenance Manual
Fieldbus system - SI unit
Type 56-EX600-SEN1 / 56-EX600-SEN2

II 3G Ex nA IIC T4 Gc X -10ºC≤Ta≤50ºC
II 3D Ex tc IIIC T77ºC Dc X IP67

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 suitable for ATEX category 3 only.
- **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.

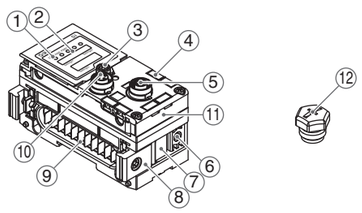
ATEX Marking Description

II 3G Ex nA IIC T4 Gc X -10ºC≤Ta≤50ºC
II 3D Ex tc IIIC T77ºC Dc X IP67

Equipment Group II	tc - protected by enclosure
Category 3	IIIC - for all types of dust
Gas (G) and Dust (D) environment	T77ºC - Max. surface temperature
Ex - European standards apply	Gc/Dc - Equipment Protection Level
nA - Non-sparking apparatus	X - special conditions, see instructions
IIC - for all types of gas	Ta - ambient temperature
T4 - Temperature classification	IP67 - Protection structure

○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. Proect 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 change.

Summary of Product parts

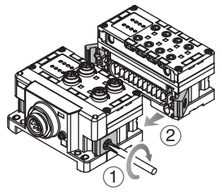


No.	Description	Function
1	Status display LED	Displays the status of the unit.
2	Display cover	Open to access the setting switches.
3	Display cover screw	Screw to open the display cover.
4	Marker groove	Groove for an identification marker.
5	Connector (PCI)	Connector for handheld terminal.
6	Valve plate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

Assembly

○Assembling the unit as a manifold

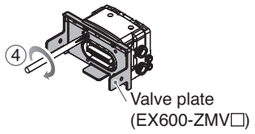
(1) Connect a unit to the end plate.
Digital and Analogue I/O units can be connected in any order.
Tighten the joint brackets to a torque of 1.5 to 1.6 Nm.



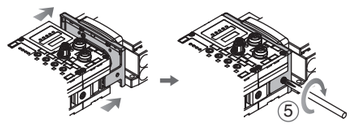
(2) Add more I/O units.
Up to 10 units (including the SI unit) can be connected to one manifold.

(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.



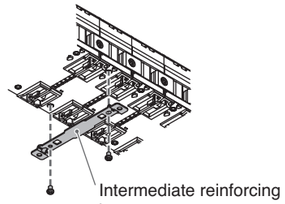
(5) Connect the SI unit to the valve manifold.
Insert the valve plate into the valve plate mounting groove on the side of the SI unit.
Fix using the valve plate screws (M4x6) supplied, to a torque of 0.7 to 0.8 Nm.



Mounting and Installation

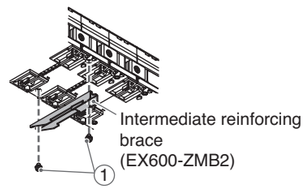
■Installation

•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.

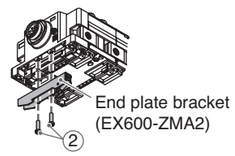


(2) Mount and tighten the end plate at one end of the unit. (M4)
Tightening torque: 0.7 to 0.8 Nm.
Fix the end plate at the valve side while referring to the operation manual of the corresponding valve manifold.

•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.

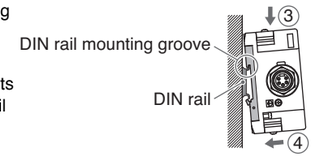


(2) Mount the end plate bracket (EX600-ZMA2) to the end plate at the opposite end to the valves, using 2-M4x14 screws.
Tightening torque: 0.7 to 0.8 Nm.



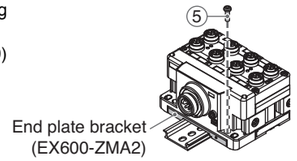
Mounting and Installation (Continued)

(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.

