SMC

Operation Manual

PRODUCT NAME

Fieldbus system
EtherNet/IP compatible SI Unit

MODEL / Series / Product Number

EX600-SEN7/SEN8
EX600-ED#

SMC Corporation

Table of Contents

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No.EX※※-OMZ0024

⚠ 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)*1), and other safety regulations.

*1) ISO 4414: Pneumatic fluid power -- General rules relating to systems.
　　ISO 4413: Hydraulic fluid power -- General rules relating to systems.
　　IEC 60204-1: Safety of machinery -- Electrical equipment of machines. (Part 1: General requirements)
　　ISO 10218: Manipulating industrial robots -Safety.
　　etc.

⚠ **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.

⚠ Warning

1. **The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.**
   Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results.
   The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product.
   This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. **Only personnel with appropriate training should operate machinery and equipment.**
   The product specified here may become unsafe if handled incorrectly.
   The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. **Do not service or attempt to remove product and machinery/equipment until safety is confirmed.**
   1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
   2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
   3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. **Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.**
   1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
   2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.
   3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
   4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

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⚠ Safety Instructions

⚠Caution
1.The product is provided for use in manufacturing industries. The product herein described is basically provided for peaceful use in manufacturing industries. If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary. If anything is unclear, contact your nearest sales branch.

Limited warranty and Disclaimer/Compliance Requirements

The product used is subject to the following "Limited warranty and Disclaimer" and "Compliance Requirements".
Read and accept them before using the product.

Limited warranty and Disclaimer

1. **The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.∗2)** **Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.** 2. **For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.** **This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.** 3. **Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.** ∗2) **Vacuum pads are excluded from this 1 year warranty.** **A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.** **Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.**

Compliance Requirements

1. **The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.** 2. **The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulation of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.**

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Operator

♦ This 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 this 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 or set with wet hands.
This may lead to an electric shock.

■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 the unit or assembling/replacing units:
 •Do not touch the sharp metal parts of the connector or plug for connecting units.
 •Take care not to hit your hand when disassembling the unit.
  The connecting portions of the unit are firmly joined with seals.
 •When joining units, take care not to get fingers caught between units.
 An 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

○Follow the instructions given below when designing, selecting and handling the product.

●The instructions on design and selection (installation, wiring, environment, adjustment, operation, maintenance, etc.) described below must also be followed.
 ∗Product specifications
  •The direct current power supply to combine should be UL1310 Class 2 power supply when conformity to UL is necessary.
  •Use the specified voltage.
   Otherwise failure or malfunction can result.
  •Reserve a space for maintenance.
   Allow sufficient space for maintenance when designing the system.
  •Do not remove any nameplates or labels.
   This can lead to incorrect maintenance, or misreading of the operation manual, which could cause damage or malfunction to the product.
   It may also result in non-conformity to safety standards.
  •Beware of inrush current when the power supply is turned on.
   Some connected loads can apply an initial charge current which will activate the over current protection function, causing the unit to malfunction.

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●Product handling

＊Installation
 •Do not drop, hit or apply excessive shock to the SI unit.
  Otherwise damage to the product can result, causing malfunction.
 •Tighten to the specified tightening torque.
  If the tightening torque is exceeded the mounting screws may be broken.
  IP67 protection cannot be guaranteed if the screws are not tightened to the specified torque.
 •If a large manifold valve is mounted, lift the unit so that stress is not applied to the connecting part
  while transporting.
  The stress may cause breakage of the connecting part. The unit may become very heavy depending on the
  combination. Transportation/installation shall be performed by multiple operators.
 •Never mount a product in a location that will be used as a foothold.
  The product may be damaged if excessive force is applied by stepping or climbing onto it.

＊Wiring
 •Avoid repeatedly bending or stretching the cables, or placing heavy load on them.
  Repetitive bending stress or tensile stress can cause breakage of the cable.
 •Wire correctly.
  Incorrect wiring can break the product.
 •Do not perform wiring while the power is on.
  Otherwise damage to the SI unit and/or input or output device can result, causing malfunction.
 •Do not route wires and cables together with power or high voltage cables.
  Otherwise the SI unit and/or input or output device can malfunction due to interference of noise and surge voltage
  from power and high voltage cables to the signal line.
  Route the wires (piping) of the SI unit and/or input or output device separately from power or high voltage cables.
 •Confirm proper insulation of wiring.
  Poor insulation (interference from another circuit, poor insulation between terminals, etc.) can lead to excess
  voltage or current being applied to the product, causing damage.
 •Take appropriate measures against noise, such as using a noise filter, when the Fieldbus system is
  incorporated into equipment.
  Otherwise noise can cause malfunction.

＊Environment
 •Select the proper type of protection according to the environment of operation.
  IP67 protection is achieved when the following conditions are met.
 (1) The units are connected properly with fieldbus cable with M12 connector and power cable with M12 (M8)
    connector.
 (2) Suitable mounting of each unit and manifold valve.
 (3) Be sure to fit a waterproof cap on any unused connectors.
  If using in an environment that is exposed to water splashes, please take measures such as using a cover.
  Do not use in an environment where moisture or water vapor are present. Otherwise failure and malfunction can
  result.
 •Do not use in a place where the product could be splashed by oil or chemicals.
  If the product is to be used in an environment containing oils or chemicals such as coolant or cleaning solvent,
  even for a short time, it may be adversely affected (damage, malfunction etc.).
 •Do not use the product in an environment where corrosive gases or fluids could be splashed.
  Otherwise damage to the product and malfunction can result.
 •Do not use in an area where surges are generated.
  If there is equipment generating large surge near the unit (magnetic type lifter, high frequency inductive furnace,
  welding machine, motor, etc.), this can cause deterioration of the internal circuitry element of the unit or result in
  damage. Take measures against the surge sources, and prevent the lines from coming into close contact.

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•When a surge-generating load such as a relay, valve or lamp is driven directly, use a product with a built-in surge absorbing element.
  Direct drive of a load generating surge voltage can damage the unit.
•The product is CE marked, but not immune to lightning strikes. Take measures against lightning strikes in the system.
•Prevent foreign matter such as dust or wire debris from getting inside the product.
•Mount the product in a place that is not exposed to vibration or impact.
  Otherwise failure or malfunction can result.
•Do not use the product in an environment that is exposed to temperature cycle.
  Heat cycles other than ordinary changes in temperature can adversely affect the inside of the product.
•Do not expose the product to direct sunlight.
  If using in a location directly exposed to sunlight, shade the product from the sunlight.
  Otherwise failure or malfunction can result.
•Keep within the specified ambient temperature range.
  Otherwise malfunction can result.
•Do not operate close to a heat source, or in a location exposed to radiant heat.
  Otherwise malfunction can result.

∗Adjustment and Operation
 •Set the switches by using a sharp-pointed screwdriver etc. When setting the switch, do not touch other unrelated parts.
  This can cause parts damage or malfunction due to a short circuit.
 •Perform settings suitable for the operating conditions.
  Incorrect setting can cause operation failure.
 •Please refer to the PLC manufacturer's manual etc. for details of programming and addresses.
  For the PLC protocol and programming refer to the relevant manufacturer's documentation.

∗Maintenance
 •Turn off the power supply, stop the supplied air, exhaust the residual pressure and verify the release of air before performing maintenance.
  There is a risk of unexpected malfunction.
 •Perform regular maintenance and inspections.
  There is a risk of unexpected malfunction.
 •After maintenance is complete, perform appropriate functional inspections.
  Stop operation if the equipment does not function properly.
  Otherwise safety is not assured due to an unexpected malfunction or incorrect operation.
 •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.

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System Outline

System configuration

The EX600 range of units can be connected to various types of fieldbus to realize the reduction of input or output device wiring and the distributed control system.

The unit communicates with the fieldbus through the SI unit.

One SI unit can be connected to manifold valves with up to 32 outputs and up to 9 input • output • I/O • IO-Link master units in random order.
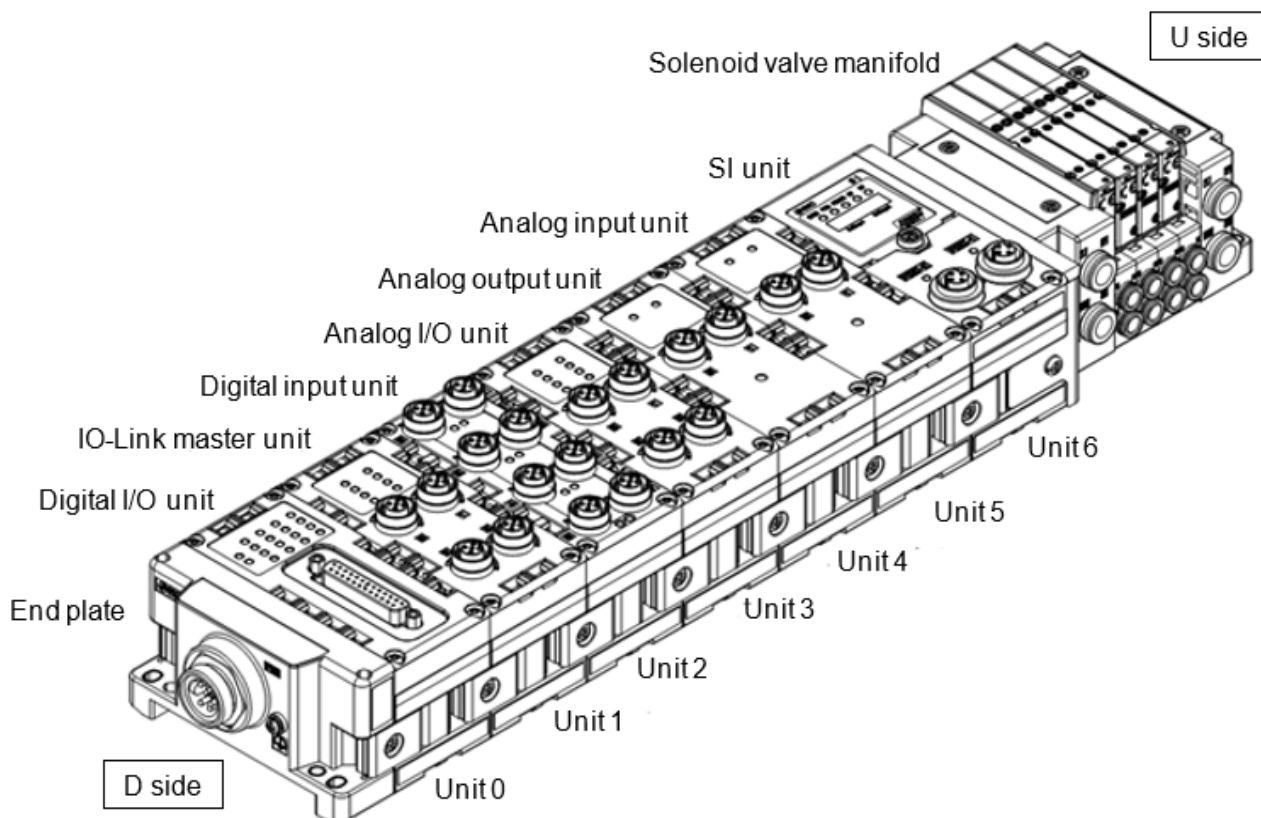
Name	Function
SI unit	Performs fieldbus communication and solenoid valve manifold ON/OFF output.
Digital input unit	For connecting sensors with switch output capability. PNP and NPN types are available.
Digital output unit	For connecting output devices such as solenoid valves, lamps, buzzers, etc. PNP and NPN types are available.
Digital I/O unit	This unit has both digital input and output functions. PNP and NPN types are available.
Analogue input unit	For connecting sensors with analogue output capability.
Analogue output unit	For connecting to equipment which can receive analogue signals.
Analogue I/O unit	This unit has both analogue input and output functions.
IO-Link master unit	Compatible with IO-Link devices. There are two port types, class A and class B.
End plate	Connected at EX600 Manifold D side, incorporating the power supply connection.
Solenoid valve manifold	An assembly of solenoid valves. One connector is used as the electrical connection to all connected valves.

■Definition and terminology

	Terminology	Definition
100	100BASE-TX	Standard of LAN transmission line with communication speed of 100 Mbps.
C	Current consumption	The current necessary to operate each unit.
D	DHCP	The protocol which automatically set the information such as IP address which needs to be registered in order to use the network. This information is set for all equipment which are connected to TCP/IP network.
	DIN rail	A metal rail conforming with the DIN (German) standard.
	DLR	An abbreviation for Device Level Ring: Performs a fast switching of the communication route when any problem occurs with the Ring network, to maintain communication.
	D Side	The side connected to the end plate when the product is connected to a manifold.
E	EDS	Settable attribute information of a device (each parameter's object address, etc.) stored on an external disk.
	Enclosure (IP□□)	Abbreviation of international standard for ingress protection. A standard related to the protection from external objects (hands, steel ball, steel wire, dust, water, etc.) applied to the product.
F	FE	Abbreviation for functional earth.
	Fieldbus	The protocol that uses digital communication to exchange signals between field equipment (instruments and actuators) running on site and a PLC.
	Full duplex	Communication system that can send and receive data at the same time bi-directionally.
H	Half duplex	Communication system that sends and receives data in one direction at a time.
I	Idle	Expression for PLC operation state. For details, Refer to the manuals of each PLC maker. Depending on which PLC is used; the idle state might not be available.
	IP address	A 32 bit digit sequence which is assigned to identify devices which are connected to the network.
M	MAC address	A unique number inherent to all devices which are connected to EtherNet/IP™.
	Manifold	A form made by combining multiple components.
N	NPN input	Receives the sensor output that uses the NPN transistor for the signal output.
	NPN output	The output type that uses an NPN transistor to operate an output device. It is also known as a positive common type since a positive potential is applied to the power supply line.
	Number of inputs	The number of points that can receive information from input devices (sensor, switch, etc.).
	Number of outputs	The number of points that can operate output devices (solenoid valve, light, motor, etc.).
O	Open circuit detection	A diagnostic function to detect if the input or output device wiring is disconnected.
P	PLC	Abbreviation for programmable logic controller. A digital computer used for automation of electromechanical processes.
	PNP input	Receives the sensor output that uses the PNP transistor for the signal output.
	PNP output	The output type that uses a PNP transistor to operate output devices. It is also known as a negative common type since a negative potential is applied to the power supply line.
Q	QuickConnect™	The function that reduces the time from the power being supplied to the equipment operating and communication starting.
S	Short circuit detection	A diagnostic function to detect an over current due to the short circuit of the output and/or power supply positive line with respect to the GND line.
	Short circuit protection	A function to protect the internal circuit from being damaged by an over current due to the short circuit of the output and/or power supply positive line with respect to the GND line.
	SI unit	Abbreviation of serial interface unit. A unit connected to a PLC to communicate using input and output data.
U	U Side	The side connected to the solenoid valve when the product is connected to a manifold.

Assembly

●**Composing the unit as a manifold**

∗: If the unit was purchased as a manifold, the work described in this section is not necessary.

(1) Connect the unit to the end plate.
   The Digital units or Analogue units can be connected in any order.
   (Tightening torque: 1.5 to 1.6 N•m)
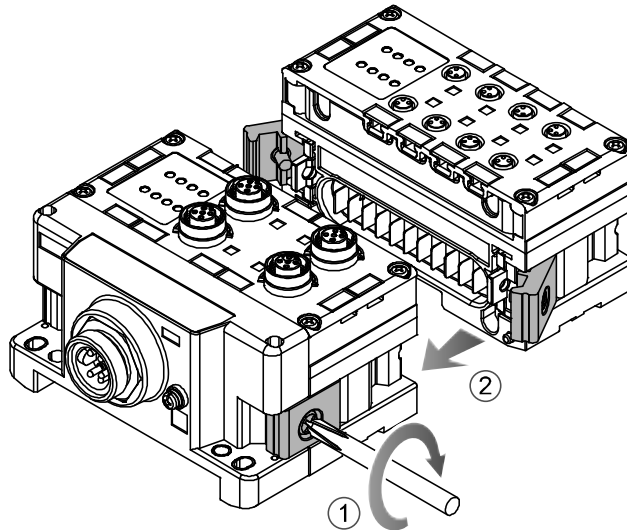
(2) Add more units.
   Up to 10 units (including the SI unit) can be connected to one manifold.
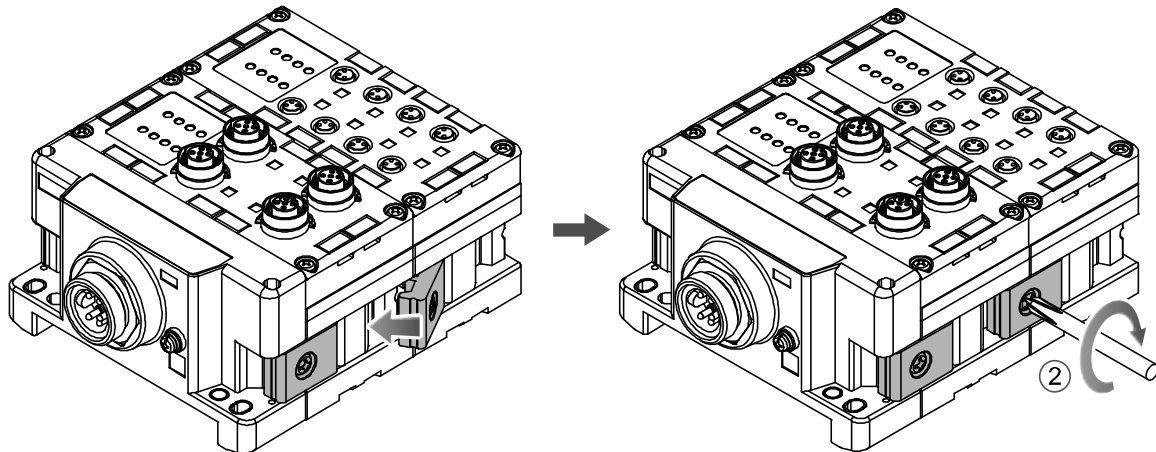
(3) Connecting the SI unit.
   After connecting the necessary I/O units, connect the SI unit.
   Connecting method is the same as above (1), (2).

