# Fieldbus system

# Instruction Manual

***EX600-SEN7/EX600-SEN8***

EtherNet/IP

Thank you for purchasing an SMC EX600 Series Fieldbus system.
Please read this manual carefully before operating the product and make sure you understand its capabilities and limitations.
Please keep this manual handy for future reference.

To obtain more detailed information about operating this product, please refer to the SMC website (URL https://www.smcworld.com) or contact SMC directly.

## 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) 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.

### Operator

- The operation manual is intended for those who have knowledge of machinery using pneumatic equipment, and have sufficient knowledge of assembly, operation and maintenance of such equipment. Only those persons are allowed to perform assembly, operation and maintenance.
- Read and understand the operation manual carefully before assembling, operating or providing maintenance to the product.

### ■Safety Instructions

**⚠ 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 units:**
•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.

■**Provide grounding to assure the noise resistance of the Fieldbus system.**
Individual grounding should be provided close to the product with a short cable.

### ■NOTE

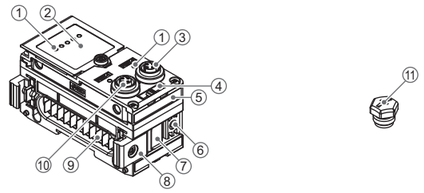
- The direct current power supply to combine should be UL1310 Class 2 power supply when conformity to UL is necessary.
- The output rating is tested as a DC output for General use.

## 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 https://www.smcworld.com) for more information about maintenance.

## Summary of Product parts

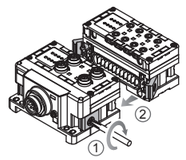



| No. | Description | Function |
|---|---|---|
| 1 | Status display LED | Displays the status of the unit. |
| 2 | Display cover | Open at the switch configuration. |
| 3 | Connector (PORT2) | Connector for the fieldbus communication cable. |
| 4 | Marker groove | Groove for an identification marker. |
| 5 | MAC address label | Displays the 12 digit MAC address which is different for each SI unit. |
| 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 to adjacent units. |
| 9 | Unit connector (Plug) | Connector for signals and power supplies to adjacent units. |
| 10 | Connector (PORT1) | Connector for the fieldbus communication cable. |
| 11 | Seal cap | Fitted to unused connector. (PORT2) |

## Assembly

○**Assembling the unit as a manifold**

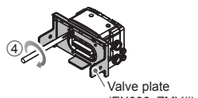
(1)Connect a unit to the end plate.
Digital and Analogue I/O units can be connected in any order.
Tighten the joint brackets to a torque of 1.5 to 1.6 N•m.



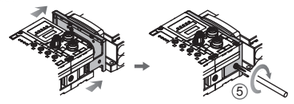

(2)Add more I/O units.
Up to 10 units (including the SI unit) can be connected to one manifold.

(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. (M3 x 8)
Apply 0.6 to 0.7 N•m tightening torque to the screws.



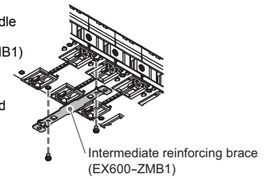

(5)Connect the SI unit to the valve manifold.
Insert the valve plate into the valve plate mounting groove on the side of the SI unit.
Fix using the valve plate screws (M4 x 6) supplied, to a torque of 0.7 to 0.8 N•m.




## Mounting and Installation

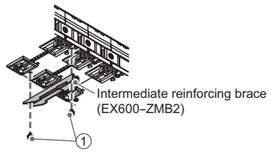
### ■Installation

•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-M4 x 5 screws.
Tightening torque: 0.7 to 0.8 N•m.

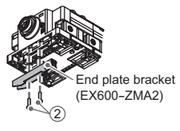



(2)Mount and tighten the end plate at one end of the unit. (M4)
Tightening torque: 0.7 to 0.8 N•m.
Fix the end plate at the valve side while referring to the operation manual of the corresponding valve manifold.

•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-M4 x 6 screws.
Tightening torque: 0.7 to 0.8 N•m.

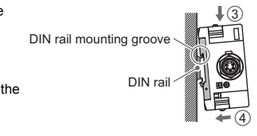



(2)Mount the end plate bracket (EX600-ZMA2) to the end plate at the opposite end to the valves, using 2-M4 x 14 screws.
Tightening torque: 0.7 to 0.8 N•m.

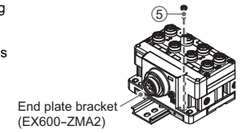



(3)Hook the DIN rail mounting groove on to the DIN rail.

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

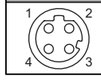
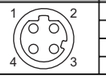



(5)Fix the manifold by tightening the DIN rail fixing screws of the EX600-ZMA2. (M4 x 20)
Tightening torque: 0.7 to 0.8 N•m.
The tightening torque at the valve side depends on the valve type.
Refer to the operation manual of the corresponding valve manifold.



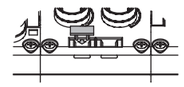

### ■Wiring

•Connector pin assignment

| Configuration | | Pin number | Signal name |
|---|---|---|---|
| PORT1 | PORT2 | | |
|  |  | 1 | TX+ |
| | | 2 | RX+ |
| | | 3 | TX– |
| | | 4 | RX– |

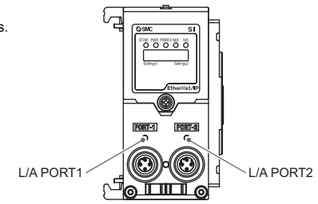


•Mounting the marker
The signal name of the input or output devices and unit address can be written to the marker, and can be installed to each unit.
Mount the marker (EX600-ZT1) into the marker groove as required.