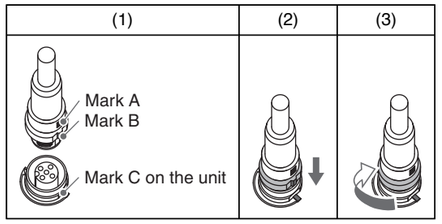


■Wiring

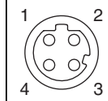
•Connect the M12 connector cable.
The M12 SPEEDCON connector connection method is explained below.
(1) Align mark B on the metal bracket of the cable connector (plug/socket) with mark A.

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

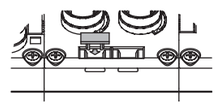
(3) When mark B has been turned 180 degrees (1/2 turn), wiring is complete. Confirm that the connection is not loose. If turned too far, it will become difficult to remove the connector.



•Connector pin assignment

Configuration BUS IN	Pin number	Signal name
	1	TX+
	2	RX+
	3	TX-
	4	RX-

•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

•IP address setting switch

Settings1	Settings2								IP address
8	1	2	3	4	5	6	7	8	
OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	192.168.0.1
:	:	:	:	:	:	:	:	:	:
OFF	OFF	ON	ON	ON	ON	ON	ON	ON	192.168.0.254
ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	192.168.1.1
:	:	:	:	:	:	:	:	:	:
ON	OFF	ON	ON	ON	ON	ON	ON	ON	192.168.1.254
ON/OFF	ON	ON	ON	ON	ON	ON	ON	ON	DHCP mode *1
ON/OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Remote Control mode *2

*1: The mode to obtain IP address from DHCP server. Obtained IP address is lost when the power supply is cut.
*2: The mode to respond to the commands from the BOOTP/DHCP Server provided by Rockwell Automation.
Enable DHCP: IP address etc. can be obtained from BOOTP/DHCP Server. If the power is supplied again in this state, information including IP address is obtained again.
Disable DHCP: IP address etc. cannot be obtained from BOOTP/DHCP Server. If the power is supplied again with this condition, previous setting can be held.

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

Settings3		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

•Diagnostics switch: Allocates the diagnostic data to the input data.

Settings3		Mode	Content	Diagnostic size set for the input
3	4			
OFF	OFF	0	Input data only (Default setting)	0 byte
OFF	ON	1	Input data + System diagnosis	4 byte
ON	OFF	2	Input data + System diagnosis + Unit diagnosis (Up to 10 units)	6 byte

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

Settings3	Content
5	
OFF	Output is OFF. (Default setting)
ON	Holds the output.

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

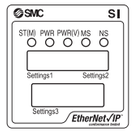
Setting and Adjustment (Continued)

•EtherNet/IP™ communication setting switch.

Settings3			Communication speed full duplex/half duplex setting
6	7	8	
OFF	ON/OFF	ON/OFF	Automatic
ON	OFF	OFF	10 Mbps, half duplex
ON	OFF	ON	10 Mbps, full duplex
ON	ON	OFF	100 Mbps, half duplex
ON	ON	ON	100 Mbps, full duplex

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.
MS	Displays the module status.
NS	Displays the network status.

•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.	Either of the following conditions: •Connection error between units has occurred. •Configuration memory error has occurred.

LED Display (Continued)

•EtherNet/IP™ status

LED display	Content
MS MS LED is OFF.	The power supply for control and input is OFF.
MS Green MS LED is flashing.	Either of the following conditions: •The unit has not been configured correctly. •Fieldbus is idling.
MS Green MS LED is ON.	The unit is in normal operation.
MS Red MS LED is flashing.	Recoverable error.
MS Red MS LED is ON.	A component failure inside the SI unit.
NS NS LED is OFF.	The power supply for control and input is OFF, or IP address is not set.
NS Green NS LED is flashing.	The unit received an IP address, but connection is not established.
NS Green NS LED is ON.	Connection is established.
NS Red NS LED is flashing.	Connection timeout.
NS Red NS LED is ON.	IP address is duplicated.

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 IIC T4 Gc X -10°C≤Ta≤50°C II 3D Ex tc IIIC T77°C Dc X IP67
Pollution degree		For use in Pollution Degree 3 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 (EDS 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

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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
HUNGARY	(36) 23 511 390	SWEDEN	(46) 8 603 1200
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