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(4) Mounting the valve plate.
   Mount the valve plate (EX600-ZMV#) to the valve manifold using the valve set screws. (M3 x 8 mm)
   (Tightening torque: 0.6 to 0.7 N•m)

Screw mounting place
   SV   : 2 places
   S0700   : 2 places
   VQC1000   : 2 places
   VQC2000   : 3 places
   VQC4000   : 4 places
   SY   : 2 places
   JSY   : 2 places

④

Valve plate
(EX600-ZMV□)
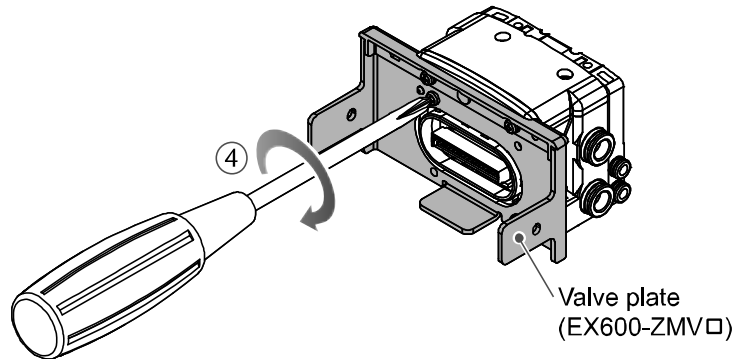
(5) Connect the SI unit and the valve manifold.
   Insert the valve plate to the valve plate set groove on the side of the SI unit.
   Then, tighten it with the valve plate set screws (M4 x 6 mm) to fix the plate.
   (Tightening torque: 0.7 to 0.8 N•m)

Valve plate
mounting groove

⑤
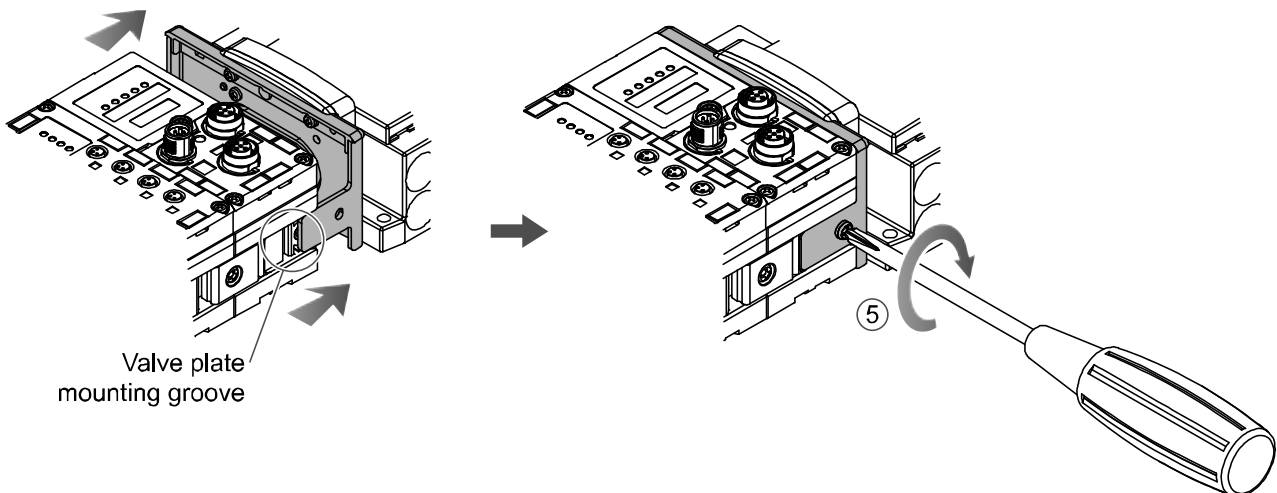
●Precautions for handling
   •Please do not connect the unit while the power supply is ON. It will cause equipment damage.
   •Take care not to drop the nuts for the Joint bracket.
   •Tighten the screws to the specified torque.
    Insufficient tightening may lead to equipment malfunction, injury or equipment damage.

Mounting and Installation

■Installation

•Direct mounting

(1) Direct mounting

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 mm screws.
(Tightening torque: 0.7 to 0.8 N•m)

Intermediate reinforcing brace
(EX600-ZMB1)
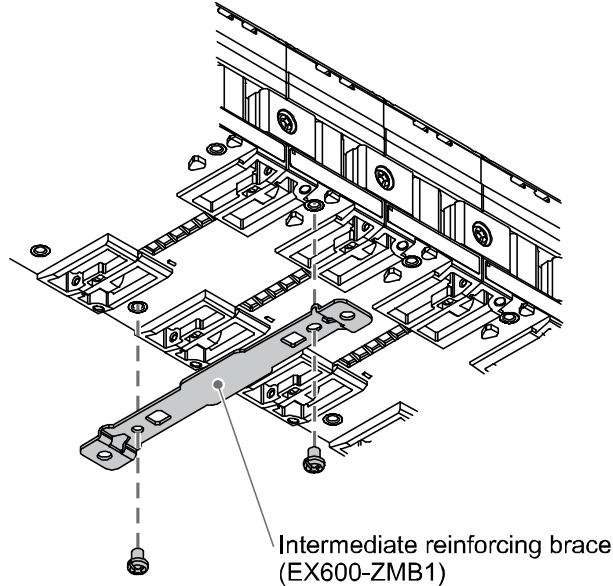
(2) Fix and tighten the end plate at one end of the unit. (M4)
(Tightening torque: 0.7 to 0.8 N•m)
Fix the end plate at the valve side while referring to the operation manual of the corresponding valve manifold.
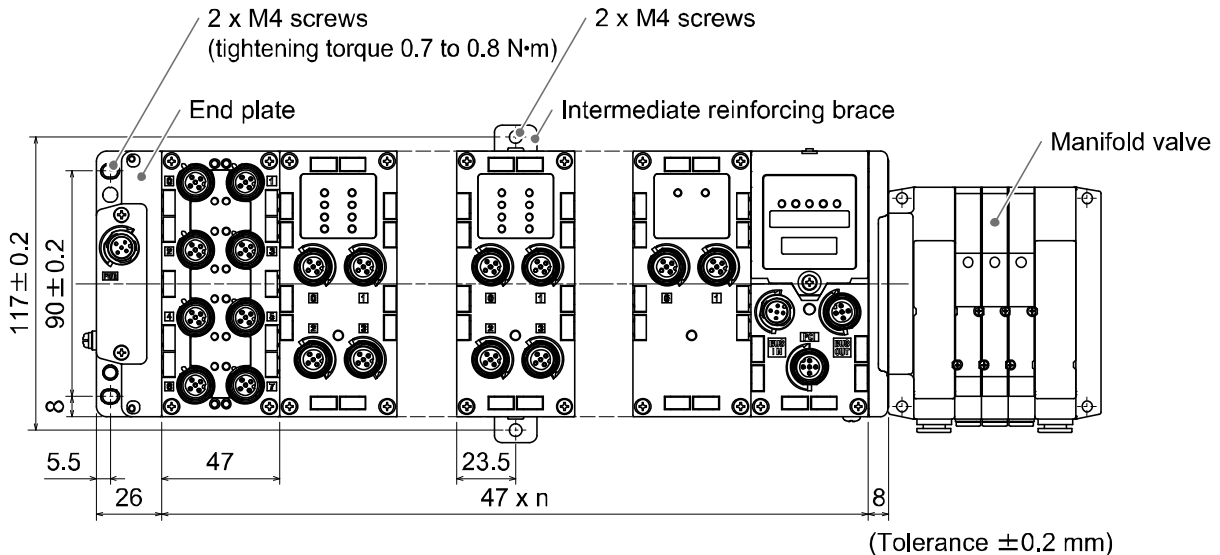
n (Number of connected Units) ≤ 10

●Precautions for handling
•When joining six or more units, fix the middle part of the complete unit with an intermediate reinforcing brace to prevent incorrect connection between the units due to deflection.

•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 mm 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 mm screws. (Tightening torque: 0.7 to 0.8 N•m)

Intermediate reinforcing brace
(EX600-ZMB2)

End plate bracket
(EX600-ZMA2)

① ②
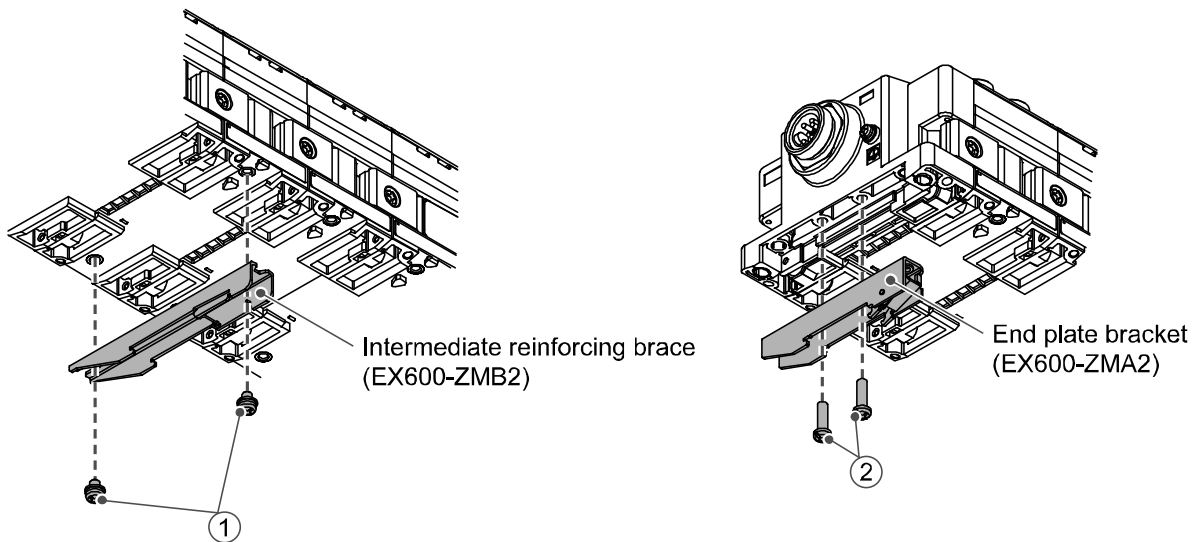
(3) Hook the DIN rail mounting groove to the DIN rail.
(4) Press the manifold using its side hooked to the DIN rail as a fulcrum until the manifold is locked.
(5) Fix the manifold by tightening the DIN rail fixing screws of the EX600-ZMA2. (M4 x 20 mm)
(Tightening torque: 0.7 to 0.8 N•m)
The tightening torque at the valve side depends on the valve type.
Refer to the operation manual of the corresponding valve manifold.
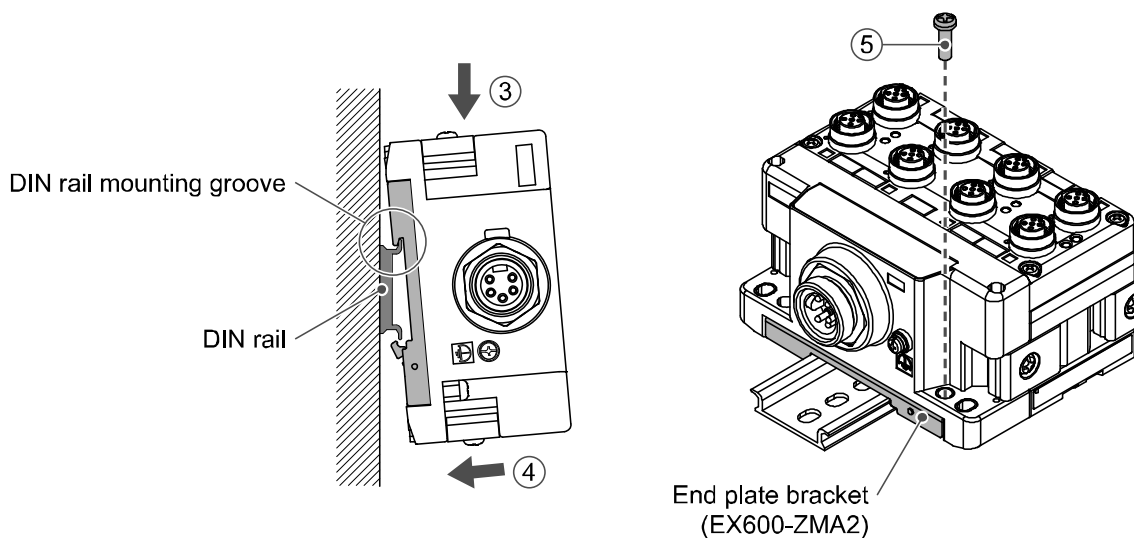
DIN rail mounting groove

DIN rail

③

④

⑤

End plate bracket
(EX600-ZMA2)

●Precautions for handling
•When joining six or more units, fix the middle part of the complete unit with an intermediate reinforcing brace to prevent incorrect connection between the units due to deflection.

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•**Mounting the marker**

The signal name of the input or output devices and unit address can be written on the marker, and it can be installed to each unit.

Mount the marker (EX600-ZT1) into the marker groove as required.

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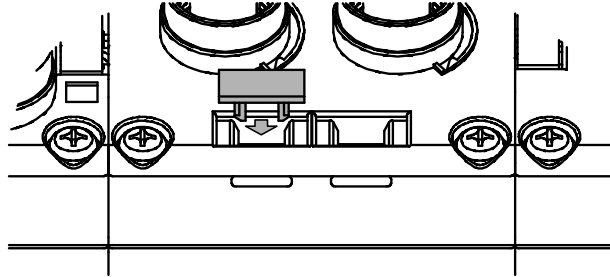
SI Unit

Model Indication and How to Order

EX600-S EN 7

SI unit

Protocol

Symbol	Content
EN	EtherNet/IP™

Polarity of output

Symbol	Content
7	PNP (Negative common) / For 2 ports
8	NPN (Positive common) / For 2 ports
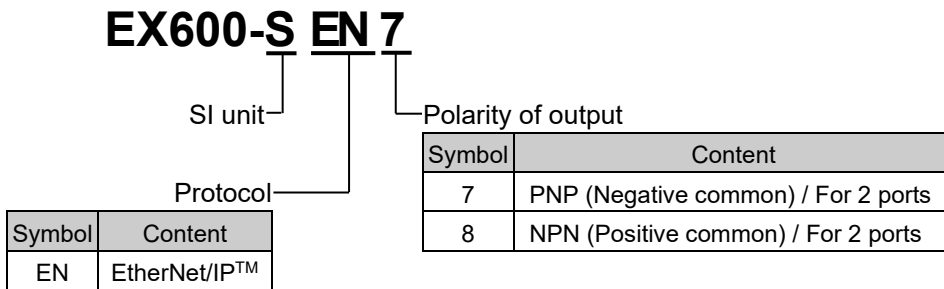
Summary of Product parts
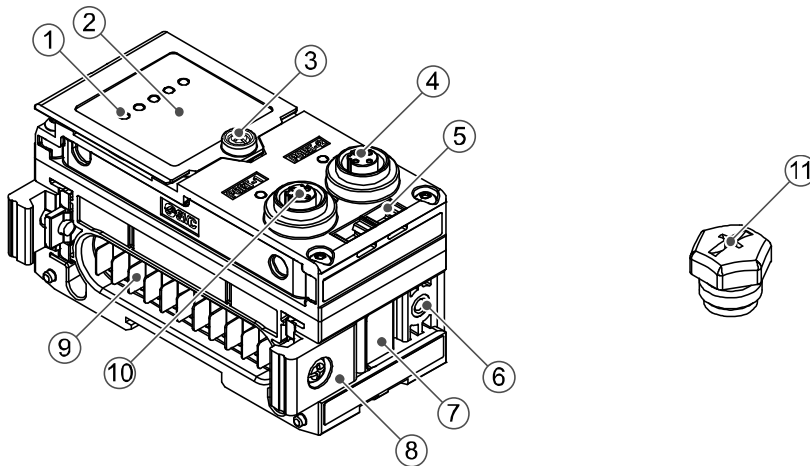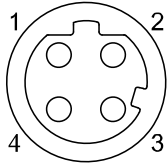
No.	Description	Function
1	Status display LED	Displays the status of the unit.
2	Display cover	Open when making the switch settings
3	Display cover screw	Loosen the screw to open the display cover.
4	Communication connector (PORT 2)	Connection for the cable for fieldbus outputs.
5	Marker groove	Groove to mount a marker.
6	Valve plate mounting screw hole	Hole for mounting the valve plate.
7	Valve plate mounting groove	Groove to insert the valve plate into.
8	Joint bracket	Bracket for joining to adjacent units.
9	Unit connector (plug)	Transmits signals and power supplies to adjacent units.
10	Communication connector (PORT 1)	Connection for the cable for fieldbus inputs.
12	Seal cap (1 pc.)	Mounted on to unused connectors (PORT 2).