## LED Display

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




| LED display | Content | |
|---|---|---|
| ST(M) | Green ON | Normal operation. |
| | Green flashing | Diagnostic error of I/O unit is detected. |
| | Red flashing | Any of the following diagnostic error is detected.<br>(When diagnostic parameter is enabled)<br>•Valve ON/OFF counter has exceeded the set value.<br>•Valve is short circuited or disconnected.<br>•IO-Link mapping oversize error detected. |
| | Red/green flashing | Internal communication error between SI unit and I/O unit is detected. |
| | Red ON | SI unit has failed. |
| PWR | Green ON | The power supply voltage for control and input is properly. |
| | Red ON | The power supply voltage for control and input is below 19 VDC.<br>(When diagnostic parameter is enabled) |
| PWR(V) | OFF | The power supply voltage for output is below 19 VDC.<br>(When diagnostic parameter is disabled) |
| | Green ON | The power supply for output is properly. |
| | Red ON | The power supply voltage for output is below 19 VDC.<br>(When diagnostic parameter is enabled) |
| MS | Green flashing | Either of the following conditions are detected:<br>•The unit has not been configured correctly.<br>•The PLC is idle state. |
| | Green ON | Normal operation. |
| | Red flashing | Diagnostic error is detected. |
| | Red ON | The element in SI unit is broken. |
| NS | OFF | IP address is not set. |
| | Green flashing | EtherNet/IP™ communication is not established. |
| | Green ON | EtherNet/IP™ communication is established. |
| | Red flashing | EtherNet/IP™ communication is time-out. |
| | Red ON | IP address is duplicated. |
| L/A PORT1 | OFF | No Link, No Activity |
| | Green ON | Link, No Activity (100 Mbps) |
| | Green flashing | Link, Activity (100 Mbps) |
| | Yellow ON | Link, No Activity (10 Mbps) |
| | Yellow flashing | Link, Activity(10 Mbps) |
| L/A PORT2 | OFF | No Link, No Activity |
| | Green ON | Link, No Activity (100 Mbps) |
| | Green flashing | Link, Activity (100 Mbps) |
| | Yellow ON | Link, No Activity (10 Mbps) |
| | Yellow flashing | Link, Activity (10 Mbps) |

Refer to the SMC website (URL https://www.smcworld.com) for more information about LED state.

## 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 |
| ON/OFF | OFF | OFF | OFF | OFF | OFF | OFF | OFF | OFF | Remote Control mode |

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

| Settings1 | Content |
|---|---|
| 1 | |
| OFF | Output is OFF. (default setting) |
| ON | Holds the output. |

*: This switch can be enabled and disabled by parameter.

•Diagnostic mode setting switch: Allocates the diagnostic data to the input data.

| Settings1 | Mode | Content | Diagnostic size set for the input |
|---|---|---|---|
| 3 | | | |
| OFF | 0 | Input data only (default setting) | 0 byte |
| ON | 1 | Input data + System diagnosis + Unit diagnosis | 4 byte |

•IO size setting switch for IO-Link unit: IO size of IO-Link unit is selected by setting switch.

| Settings1 | | IO size |
|---|---|---|
| 4 | 5 | |
| OFF | OFF | 44 byte |
| OFF | ON | 70 byte |
| ON | OFF | 134 byte |
| ON | ON | 134 byte |

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

## Troubleshooting

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

## Specifications

| | Model | EX600-SEN7 | EX600-SEN8 |
|---|---|---|---|
| Communication | Protocol | EtherNet/IP™ | |
| | Conformance version | CT18 | |
| | Communiaction speed | 10/100 Mbps | |
| | Configuration file | EDS file | |
| | Application function | QuickConnect™<br>DLR<br>Web server | |
| Electrical | Power supply for Control/Input | 24 VDC Class 2, 2 A | |
| | Power supply for Output | 24 VDC Class 2, 2 A | |
| | Internal current consumption (Power supply for Control/Input) | 120 mA or less | |
| Output | Output type | Source/PNP (Negative common) | Sink/NPN (Positive common) |
| | Number of outputs | 32 outputs | |
| | Connected load and output rating | Solenoid valve with surge voltage suppressor of 24 VDC, 1.0 W or less, DC General per output (manufactured by SMC) | |
| | Fail safe | Hold/Clear/Forced ON | |
| | Protection | Short circuit protection | |
| Operating temperature | | −10 to 50 °C (Max. surrounding air temeprature rating: 50 °C) | |
| Vibration resistance | | 10 to 57 Hz constant amplitude 0.75 mm p-p<br>57 to 150 Hz constant acceleration 49 m/s²<br>for 2 hours each in direction X, Y and Z respectively (De-energized) | |
| Impact resistance | | 147 m/s² 3 times each in direction of X, Y and Z respectively (De-energized) | |
| Enclosure | | IP67 (Manifold assembly)<br>(IP rating is outside range for UL/cUL certified) | |
| Standard | | CE/UKCA marked, UL (CSA) | |
| Weight | | 300 g | |

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

## Outline with Dimensions

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

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Note: Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.
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