Mounting and Installation

■Wiring

Connector pin assignment

Configuration	Pin No.	Signal name
PORT 1 / PORT 2		
	1	TX+
	2	RX+
	3	TX-
	4	RX-

●Precautions for handling
Be sure to fit a seal cap on any unused connectors. Proper use of the seal cap enables the enclosure to maintain the IP67 specification.

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Setting and Adjustment

●**Switch setting operation**
(1) Loosen the display cover screw (indicated by the arrow).
(2) Open the display cover using a flat blade screwdriver, etc.
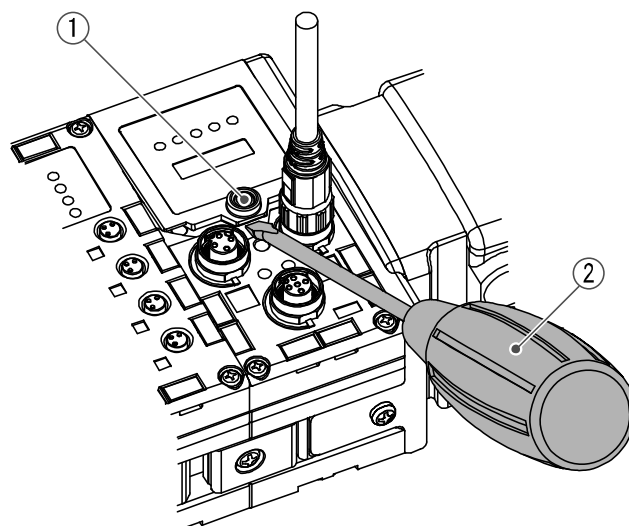
(3) Set the switch using a small flat blade screwdriver, referring to the switch settings on the following pages.
(4) After setting the switch, tighten the display cover screw in the reverse order of the above procedure. (Tightening torque: 0.3 to 0.4 N•m)

●Precautions for handling
•Turn off the power supply whilst setting the switch.
•If there is foreign matter or water droplets around the display cover, clean it off before opening the cover.
•When setting the switch, do not touch other unrelated parts. This can cause parts damage or malfunction due to a short circuit.
•All default settings are OFF. Perform the setting of the switch before using this product.
•When introducing the power supply, the switch setting will become effective.

●Switch setting

Settings1   Settings2
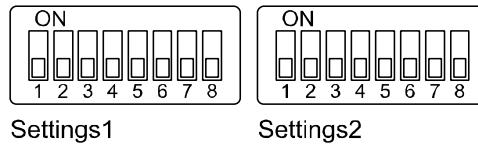
	Settings1 (Normal mode)			Settings1 (EX600-SEN1/2 compatibility mode)
1	Hold/Clear setting		1	Hold/Clear setting
2	Diagnostics setting		2	Diagnostics setting
3			3	
4	IO-Link master size setting		4	V_SEL
5			5	
6	**OFF (Normal mode)**		6	**ON (EX600-SEN1/2 Compatibility mode) *1**
7	Reserved *2		7	Reserved *2
8	IP address byte 3 setting		8	IP address byte 3 setting

∗: When switch 6 of Settings1 is turned ON, the memory map and the functions assigned at Setting1 change to EX600-SEN1/2 Compatibility mode.

∗: Make sure to use EX600-SEN7/8 keeping switch 7 of Settings1 OFF because if it is ON, the LED's on the product are turned OFF.

	Settings 2
1	
2	
3	
4	•IP address byte 4 setting
5	•DHCP mode setting
6	
7	
8	

> ## ●Precautions for handling
> •Handle the switches with care. Excessive force can break the switch.
> •Switch 7 of the Settings1 switch is not used (Never turn it ON).

•HOLD/CLEAR switch: Sets the output status for 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.

•Switch for diagnosis: Allocates the diagnostic data to the input data.
 When switch 6 of Settings1 is OFF (Normal mode)

| Settings1 | | Mode | Content | Diagnostic size set for the input |
2	3			
ON/OFF	OFF	0	Input data only (default setting)	0 byte
ON/OFF	ON	1	Input data + System diagnosis + Unit diagnosis	4 bytes

 When switch 6 of Settings1 is ON (EX600-SEN1/2 compatibility mode)

| Settings1 | | Mode | Content | Diagnostic size set for the input |
2	3			
OFF	OFF	0	Input data only (default setting)	0 byte
OFF	ON	1	Input data + System diagnosis	4 bytes
ON	ON/OFF	2	Input data + System diagnosis + Unit diagnosis	6 bytes

•Switch for IO-Link master size: Sets byte sizes which every IO-Link master in the manifold occupies.
 (Only for Normal mode)

| Settings1 | | Content |
4	5	
OFF	OFF	44 bytes (default setting)
OFF	ON	70 bytes
ON	ON/OFF	134 bytes

∗: The process data size can be selected at each communication port from the following 11 methods in the IO-Link master unit parameters. Make the IO-Link master size larger than the amount of process data size at each communication port plus 6 bytes.

| No | Process data size at each communication port | Content (IO size at each port) | | | | IO-Link master size setting | | |
		Port 1	Port 2	Port 3	Port 4	44 byte	70 byte	134 byte
1	2/2/2/2 byte	2	2	2	2	Can be selected	Can be selected	Can be selected
2	4/4/4/4 byte	4	4	4	4			
3	8/8/8/8 byte	8	8	8	8			
4	16/16/2/2 byte	16	16	2	2			
5	32/2/2/2 byte	32	2	2	2			
6	16/16/8/8 byte	16	16	8	8	Cannot be selected		
7	16/16/16/16 byte	16	16	16	16			
8	24/24/8/8 byte	24	24	8	8			
9	24/24/24/24 byte	24	24	24	24		Cannot be selected	
10	32/32/8/8 byte	32	32	8	8			
11	32/32/32/32 byte	32	32	32	32			

∗: If you select the "Cannot be selected" method in the above table, all process data are treated as zero and the product generates "process data mapping fault" diagnostics that indicates the amount of process data size exceeds IO-Link master size (Diagnostics at SI unit).

∗: In EX600-SEN1/2 compatibility mode, the process data size is fixed at 134 bytes since the process data size cannot be operated using the switches.

SMC

•V_SEL: Select the occupying number of the valve outputs.
(Valid only during EX600-SEN1/2 compatibility mode)

Settings1		Content	SI unit output data size
4	5		
OFF	OFF	32 outputs (default setting)	4 bytes
OFF	ON	24 outputs	3 bytes
ON	OFF	16 outputs	2 bytes
ON	ON	8 outputs	1 byte

•Selecting the operating mode

Settings1	Content
6	
OFF	Run in Normal mode.
ON	Run in EX600-SEN1/2 compatibility mode.

•IP address setting switch

Settings1	Settings2								IP address	Subnet mask
8	1	2	3	4	5	6	7	8		
OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	192.168.0.1	255.255.255.0
OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	192.168.0.2	
:	:	:	:	:	:	:	:	:	:	
OFF	ON	OFF	ON	ON	ON	ON	ON	ON	192.168.0.253	
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	255.255.255.0
ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	192.168.1.2	
:	:	:	:	:	:	:	:	:	:	
ON	ON	OFF	ON	ON	ON	ON	ON	ON	192.168.1.253	
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 the IP address from the DHCP server. Obtained IP address etc. is lost when the power supply is cut.

∗2: The mode to respond to the commands below of BOOTP/DHCP Server provided by Rockwell Automation.

        Enable DHCP: The IP address etc. can be obtained from BOOTP/DHCP Server.

            If the power is supplied again in this state, information including the IP address is obtained again.

        Disable DHCP: The IP address etc. cannot be obtained from BOOTP/DHCP Server.

            If the power is supplied again with this condition, the previous setting can be held.

● **How to set the IP address using EtherNet/IP™ compatible IP address setting software.**
You can also download the following software from our website to set the IP address in DHCP mode or Remote Control mode.
For details of the setting method, please refer to the oepration manual of the software below.

Software model: EX9-ZSW-IPC1 or EX9-ZSW-IPC2

●Setting method of IP address by BOOTP/DHCP Server

•When BOOTP/DHCP Server starts up, the Server scans the devices connected to the network.
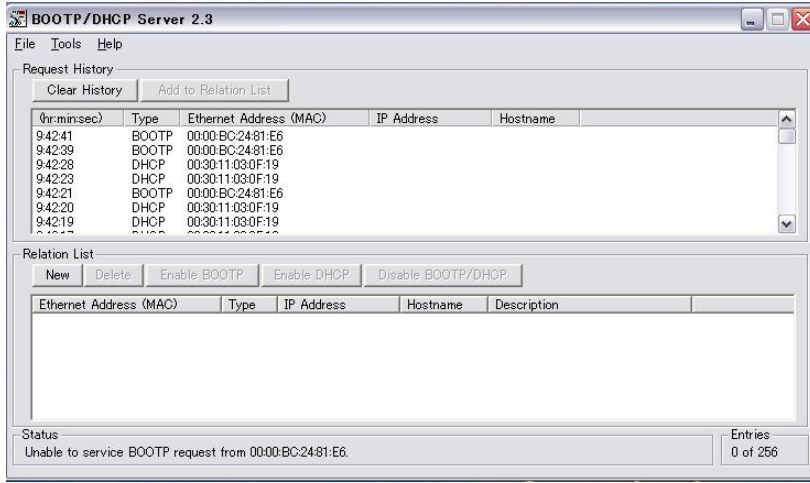
•After selecting the MAC address of EX600, IP address is set.
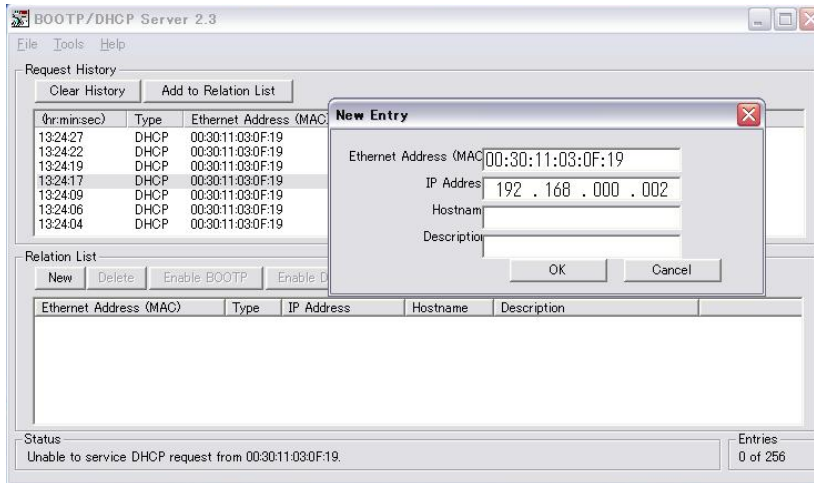
•IP address is set and added to the list.
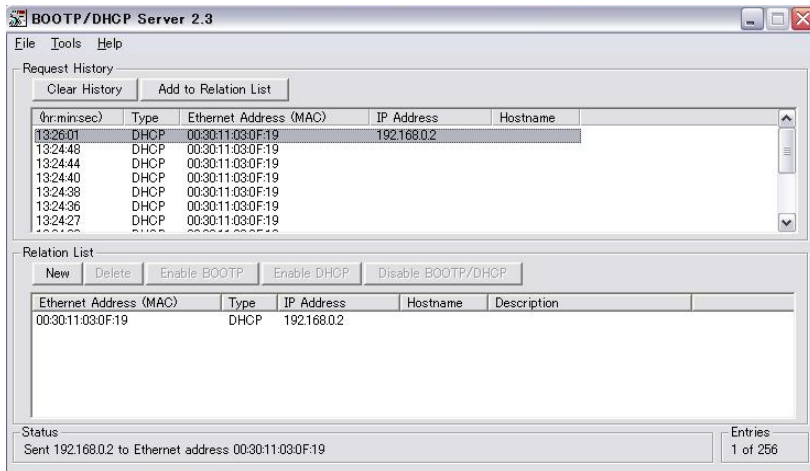
LED Display

LED display shows the power supply and communication status.
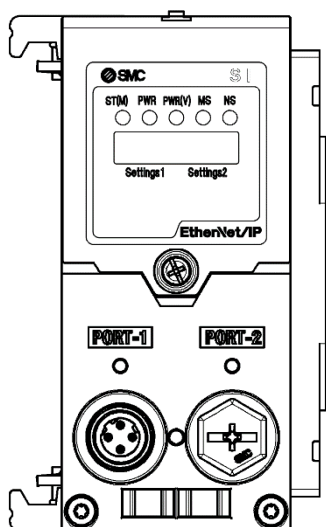
Display	Content
ST(M)	Displays the diagnostic status of the unit.
PWR	Displays the status of the power supply voltage for control and input.
PWR(V)	Displays the status of the power supply voltage for output.
MS	Displays the module status.
NS	Displays the network status.

Display	Content
PORT-1	Displays the communication status of the PORT-1 side.
PORT-2	Displays the communication status of the PORT-2 side.

•ST(M)-LED

LED display	Content
OFF	The power supply voltage for control and input is not connected.
Green ON	Normal operation.
Green flashing	Diagnostic error of I/O unit is detected.
Red flashing	Either of the following diagnostic errors is detected. (When diagnostic parameter is enabled) •Valve ON/OFF counter has exceeded the set value. •Valve is short circuited or disconnected. •IO-Link master process data mapping fault diagnostics is detected.
Red/Green flashing alternately	Detect a communication error between SI unit and I/O unit.
Red ON	SI unit has failed.

•PWR-LED

LED display	Content
Green ON	The power supply voltage for control and input is correct.
Red ON	The power supply voltage for control and input is below 19 VDC. (When diagnostic parameter is enabled)

•PWR(V)-LED

LED display	Content
OFF	The power supply voltage for output is below 19 VDC. (When diagnostic parameter is disabled)
Green ON	The power supply for output is correct.
Red ON	The power supply voltage for output is below 19 VDC. (When diagnostic parameter is enabled)

•MS-LED

LED display	Content
Green flashing	Either of the following conditions. •The PLC and EX600 are not configured correctly. •The PLC is idling.
Green ON	Normal operation.
Red flashing	Diagnostic error is detected.
Red ON	SI unit has failed.

•NS-LED

LED display	Content
OFF	IP address is not set.
Green flashing	EtherNet/IP^{TM} communication is not established.
Green ON	EtherNet/IP^{TM} communication is established.
Red flashing	EtherNet/IP^{TM} communication has timed-out.
Red ON	IP address is duplicated.

•L/A PORT1-LED

LED display	Content
OFF	No Link, No Activity (Port1 side)
Green ON	100 Mbps Link, No Activity (Port1 side)
Green flashing	100 Mpps Link, Activity (Port1 side)
Yellow ON	10 Mpps Link, No Activity (Port1 side)
Yellow flashing	10 Mpps Link, Activity (Port1 side)

•L/A PORT2-LED

LED display	Content
OFF	No Link, No Activity (Port2 side)
Green ON	100 Mbps Link, No Activity (Port2 side)
Green flashing	100 Mpps Link, Activity (Port2 side)
Yellow ON	10 Mpps Link, No Activity (Port2 side)
Yellow flashing	10 Mpps Link, Activity (Port2 side)

Specifications

Model		EX600-SEN7	EX600-SEN8
Communication	Number of ports	2 ports	
	Protocol	EtherNet/IP™ (Conformance version: Composite18)	
	Transmission speed	10/100 Mbps	
	Transmission type	Full duplex/Half duplex	
	Configuration file	EDS file	
	Occupying area (Number of input/output)	(1212 bytes/1210 bytes) Max.	
	IP address range	By switch on SI unit: 192.168.0 or 1.1 to 254 Via DHCP server: Any address	
	Device information	Vendor ID: 7 (SMC Corporation) Device Type: 12 (Communication Adapter) Product code: 258	
	Applicable function	Quickconnect™ DLR Web server	
Internal current consumption (Power supply for control / input)		120 mA or less	
Valve output	Output type	Source/PNP (Negative common)	Sink/NPN (Positive common)
	Number of solenoid valves	32 outputs	
	Applicable valve series	Solenoid valve with surge voltage suppressor of 24 VDC and 1.0 W or less (manufactured by SMC)	
	Fail safe	HOLD/CLEAR / Force ON	
	Protection	Short circuit protection	
Environment	Enclosure	IP67 (manifold assembled) *1	
	Operating temperature range	-10 to 50 ºC	
	Storage temperature range	-20 to 60 ºC	
	Operating humidity range	35 to 85% RH (no condensation)	
	Withstand voltage	500 VAC for 1 minute between external terminals and FE	
	Insulation resistance	500 VDC, 10 MΩ or more between external terminals and FE	
	Vibration resistance	10 to 57 Hz: constant amplitude 0.75 mm p-p 57 to 150 Hz: constant acceleration 49 m/s^2 for 2 hours in each direction X, Y and Z respectively (De-energized)	
	Impact resistance	147 m/s^2 3 times in each directions of X, Y and Z respectively (De-energized)	
Standard		CE/UKCA marked, UL (CSA)	
Weight		300 g	

∗1: All unused connectors must have a seal cap fitted to maintain IP67 rating.

SMC

■Dimensions

No.EX※※-OMZ0024
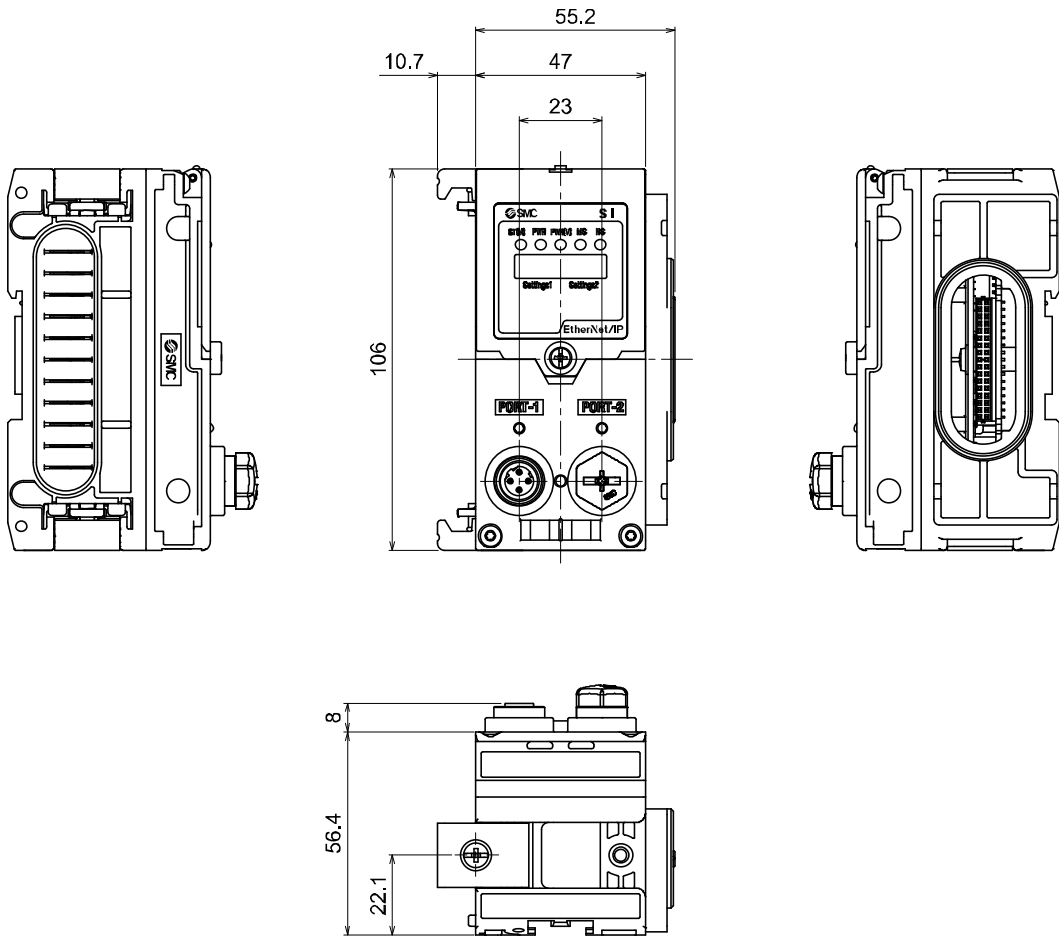
End plate

Model Indication and How to Order

•End plate (D side)

EX600-ED☐-☐

End plate at D side ⌐

Connector ⌐

Mounting method

Symbol	Description
Nil	No DIN rail bracket
2	With DIN rail bracket (VQC/SV/S0700 valve)
3	With DIN rail bracket (SY/JSY valve)

Symbol	Connector	Key type	Function
2	M12 (5 pin)	B code	IN
3	7/8 inch (5 pin)	-	IN
4	M12 (4 pin/5 pin)	A code	IN/OUT (PIN layout 1*)
5	M12 (4 pin/5 pin)	A code	IN/OUT (PIN layout 2)

∗: Refer to Connector Pin No. (page 30) for details of the PIN layout 1 and 2.

•End plate (U side)

EX600-EU1-☐

End plate at U side ⌐

Mounting method

Symbol	Description
Nil	No DIN rail bracket
2	With DIN rail bracket (EX600-ED#-2)
3	With DIN rail bracket (EX600-ED#-3)

SMC

Summary of Product parts

•EX600-ED2-#
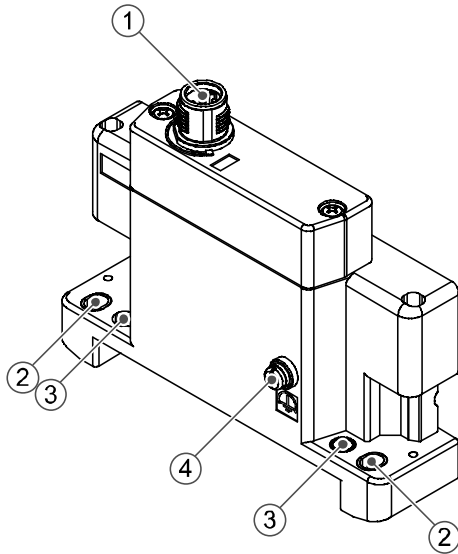
•EX600-ED3-#
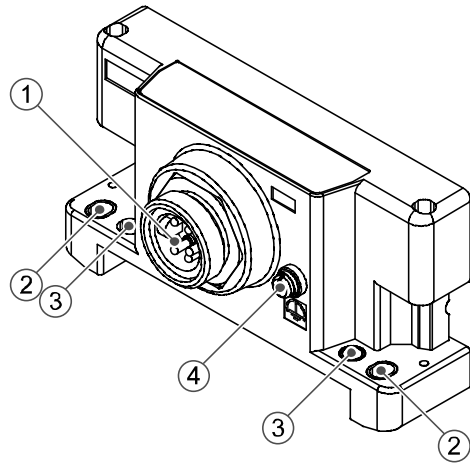
•EX600-EU1-#
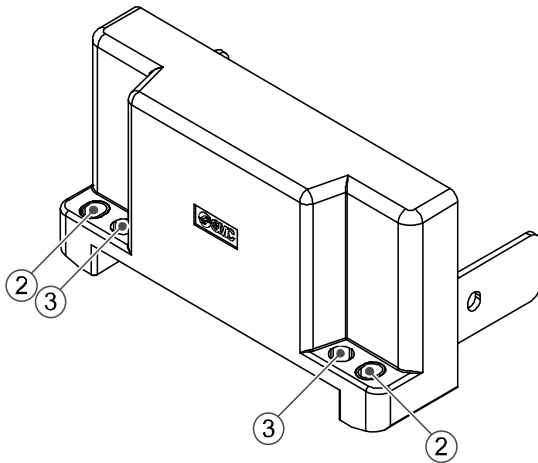
No.	Description	Function
1	Power connector	Connector for power supply to SI unit and I/O unit.
2	Fixing hole for direct mounting	Holes for direct mounting.
3	DIN rail fixing hole	Holes for fix DIN rail mounting.
4	F.E. terminal *	Functional Earth terminal - must be connected directly to system earth (ground).

∗: Individual grounding should be provided close to the product with a short cable.

•EX600-ED4/ED5-#
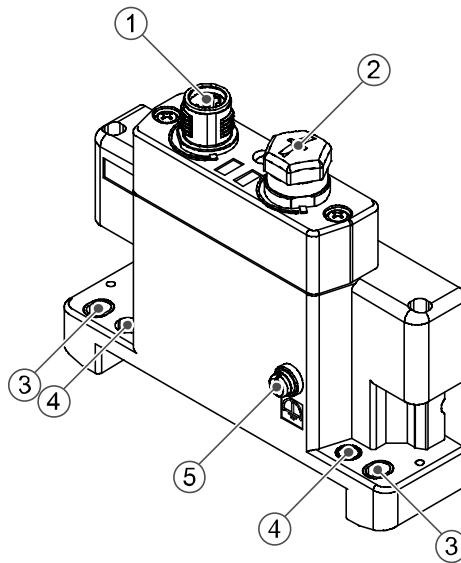
No.	Description	Function
1	Power connector (PWR IN)	Supplies power for each unit and input/output devices.
2	Power connector (PWR OUT)	Provides power to downstream equipment.
3	Fixing hole for direct mounting	Holes used for direct mounting.
4	DIN rail fixing hole	Holes used for fix DIN rail.
5	F.E. terminal ∗	Functional Earth terminal - must be connected directly to system earth (ground).

∗: Individual grounding should be provided close to the product with a short cable.
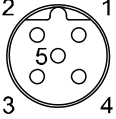
Mounting and Installation

■Wiring

○Connector pin assignment
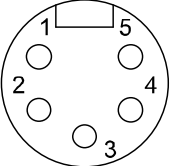
(1) EX600-ED2-□

PWR IN: M12 5-pin Plug B code

Configuration	Pin No.	Signal name
	1	24 V (Output)
	2	0 V (Output)
	3	24 V (Control and input)
	4	0 V (Control and input)
	5	F.E.
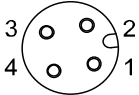
(2) EX600-ED3-□

PWR IN: 7/8 inch 5-pin Plug

Configuration	Pin No.	Signal name
	1	0 V (Output)
	2	0 V (Control and input)
	3	F.E.
	4	24 V (Control and input)
	5	24 V (Output)

(3) EX600-ED4-□

PWR IN: M12 4-pin Plug A code
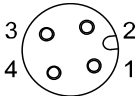
Configuration	Pin No.	Signal name
	1	24 V (Control and input)
	2	24 V (Output)
	3	0 V (Control and input)
	4	0 V (Output)

PWR OUT: M12 5-pin Socket A code

Configuration	Pin No.	Signal name
	1	24 V (Control and input)
	2	24 V (Output)
	3	0 V (Control and input)
	4	0 V (Output)
	5	Not used

(4) EX600-ED5-□

PWR IN: M12 4-pin Plug A code

Configuration	Pin No.	Signal name
	1	24 V (Output)
	2	0 V (Output)
	3	24 V (Control and input)
	4	0 V (Control and input)

PWR OUT: M12 5-pin Socket A code

Configuration	Pin No.	Signal name
	1	24 V (Output)
	2	0 V (Output)
	3	24 V (Control and input)
	4	0 V (Control and input)
	5	Not used

SMC

○Regarding the 2 types of power supply

The power supply consists of two power supply systems as follows:
•Power supply for control and input: Supplying power for control of each unit's power supply for control
　　　　　　　　　　　　　　　　　　and also for device connected to input port of Digital and Analogue
　　　　　　　　　　　　　　　　　　unit.
•Power supply for output: Supplying power for equipment connected to output port of Digital and
　　　　　　　　　　　　　Analogue unit, and also power supply for solenoid valve manifold.
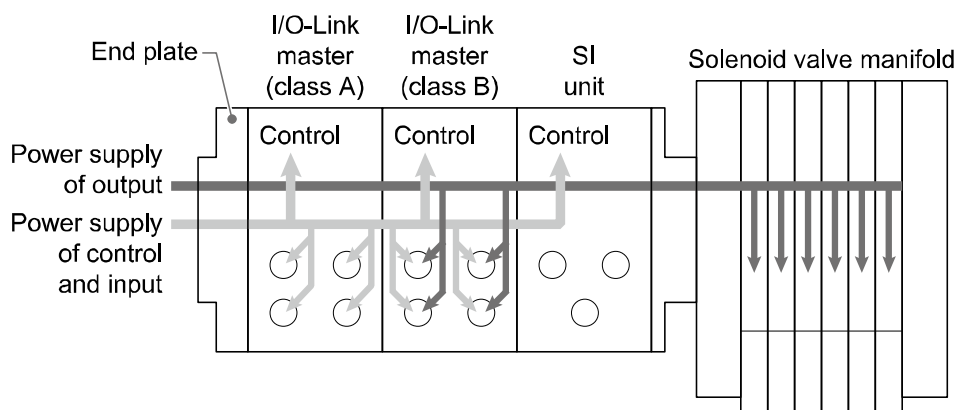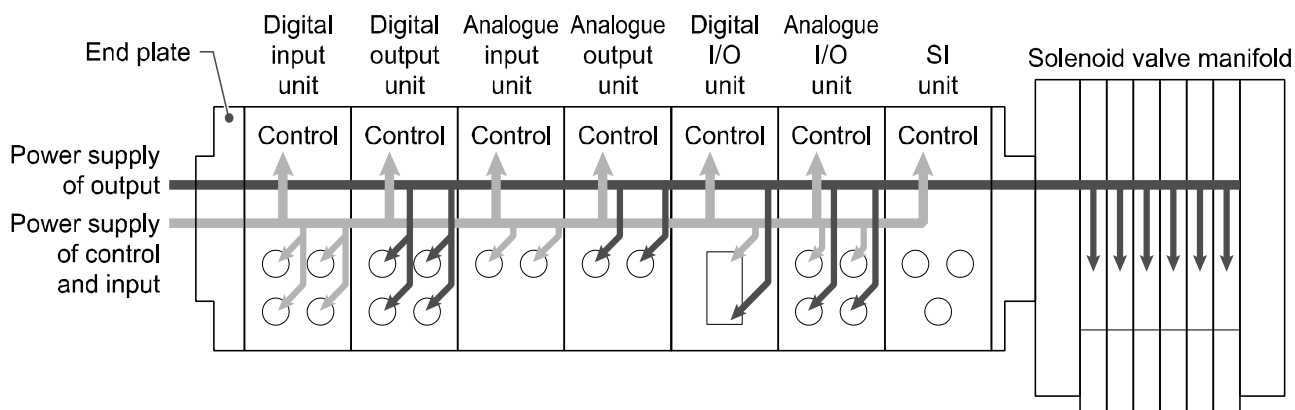
●Precautions for handling
Be sure to fit a seal cap on any unused connectors. Proper use of the seal cap enables the
enclosure to achieve IP67 specification.

Specifications

Model			EX600-ED2-#	EX600-ED3-#	EX600-ED4-#	EX600-ED5-#
Power	Power connector	PWR IN	M12 (5 pin) Plug	7/8 inch (5 pin) Plug	M12 (4-pin) Plug	M12 (4-pin) Plug
		PWR OUT	-	-	M12 (5-pin) Socket	M12 (5-pin) Socket
	Power supply (Control and input)		24 VDC ±10%, 2 A	24 VDC ±10%, 8 A	DC24 V ±10%, 4 A	
	Power supply (Output)		24 VDC +10/-5%, 2 A	24 VDC +10/-5%, 8 A	DC24 V +10/-5%, 4 A	
Environment	Enclosure		IP67 (With manifold assembled) [1]			
	Operating temperature range		-10 to 50 °C			
	Storage temperature range		-20 to 60 °C			
	Operating humidity range		35 to 85%R.H. (No condensation)			
	Withstand voltage		500 VAC for 1 minute between external terminals and F.E.			
	Insulation resistance		500 VDC, 10 MΩ min. between external terminals and F.E.			
Standard			CE marked (EMC directive, RoHS directive), UL (CSA)		CE marked (EMC directive, RoHS directive)	
Weight			170 g	175 g	170 g	

∗1: All unused connectors must have a seal cap fitted.

SMC

■Dimensions
 •EX600-ED2
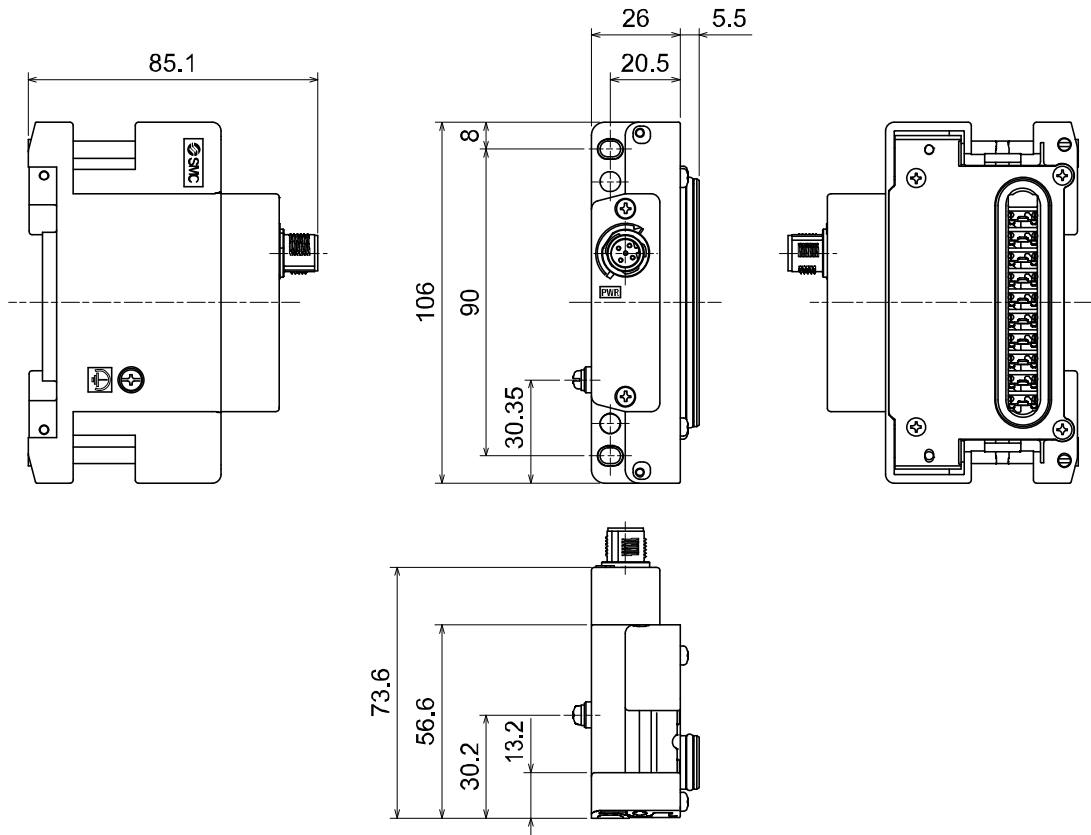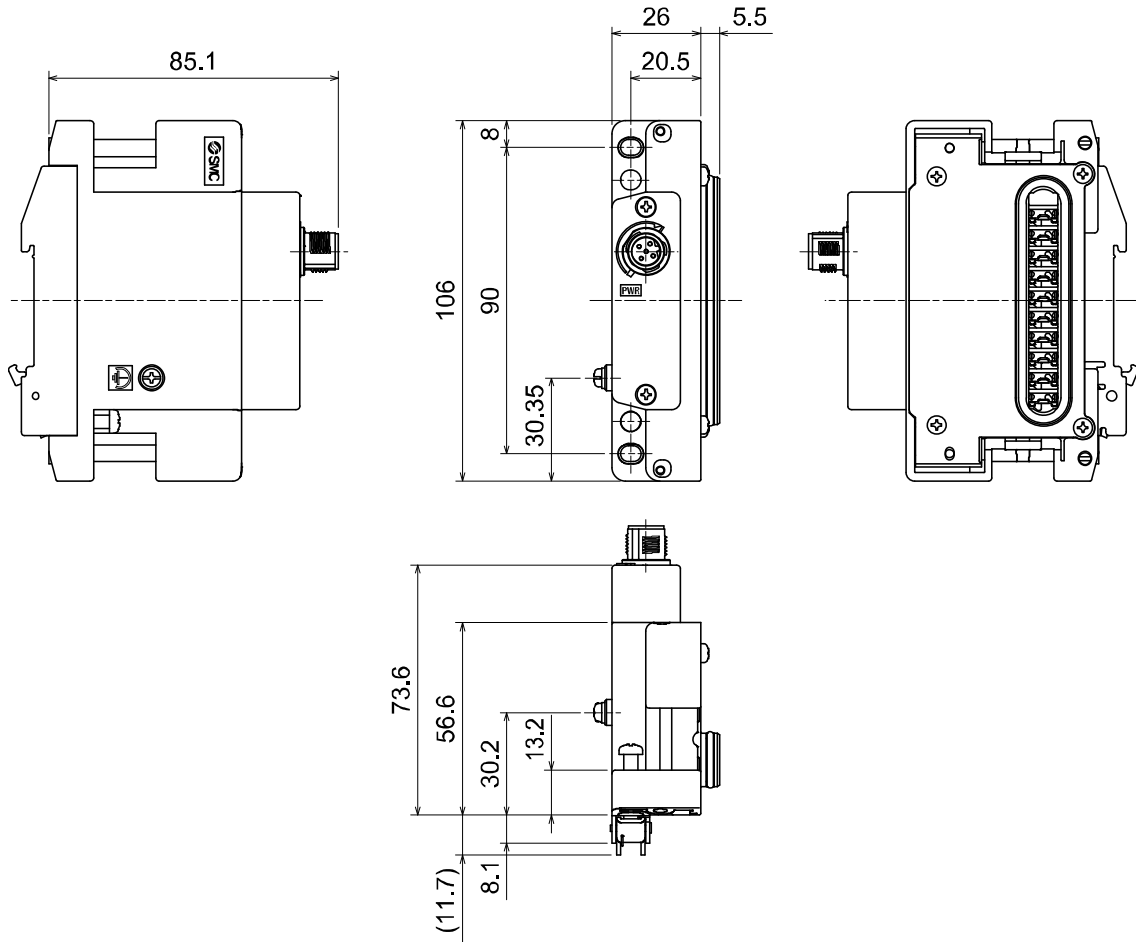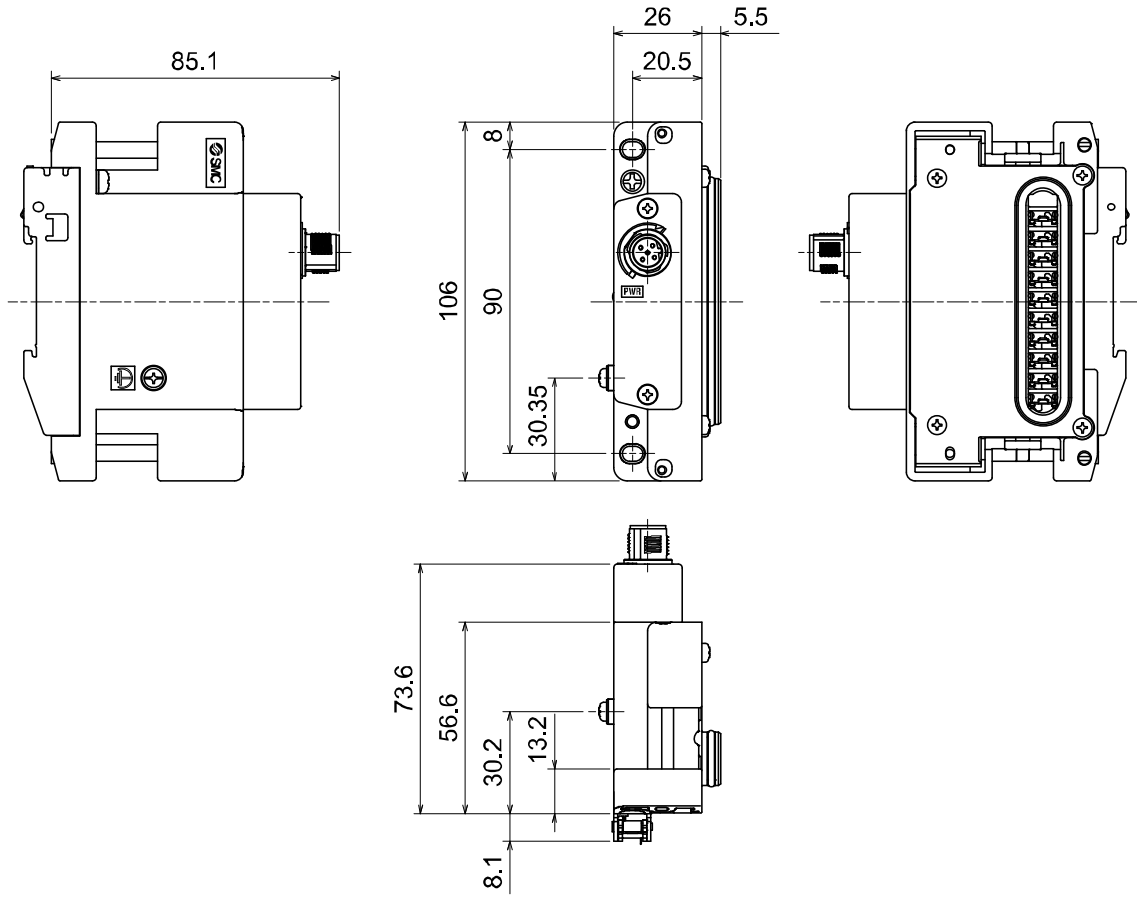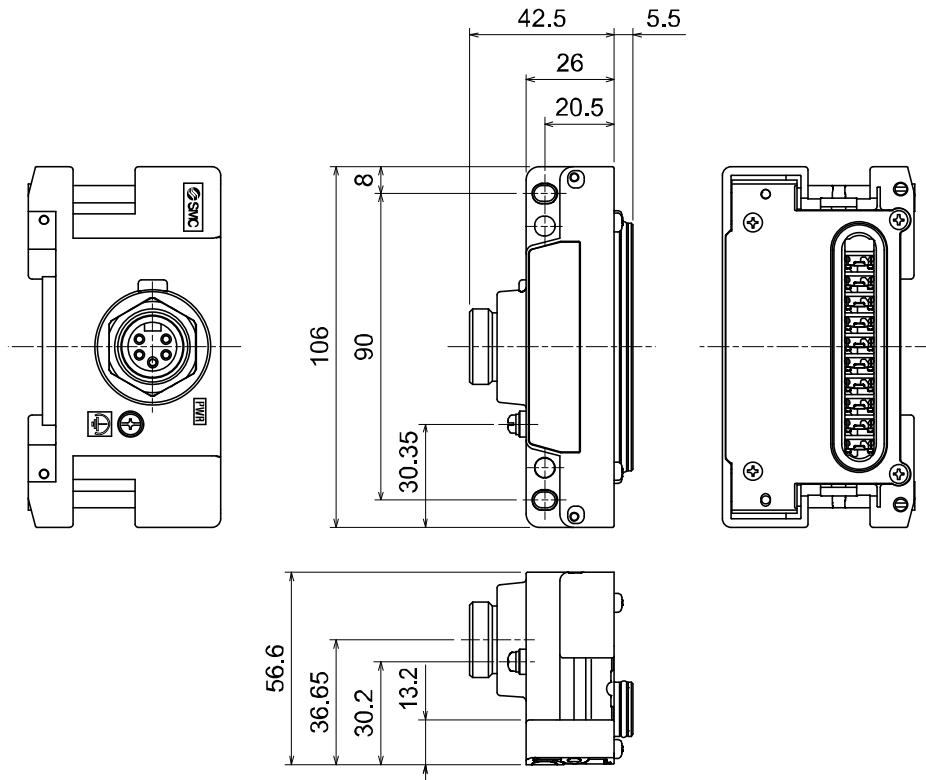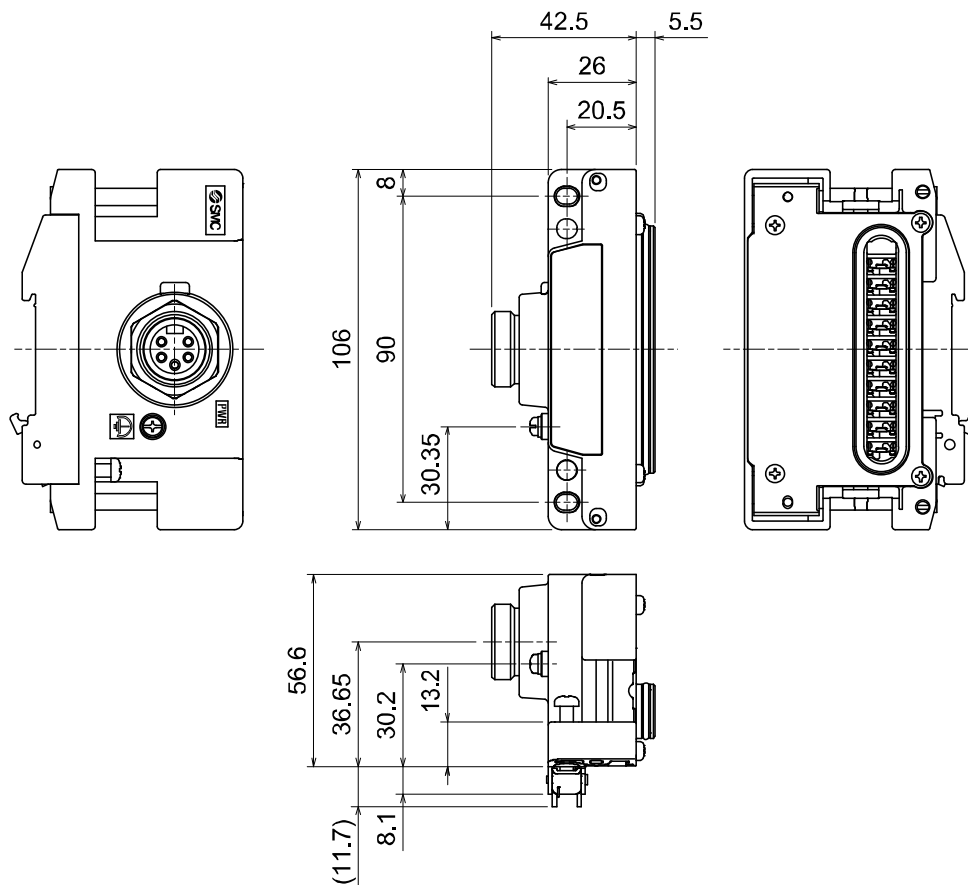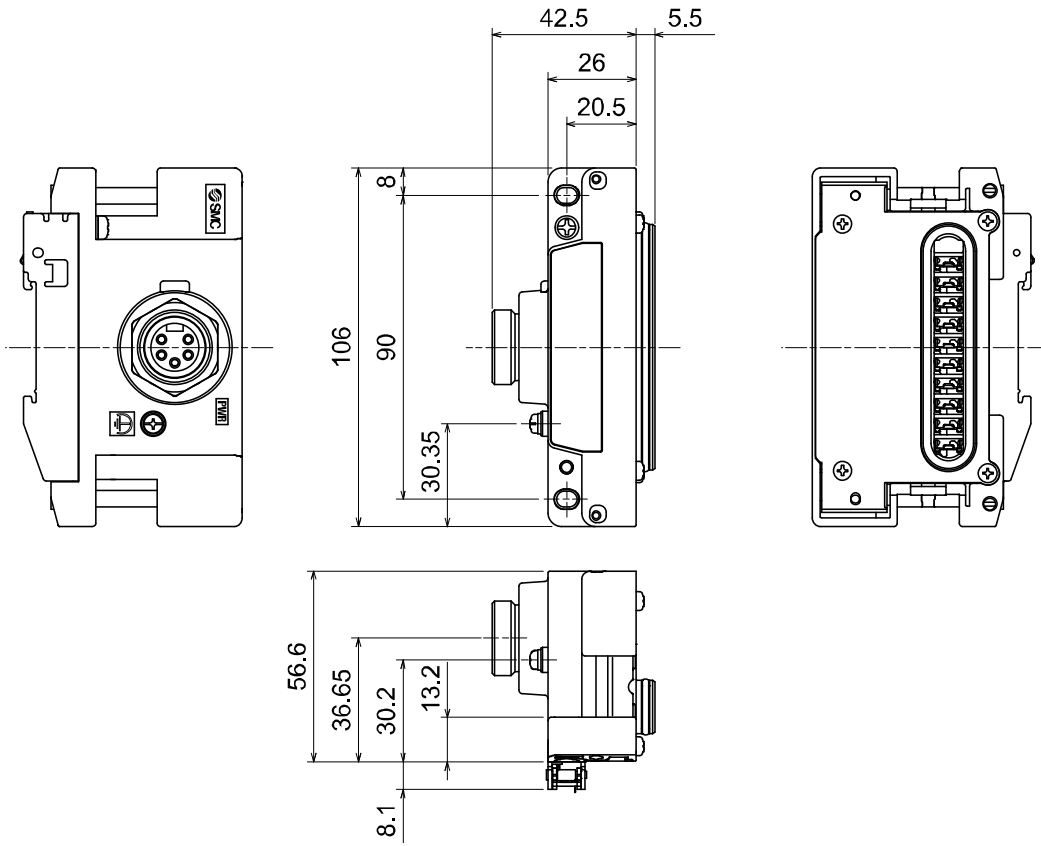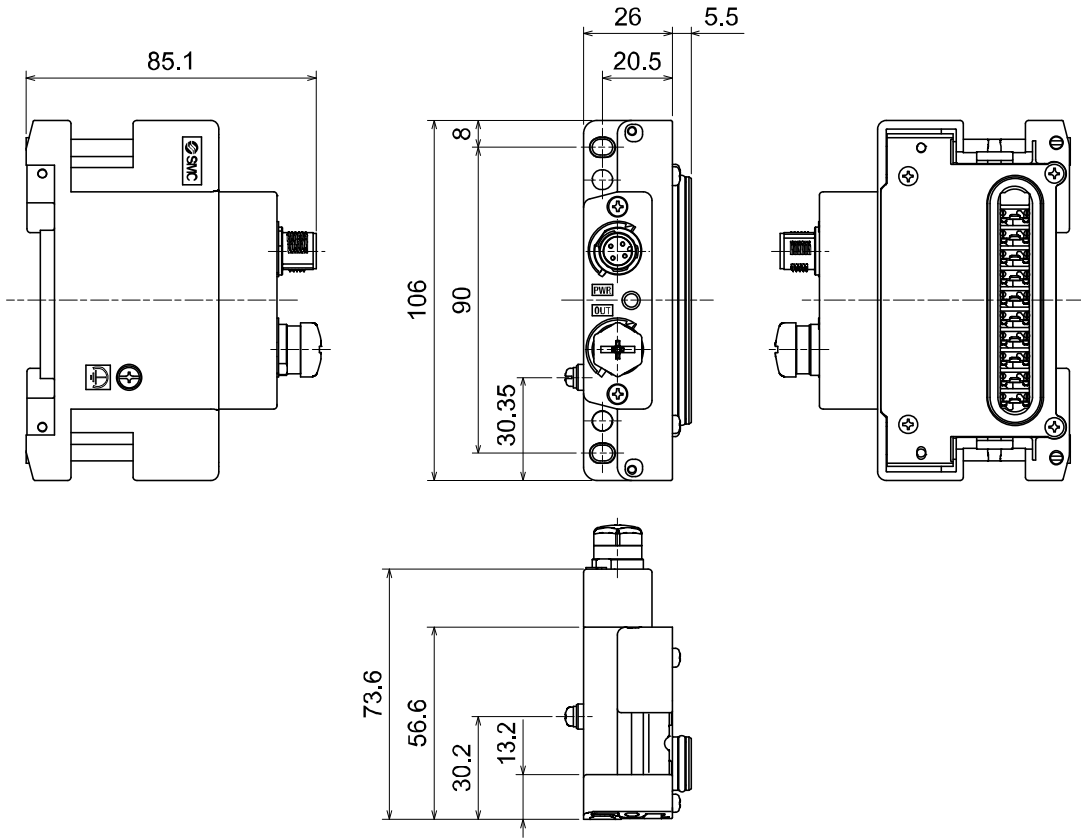
No.EX※※-OMZ0024

•EX600-ED2-2

85.1

26   5.5

20.5

8

106   90

30.35

73.6   56.6   30.2   13.2

(11.7)   8.1

PWR

-34-

SMC

•EX600-ED2-3

No.EX※※-OMZ0024

•EX600-ED3

42.5   5.5
26
20.5
8
106
90
30.35
56.6
36.65
30.2
13.2

•EX600-ED3-2

42.5   5.5
26
20.5
8
106
90
30.35
56.6
36.65
30.2
13.2
(11.7)
8.1

SMC

•EX600-ED3-3

No.EX※※-OMZ0024

•EX600-ED4/ED5

SMC

•EX600-ED4/ED5-2

85.1

26
5.5
20.5
8
106
90
30.35

73.6
56.6
30.2
13.2
(11.7)
8.1

PWR
OUT

SMC

No.EX※※-OMZ0024

•EX600-ED4/ED5-3

SMC

No.EX※※-OMZ0024

•EX600-EU1

•EX600-EU1-2

SMC

No.EX※※-OMZ0024

•EX600-EU1-3

28.2 26
20.5
8
90 106
4.6

9.1
18.2
13
13.2
56.6
68.3
4.1
6.7

SMC

SMC
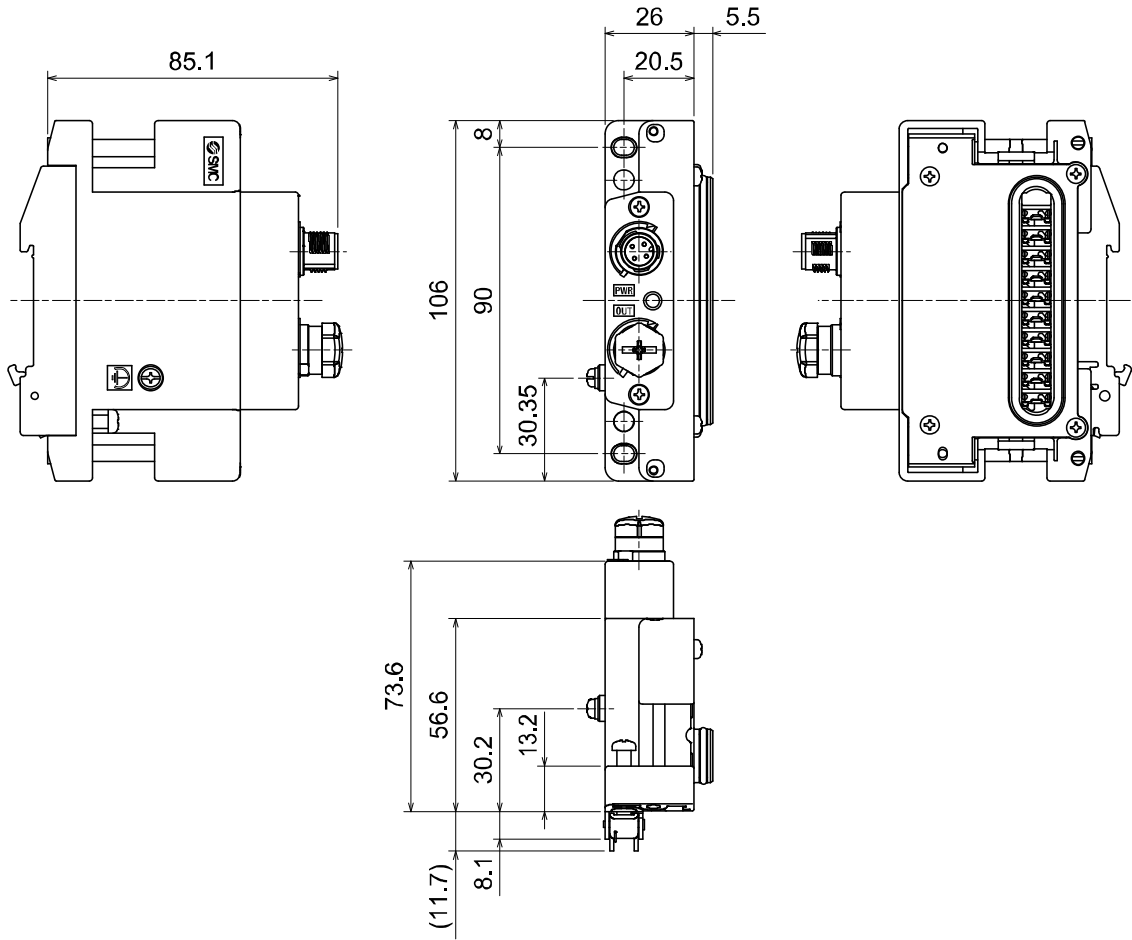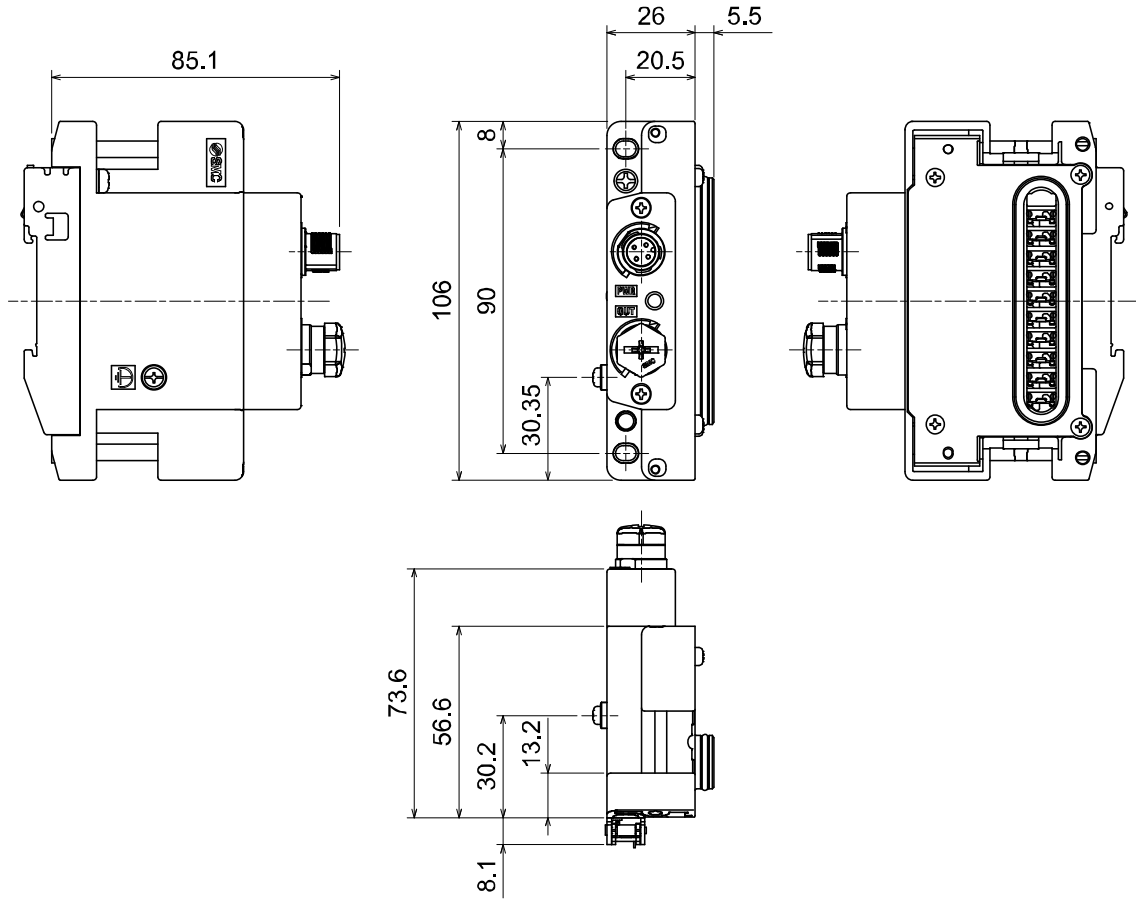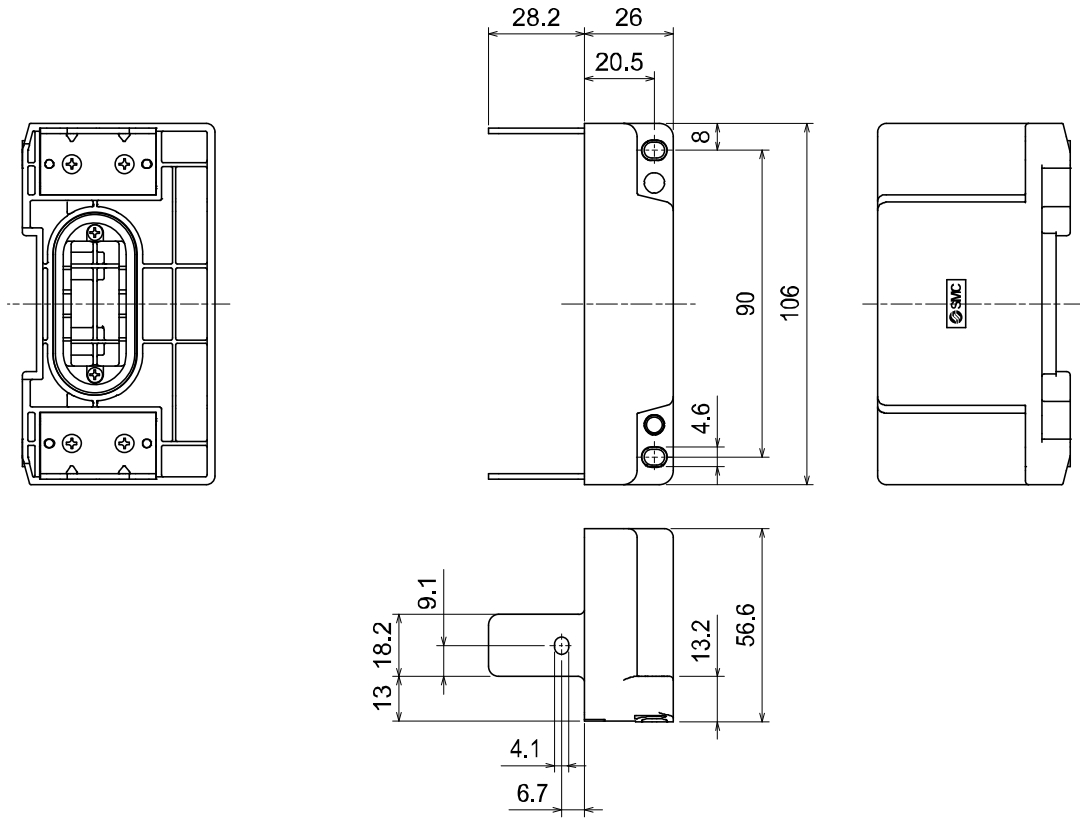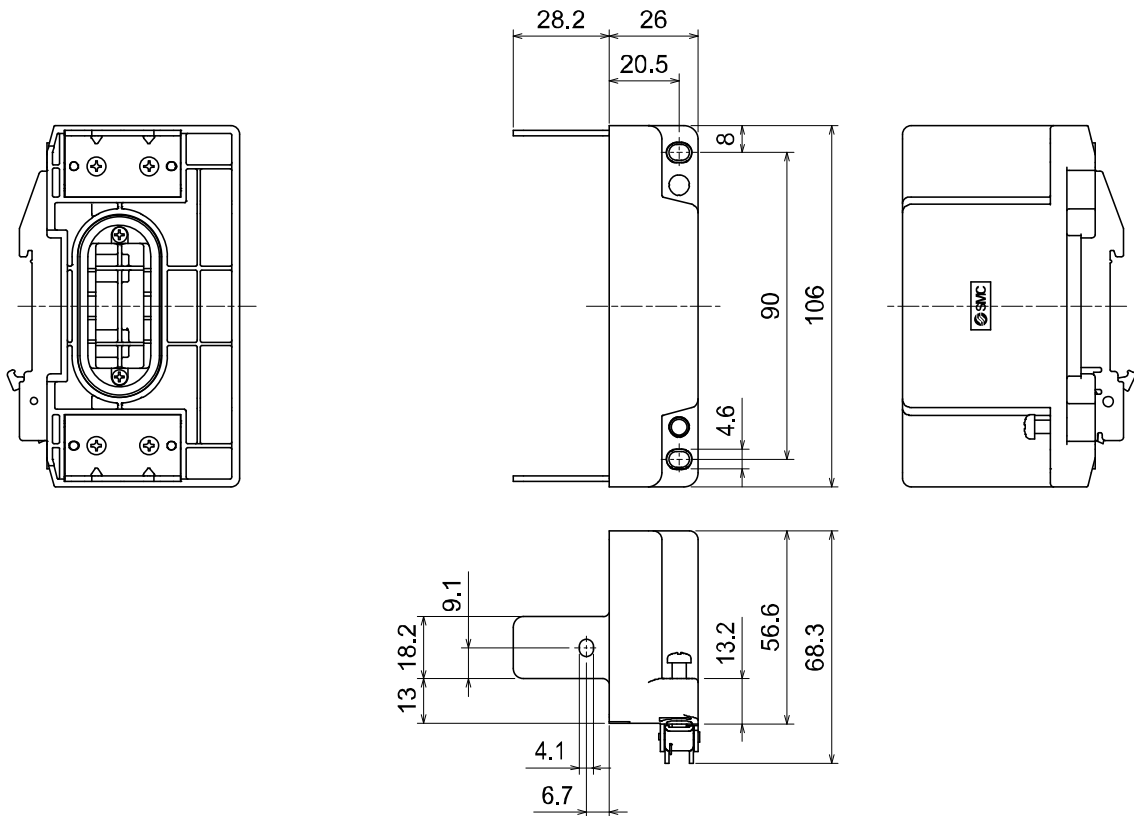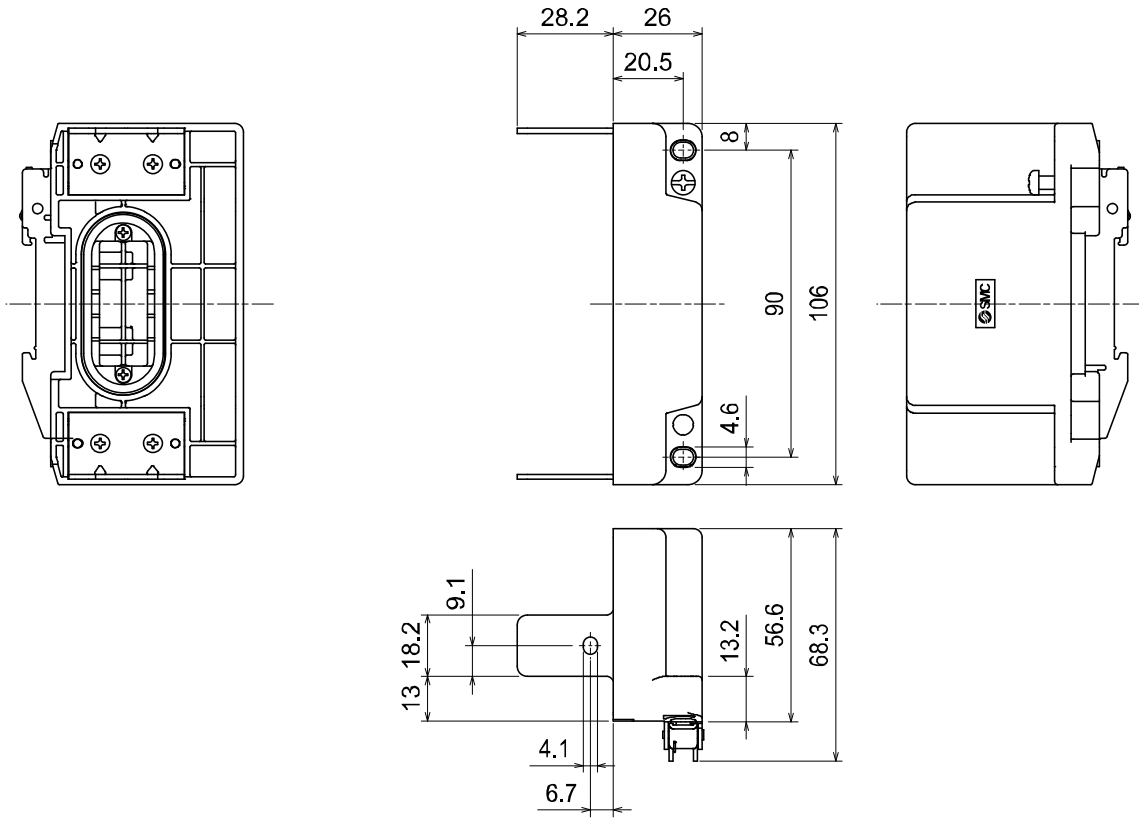
Maintenance

Turn OFF the power supply, stop the supplied air, exhaust the residual pressure and verify the release of air before performing maintenance.

Cleaning method

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.
Do not use solvents such as benzene, thinner etc. to clean each unit.

Inspection item	Content of inspection
Connector/Electric wiring	Connect properly if the connection is loose.
Seal cap	Tighten properly if the connection is loose.
Thread for mounting and installation	If the thread is loose, re-tighten it to the specified torque.
Connection cables	If the cable is broken or any other abnormality is confirmed by appearance, replace the cable with a new one.
Supply source voltage	Check if source voltage within the specification range (24 VDC ±10%) is supplied.

How to reset the product for power cut or forcible de-energizing

Supply power to the product.
The output status just before the power failure is not maintained when power supply is recovered.
Start operation after confirming safety of the entire equipment.

Troubleshooting

•Troubleshooting
When any failure happens with this Fieldbus system, the following chart is used to identify the cause of the failure.
Error status is reflected from the parameter setting of the Fieldbus system.
When a failure occurs, take the appropriate countermeasures referring to the LED display, the troubleshooting and the parameter setting.
If a cause applicable to the failure cannot be identified, it indicates that the Fieldbus system itself is broken. The Fieldbus system breakage can be caused by the operating environment. Contact SMC separately to obtain countermeasures.

```
┌─────────────────┐
│ The system does │
│ not work        │
│ correctly.      │
└────────┬────────┘
         │
         ▼
    ┌─────────┐                              ┌──────────────────┐
    │ LED is  │─────────────────────────────▶│ Refer to Fault 1 │
    │ OFF.    │                              └──────────────────┘
    └─────────┘            IO unit
 Yes ─▶
 No  ┄▶

  SI unit                    ┌──────────────────┐    ┌──────────────────┐
                             │ Digital unit     │───▶│ Refer to Fault 2 │
                             │ displays error.  │    └──────────────────┘
                             └──────────────────┘

                             ┌──────────────────┐    ┌──────────────────┐
                             │ Analogue unit    │───▶│ Refer to Fault 3 │
                             │ displays error.  │    └──────────────────┘
                             └──────────────────┘

  ┌─────────────┐            ┌──────────────────┐    ┌──────────────────┐
  │ Green ST(M) │            │ IO-Link master   │───▶│ Refer to Fault 4 │
  │ LED is      │──────────▶ │ unit displays    │    └──────────────────┘
  │ flashing.   │            │ error.           │
  └─────────────┘            └──────────────────┘

                             ┌──────────────────┐    ┌──────────────────┐
                             │ Frequency count  │───▶│ Refer to Fault 5 │
                             │ unit displays    │    └──────────────────┘
                             │ error.           │
                             └──────────────────┘

                    ┌───────────────────────────────────┐
                    │ If the error is not eliminated     │
                    │ even after supplying power, the    │
                    │ unit failure is possible.          │
                    │ Replace the applicable I/O unit.   │
                    └───────────────────────────────────┘

  ┌─────────────┐                              ┌──────────────────┐
  │ Red ST(M)   │─────────────────────────────▶│ Refer to Fault 6 │
  │ LED is      │                              └──────────────────┘
  │ flashing.   │
  └─────────────┘

  ┌─────────────────┐                          ┌──────────────────┐
  │ Red ST(M) LED   │                          │ Refer to Fault 7 │
  │ is ON. Or       │─────────────────────────▶└──────────────────┘
  │ red/green ST(M) │
  │ LED is flashing │
  │ alternately.    │
  └─────────────────┘
```

```
SI unit ┊

┌─────────────────┐                              ┌──────────────────┐
│ Red PWR or PWR(V)│ ───────────────────────────▶│  Refer to Fault 8 │
│   LED is ON.     │                              └──────────────────┘
└─────────────────┘
        ┊
┌─────────────────┐                              ┌──────────────────┐
│ L/A port1 or L/A │ ───────────────────────────▶│  Refer to Fault 9 │
│ port2 LED is NOT │                              └──────────────────┘
│    flashing.     │
└─────────────────┘
        ┊
┌─────────────────┐                              ┌──────────────────┐
│   MS or NS is    │ ───────────────────────────▶│ Refer to Fault 10 │
│red ON or red     │                              └──────────────────┘
│   flashing.      │
└─────────────────┘
        ┊
┌─────────────────┐                              ┌──────────────────┐
│ The valves do not│ ───────────────────────────▶│ Refer to Fault 11 │
│  work correctly. │                              └──────────────────┘
└─────────────────┘
        ┊
┌─────────────────┐                              ┌──────────────────┐
│The digital input │ ───────────────────────────▶│ Refer to Fault 12 │
│ or output device │                              └──────────────────┘
│does not work     │
│   correctly.     │
└─────────────────┘
        ┊
┌─────────────────┐                              ┌──────────────────┐
│The analogue input│ ───────────────────────────▶│ Refer to Fault 13 │
│ or output device │                              └──────────────────┘
│does not work     │
│   correctly.     │
└─────────────────┘
        ┊
┌─────────────────┐                              ┌──────────────────┐
│The IO-Link device│ ───────────────────────────▶│ Refer to Fault 14 │
│ does not work    │                              └──────────────────┘
│   correctly.     │
└─────────────────┘
        ┊
┌─────────────────┐                              ┌──────────────────┐
│ The temperature  │ ───────────────────────────▶│ Refer to Fault 15 │
│measurement unit  │                              └──────────────────┘
│does not work     │
│   correctly.     │
└─────────────────┘
        ┊
        ┊                         ┌────────────────────────────────┐
        ┊ ........................│If the error is not eliminated   │
                                  │even after supplying power,      │
                                  │contact your SMC sales           │
                                  │representative.                  │
                                  └────────────────────────────────┘
```

SMC

•Trouble counter measure method

No.	Part No. EX600-	Problem	Presumed cause	Troubleshooting
1	-	LED is OFF.	Power supply for control and input is OFF.	Check if the power for control and input is supplied.
2	DX#B DX#C# DX#D	Red LED is ON. (Diagnosis is activated)	Input device power supply is short-circuited.	Check the parts with error by using the LED display or unit diagnostic data or web server. Re-wire the short-circuited part or check if the cable and input device are normal.
		Red LED is flashing. (Diagnosis is activated)	(1) ON/OFF count of the input device has exceeded the set value. (2) The wire of the input device is broken or disconnected. (Only EX600-DX#C1)	Check the parts with error by using the LED display or unit diagnostic data or web server. (1) Reset the ON/OFF count to zero or change the set value. Or invalidate diagnosis. (2) Check if the connector is loose and if the wire is broken.
		Red/green all LEDs are flashing.	An internal memory error occurred in the Digital input unit.	Turn OFF the power for the unit and then turn it ON again. If the error is not eliminated, stop the operation and contact SMC.
	DX#E DX#F	Red ST LED is ON. (Diagnosis is activated)	Input device power supply is short-circuited.	Check the parts with error by using the LED display or unit diagnostic data or web server. Re-wire the short-circuited part or check if the cable and input device are normal.
		Red ST LED is flashing. (Diagnosis is activated)	ON/OFF count of the input device has exceeded the set value.	Check the parts with error by using the LED display or unit diagnostic data or web server. Reset the ON/OFF count to zero or change the set value. Or invalidate diagnosis.
		Red/green ST LED is flashing.	An internal memory error occurred in the Digital input unit.	Turn OFF the power for the unit and then turn it ON again. If the error is not eliminated, stop the operation and contact SMC.

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No.	Part No. EX600-	Problem	Presumed cause	Troubleshooting
2	DY#B	Red LED is ON. (Diagnosis is activated)	Output device is short-circuited.	Check the parts with error by using the LED display or unit diagnostic data or web server. Re-wire the short-circuited part or check if the cable and output device are normal.
		Red LED is flashing. (Diagnosis is activated)	(1) ON/OFF count of the output device has exceeded the set value. (2) The wire of the output device is broken or disconnected.	Check the parts with error by using the LED display or unit diagnostic data or web server. (1) Reset the ON/OFF count to zero or change the set value. Or invalidate diagnosis. (2) Check if the connector is loose and if the wire is broken.
		Red/green all LEDs are flashing.	An internal memory error occurred in the Digital output unit.	Turn OFF the power for the unit and then turn it ON again. If the error is not eliminated, stop the operation and contact SMC.
	DY#E DY#F	Red ST LED is ON. (Diagnosis is activated)	Output device is short-circuited.	Check the parts with error by using the LED display or unit diagnostic data or web server. Re-wire the short-circuited part or check if the cable and output device are normal.
		Red ST LED is flashing. (Diagnosis is activated)	(1) ON/OFF count of the output device has exceeded the set value. (2) The wire of the output device is broken or disconnected.	Check the parts with error by using the LED display or unit diagnostic data or web server. (1) Reset the ON/OFF count to zero or change the set value. Or invalidate diagnosis. (2) Check if the connector is loose and if the wire is broken.
		Red/green ST LED is flashing.	An internal memory error occurred in the Digital output unit.	Turn OFF the power for the unit and then turn it ON again. If the error is not eliminated, stop the operation and contact SMC.
	DM#E DM#F	Red ST(I) LED is ON. (Diagnosis is activated)	Input device power supply is short-circuited.	Check the parts with error by using the LED display or unit diagnostic data or web server. Re-wire the short-circuited part or check if the cable and input device are normal.
		Red ST(I) LED is flashing. (Diagnosis is activated)	ON/OFF count of the input device has exceeded the set value.	Check the parts with error by using the LED display or unit diagnostic data or web server. Reset the ON/OFF count to zero or change the set value. Or invalidate diagnosis.
		Red ST(O) LED is ON. (Diagnosis is activated)	Output device is short-circuited.	Check the parts with error by using the LED display or unit diagnostic data or web server. Re-wire the short-circuited part or check if the cable and output device are normal.
		Red ST(O) LED is flashing (Diagnosis is activated)	(1) ON/OFF count of the output device has exceeded the set value. (2) The wire of the output device is broken or disconnected.	Check the parts with error by using the LED display or unit diagnostic data or web server. (1) Reset the ON/OFF count to zero or change the set value. Or invalidate diagnosis. (2) Check if the connector is loose and if the wire is broken.
		Red/green ST LED is flashing.	An internal memory error occurred in the Digital input/ output unit.	Turn OFF the power for the unit and then turn it ON again. If the error is not eliminated, stop the operation and contact SMC.

No.	Part No. EX600-	Problem	Presumed cause	Troubleshooting
3	AXA AXB	Red LED is ON. (Diagnosis is activated)	Analogue input device power supply is short-circuited.	Check the parts with error by using the LED display or unit diagnostic data or web server. Re-wire the short-circuited part, and check if the cable and analogue input device are normal.
		"0" and "1" red LEDs are ON (AXA). "0" to "3" red LEDs are ON (AXB).	Input value has exceeded the upper limit when set to current input type range.	Check the following when the range of the Analogue input unit is set to current input. (1) Set the input value of the analogue input device so that it does not exceed the upper limit. (2) Voltage is input from the analogue input device.Ensure the range of the Analogue input unit matches the range of the analogue input device.
		Red LED is flashing. (Diagnosis is activated)	(1) Input value has exceeded the upper or lower limit of the range. (2) Input value (value set by user) has exceeded the upper or lower limit.	(1) If the input value from the analogue input device exceeds the upper or lower limit of the range, select the appropriate range so that the input value is within the range. Or invalidate diagnosis. (2) If the input value from the analogue input device exceeds the upper or lower limit of the user set value, adjust it so that the input value is within the range of the user set value. Or invalidate diagnosis.
		Red/green all LEDs are flashing.	An internal memory error occurred in the Analogue input unit.	Turn OFF the power for the unit and then turn it ON again. If the error is not eliminated, stop the operation and contact SMC.
	AYA	Red LED is ON. (Diagnosis is activated)	Analogue output device power supply is short-circuited.	Check the parts with error by using the LED display or unit diagnostic data or master. Re-wire the short-circuited part, and check if the cable and analogue output device are normal.
		Red LED is flashing. (Diagnosis is activated)	Output value (value set by user) has exceeded the upper or lower limit.	If the output value from the analogue output device exceeds the upper or lower limit of the user set value, adjust it so that the output value is within the range of the user set value. Or invalidate diagnosis.
		Red/green all LEDs are flashing.	An internal memory error occurred in the Analogue output unit.	Turn OFF the power for the unit and then turn it ON again. If the error is not eliminated, stop the operation and contact SMC.

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No.	Part No. EX600-	Problem	Presumed cause	Troubleshooting
3	AMB	Red LED is ON. (Diagnosis is activated)	Analogue input or output device power supply is short-circuited.	Check the parts with error by using the LED display or unit diagnostic data or web server. Re-wire the short-circuited part, and check if the cable and analogue input or output device are normal.
		"0 and 1" red LEDs are ON.	Input value has exceeded the upper limit when set to current input type range.	Check the following when the range of the Analogue input unit is set to current input. (1) Set the input value of the analogue input device so that it does not exceed the upper limit. (2) Voltage is input from the analogue input device. Ensure the range of the input unit matches the range of the input device.
		Red LED is flashing. (Diagnosis is activated)	(1) Input value has exceeded the upper or lower limit of the range. (2) Input or output value (value set by user) has exceeded the upper or lower limit.	(1) If the input value from the analogue input device exceeds the upper or lower limit of the range, select the appropriate range so that the input value is within the range. Or invalidate diagnosis. (2) If the input (output) value from the analogue input (output) device exceeds the upper or lower limit of the user set value, adjust it so that the input (output) value is within the range of the user set value. Or invalidate diagnosis.
		Red/green all LEDs are flashing.	An internal memory error occurred in the Analogue input/ output unit.	Turn OFF the power for the unit and then turn it ON again. If the error is not eliminated, stop the operation and contact SMC.
4	L#B1	Red LED is ON (C/Q or P24) (When diagnostics is valid)	Short circuit of L + power supply or C/Q terminal or P24.	Check the parts showing an error using the LED display or via the Web server. Re-wire the short-circuited part or check if the cable, IO-Link master device or IO-Link device are normal.
		Red and green LEDs are ON alternately.	An internal memory error has occurred in the IO-Link master unit.	Turn off the power to the unit and then turn it on again. If the error is not eliminated, stop using the product and contact your SMC sales representative.
5	DFB	Red LED is ON.	Short circuit of power supply.	Check the parts showing an error using the LED display, diagnosis data or via the Web server. Re-wire the short-circuited part or check if the cable, the input device are normal.
		Red LED is flashing.	Frequency count value (value set by user) has exceeded the upper or lower limit.	If the frequency count value exceeds the upper or lower limit of the range, adjust it so that the count value is within the range of the user set value.

SMC

No.	Problem	Presumed cause	Troubleshooting
6	Red ST(M) LED is flashing. (Diagnosis is activated)	(1) Valve is short-circuited. (2) Valve is open-circuited. (3) ON/OFF count of the valve has exceeded the set value. (4) Process data mapping fault.	Check the parts with error by using the LED display or unit diagnostic data or master. (1) Check the operation after replacing the valve. (2) Check the operation after replacing the valve. (3) Reset the ON/OFF count to zero or change the set value. Or invalidate diagnosis. (4) The amount of process data size at each port exceeds IO-Link master size. Change process data size at each port or IO-Link master size setting.
7	Red ST(M) LED is ON.	SI unit has failed.	Turn OFF the power for the unit and then turn it ON again. If the error is not eliminated, stop the operation and contact SMC.
7	Red/Green ST(M) LED is flashing alternately.	Connection error between units is detected.	Confirm that there is no loose connection between the units and connect them correctly.
8	Red PWR LED is ON. (Diagnosis is activated)	Power supply voltage for control and input is out of range.	Supply 24 VDC ±10% for control and input power source.
8	Red PWR(V) LED is ON. (Diagnosis is activated)	Power supply voltage for output is out of range.	Supply 24 VDC +10/-5% for output power source.
9	L/A port1 or L/A port2 LEDs are OFF.	LINK has not yet been established.	Check the following and restart. (1) Check if the power is supplied to the PROFINET device one level above.(When L/A port1 LED is OFF.) (2) Check that the connectors of L/A port1 and L/A port2 communication cables are connected and there are no broken wires. (3) Keep noise sources away from the communication cable.
9	L/A port1 or L/A port2 green LED is ON.	LINK is established but data has not been received.	Check the following and restart. (1) Check the master condition and run the master. (2) Check that the communication connector is not loose and there are no broken wires. (3) Keep noise sources away from the communication cable.

No.	Problem	Presumed cause	Troubleshooting
10	MS: Green LED is flashing	(1) Configuration is not correctly. (2) The master is idle state.	(1) Set the configuration properly. Refer to "Hardware Configuration" (page 91) for details. (2) Set the PLC to RUN status.
	MS: Red LED is flashing	Diagnostic error is detected.	Check the LED status and eliminate the error by referring to countermeasure No.2 to 5.
	MS: Red LED is ON.	SI unit failure.	Replace SI unit. If the problem is not solved, stop the operation and contact SMC.
	NS: OFF	IP address is not setting.	Set IP address. Refer to "IP address setting switch" (page 21) for details.
	NS: Green LED is flashing.	EtherNet/IP™ communication is not established.	Check the following and restart. •Signal line is connected from PLC. •The communication speed of PLC and SI unit is appropriate. •Wire the communication line away from the noise source.
	NS: Red LED is flashing.	EtherNet/IP™ communication is time-out.	Check the following, and restart. •Signal line is connected from PLC. •The communication speed of PLC and SI unit is appropriate. •Wire the communication line away from the noise source.
	NS: Red LED is ON.	IP address is duplicated.	Reset IP address which has not been used yet. Refer to "IP address setting switch" (page 21) for details.
11	The valve dose not work correctly.	Program etc. is defective.	Check if the ladder program of master, etc. is correct.
		Power supply for output is out of range.	Check if the green PWR(V) LED of the SI unit is ON. If the LED is off, or the red LED is ON, supply 24 VDC +10/-5% to the power supply for output.
		Connection between SI unit and manifold valve is defective.	Check the connectors between the SI unit and manifold valve are not damaged, such as bent pins, and connect them correctly.

		Polarity of output does not match.	IF the polarity of the SI unit and the valve are different, replace one of them to make the combination match.
			•EX600-SEN7 (PNP output)
			  ⇒ Negative common type valve
			•EX600-SEN8 (NPN output)
			  ⇒ Positive common type valve

		SI unit has failed.	Replace the SI unit with a normal one, and check the operation.
		Valve failure.	Replace the valve with a normal one, and check the operation. Or refer to the troubleshooting of the valve used.

No.	Problem	Presumed cause	Troubleshooting
12	The digital input device does not work correctly.	Polarity of input does not match.	If the polarity (PNP, NPN) of the input unit and the input device are different, replace one of them to make the combination match.
		Power supply for control and input is out of range.	Check if the green PWR LED of the SI unit is ON. If the LED is off, or the red LED is ON, supply 24 VDC ±10% to the power supply for control and input.
		Wiring or connection is defective.	Connect the wiring correctly between the digital input device and the Digital input unit.
		Input unit has failed.	Replace the input unit with a normal one, and check the operation.
		Input device failure.	Replace the input device with a normal one, and check the operation. Or refer to the troubleshooting of the input device used.
	The digital output device does not work correctly.	Polarity of output does not match.	If the polarity (PNP, NPN) of the output unit and the output device are different, replace one of them to make the combination match.
		Power supply for output is out of range.	Check if the green PWR(V) green LED of the SI unit is ON. If the LED is off, or the red LED is ON, supply 24 VDC +10/-5% to the power supply for output.
		Wiring or connection is defective.	Connect the wiring correctly between the digital output device and the Digital output unit.
		Output unit has failed.	Replace the Output unit with a normal one, and check the operation.
		Output device failure.	Replace the output device with a normal one, and check the operation. Or refer to the troubleshooting of the output device used.
		Program etc. is defective.	Check if the ladder program of master, etc. is correct.

No.	Problem	Presumed cause	Troubleshooting
13	The analogue input device does not work correctly.	Power supply for control and input is out of range.	Check if the green PWR green LED of the SI unit is ON. If the LED is off, or the red LED is ON, supply 24 VDC ±10% to the power supply for control and input.
		Analogue input signal range setting failure.	Check the analogue input device specification, and set the input signal range which satisfies the specification.
		Analogue data format does not match.	Check whether the data format of the Analogue input unit is properly set.
		Wiring or connection is defective.	Connect the wiring correctly between the analogue input device and the Analogue input unit.
		Analogue input unit has failed.	Replace the Analogue input unit with a normal one, and check the operation.
		Analogue input device failure.	Replace the analogue input device with a normal one, and check the operation. Or refer to the troubleshooting of the analogue input device used.
	The analogue output device does not work correctly.	Power supply for output is out of range.	Check if the green PWR(V) green LED of the SI unit is ON. If the LED is off, or the red LED is ON, supply 24 VDC +10/-5% to the power supply for output.
		Analogue output signal range setting failure.	Check the analogue output device specification, and set the output signal range which satisfies the specification.
		Analogue data format does not match.	Check whether the data format of the Analogue output unit is properly set.
		Wiring or connection is defective.	Connect the wiring correctly between the analogue output device and the Analogue output unit.
		Analogue output unit has failed.	Replace the Analogue output unit with a normal one, and check the operation.
		Analogue output device failure.	Replace the analogue output device with a normal one, and check the operation. Or refer to the troubleshooting of the analogue output device used.
		Program etc. is defective.	Check if the ladder program of master, etc. is correct.

No.	Problem	Presumed cause	Troubleshooting
14	LED (C/Q) of EX600-L□B1 is flashing green (1Hz).	In IO-Link mode, •IO-Link device disconnected.	Connect the IO-Link device.
	LED (C/Q) of EX600-L□B1 is flashing green (2 Hz).	In IO-Link mode, •Connected IO-Link device matching error. •Data size error. •Data strorage writing error.	•Check the setting of Validation and Backup. •Check the process data of each port of the IO-Link master. When setting the size, it should be more than that of the IO-Link device connected. •Perform writing of the data storage once again.
	LED (C/Q) of the EX600-L□B1 is OFF or turned ON orange.	Port setting is not in the IO-Link communication mode.	For IO-Link communication, set the IO-Link port operation mode to "IOL_Manual" or "IOL_AutoStart".
	IO-Link device operation error.	Power supply for control and input is out of range.	Check if the Power LED of the SI unit is turned ON in green. If the LED is OFF or the red LED is ON, supply 24 VDC ±10 % to the power supply for control and input.
		Power supply for output is out of range.	Check if the P24_LED of EX600-LBB1 is turned ON green. If the LED is OFF, supply 24 VDC ± 5% to the power supply for output.
		Wiring or connection is defective.	Connect the IO-Link master port and IO-Link device correctly.
		IO-Link device failure.	Replace the IO-Link device and check the operation. Or, refer to the troubleshooting of the IO-Link device used.
		IO-Link master failure.	Replace the IO-Link master and check the operation.
		Program etc. is defective.	•Check that the ladder logic program works correctly. •Check if the process data mapping setting in the unit parameter of IO-Link master is as you intended. See IO map example (page 84) •Check if the byte swap of process data in the unit parameter of IO-Link master is as you intended.
15	Temperature measurement device operation error.	Wiring or connection is defective.	Connect the temperature measurement unit and the temperature sensor correctly.
		Temperature measurement unit failure.	Replace the temperature measurement unit and check the operation.
		Temperature sensor failure.	Replace the temperature sensor and check the operation. Or, refer to the troubleshooting of the temperature sensor used.
		Program etc. is defective.	Check if the ladder program of master, etc. is correct.

SMC

No.EX※※-OMZ0024

Parameter Setting

The EX600 parameters can be configured for the system, each unit and each channel. Parameters can be changed by Web server, EtherNet/IP™ Object or Configuration assenbly.

■Parameter definition and setting

With EX600 series, parameters can be set for each unit.
The table below shows settable parameters for the SI unit and input/output units.

•System parameters

No.	Parameter	Definition	Item	Content	Default setting
1	Hold/Clear priority setting	Switch the setting of the output during communication error or communication idling to follow the setting of the SI unit or the parameters.	Via switch	Setting by SI unit switch becomes valid. OFF/Hold can be set output of all.	○
			Via software	Setting by EtherNet/IP™ object or the Web server becomes valid. OFF/Hold/Forced ON can be set per channel.	
2	Byte order of analogue values	Switch the byte sequence with which the analogue values are transferred to the controller.	LSB-MSB	The data format of all analogue units is assumed to be LSB-MSB.	○
			MSB-LSB	The data format of all analogue units is assumed to be MSB-LSB.	

• SI unit parameters (1)

No.	Parameter	Definition	Item	Content	Default setting	Parameter setting range
1	Power supply for control and input voltage monitor	Generated error when control and input power supply voltage goes under approx. 19 V.	Enable	Generates an error.	○	Unit
			Disable	Does not generate an error.		
2	Power supply for output voltage monitor	Generated error when output power supply voltage goes under approx. 19 V.	Enable	Generates an error.		Unit
			Disable	Does not generate an error.	○	
3	Short Circuit Detection	Generates error when the short circuit of the valve is detected.	Enable	Generates an error.	○	Unit
			Disable	Does not generate an error.		
4	Restart after short circuit	Restore the setting of short circuit detection error after the valve short circuit is cleared.	Auto	Error is automatically cleared when the short circuit is fixed.	○	Unit
			Manual	Even when the short circuit is fixed, error is not cleared until the power is supplied again.		
5	Open Circuit Detection	Generates error when the disconnection of the valve is detected.	Enable	Generates an error.		Channel
			Disable	Does not generate an error.	○	
6	Output setting during communication fault *1	Sets output when communication error is occurred.	Clear	Turn off the output	○	Channel
			Hold	Hold the output		
			ForceON	Turn on the output forcefully		
7	Output setting during communication idling *1 *2	Output setting at the time of communication idling	Clear	Turn off the output	○	Channel
			Hold	Hold the output		
			ForceON	Turn on the output forcefully		

• SI unit parameters (2)

No.	Parameter	Definition	Item	Content	Default setting	Parameter setting range
8	Valve ON/OFF counter	Generates error when the operation count exceeds the set value. *3	Enable	Generates an error. Val: 1 to 65000 *4		Channel
			Disable	Does not generate an error.	○	
9	Valve ON/OFF counter clear	Clears the valve ON/OFF counter to 0.	-	-	-	-
10	PORT1 port setting	Sets the communication speed and communication method of PORT1.	Auto	Selects the required communication speed and communication method	○	Unit
			10 HDX			
			10 FDX			
			100 HDX			
			100 FDX			
11	PORT2 port setting	Sets the communication speed and communication method of PORT2.	Auto	Selects the required communication speed and communication method.	○	Unit
			10 HDX			
			10 FDX			
			100 HDX			
			100 FDX			

*1: This function is valid only when "Hold/Clear priority" of the system parameter is set to "Via software".

*2: Some PLC does not support an idle mode.

*3: The count is memorized every hour. When the power supply is turned on again, counting starts from the last value memorized.

*4: Times for setting is set value x1000 times.

•Digital input unit parameters

No.	Parameter	Definition	Item	Content	Default setting	Parameter setting range
1	The power supply short circuit detection for control and input	Generates error when the short circuit of the power supply for the input device is detected.	Enable	Generates an error.	○	Unit
			Disable	Does not generate an error.		
2	Open circuit detection *1	Generates error when the disconnection of the input device is detected. *2	Enable	Generates an error.		Channel
			Disable	Does not generate an error.	○	
3	Inrush current filter	Selects the over current detection for 100 msec after supplying power.	Enable	Ignores inrush current.		Unit
			Disable	Does not ignore inrush current.	○	
4	Input filtering time	Sets the time to ignore the input signal change.	0.1 ms	Selects the time for filtering.	1.0 ms	Unit
			1.0 ms			
			10 ms			
			20 ms			
5	Input extension time	Sets the time to hold the input signal.	1.0ms	Selects the time to hold the input signal.	15 ms	Unit
			15 ms			
			100 ms			
			200 ms			
6	Input ON/OFF counter	Generates error when the operation count exceeds the set value. *3	Enable	Generates an error. Val: 1 to 65000 *4		Channel
			Disable	Does not generate an error.	○	
7	Input ON/OFF counter clear	Clears the Input ON/OFF counter to 0.	-	-	-	-

*1: Disconnection detection is a function only available for digital unit (EX600-DXPC1, EX600-DXNC1) with disconnection detection.

*2: 2-wire type input equipment cannot be correctly detected if its leakage current is 0.5 mA or less while the equipment is in the OFF state (reed sensor, etc.).
Ensure that all input equipment used has a leakage current above 0.5 mA in the OFF state.
3-wire type input equipment cannot be correctly detected if its current consumption is 0.5 mA or less.
The open circuit of input signals cannot be detected.

*3: The count is memorized every hour. When the power supply is turned on again, counting starts from the last value memorized.

*4: Times for setting is set value x1000 times.

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•Digital output unit parameters

No.	Parameter	Definition	Item	Content	Default setting	Parameter setting range
1	Output load short circuit detection	Generates error when the short circuit of the output device is detected. *1	Enable	Generates an error.	○	Unit
			Disable	Does not generate an error.		
2	Restart after output load short circuit	Restore the setting of short circuit detection error after the output device short circuit is cleared.	Auto	Error is automatically cleared when the short circuit is fixed.	○	Unit
			Manual	Even when the short circuit is fixed, error is not cleared until the power is supplied again.		
3	Open circuit detection	Generates error when the disconnection of the output device is detected.	Enable	Generates an error.		Channel
			Disable	Does not generate an error.	○	
4	Output setting during communication fault *2	Sets output when communication error is occurred.	Clear	Turn off the output	○	Channel
			Hold	Hold the output		
			ForceON	Turn on the output forcefully		
5	Output setting during communication idling *2 *3	Sets output during communication idling.	Clear	Turn off the output	○	Channel
			Hold	Hold the output		
			ForceON	Turn on the output forcefully		
6	Output ON/OFF counter	Generates error when the operation count exceeds the set value. *4	Enable	Generates an error. Val: 1 to 65000 *5		Channel
			Disable	Does not generate an error.	○	
7	Output ON/OFF counter clear	Clears the Output ON/OFF counter to 0.	-	-	-	-

∗1: Could be incorrectly recognized as short circuit depending on used load (ex.: lamp load). If detection is incorrect, disable the parameter setting.

∗2: This function is valid only when "Hold/Clear priority" of the system parameter is set to "Via software".

∗3: Some PLC does not support an idle mode.

∗4: The count is memorized every hour. When the power supply is turned on again, counting starts from the last value memorized.

∗5: Times for setting is set value x1000 times.

•Digital I/O unit parameters (1)

No.	Parameter	Definition	Item	Content	Default setting	Parameter setting range
1	The power supply short circuit detection for control and input	Generates error when the short circuit of the control or input power supply is detected.	Enable	Generates an error.	○	Unit
			Disable	Does not generate an error.		
2	Inrush current filter	Select the over current detection for 100 msec after supplying power.	Enable	Ignores inrush current.		Unit
			Disable	Does not ignore inrush current.	○	
3	Input filtering time	Sets the time to ignore the input signal change.	0.1 ms	Selects the time for filtering.	1.0 ms	Unit
			1.0 ms			
			10 ms			
			20 ms			
4	Input extension time	Sets the time to hold the input signal.	1.0 ms	Selects the time to hold the input signal.	15 ms	Unit
			15 ms			
			100 ms			
			200 ms			
5	Output load short circuit detection	Generates error when the short circuit of the output device is detected. *1	Enable	Generates an error.	○	Unit
			Disable	Does not generate an error.		
6	Restart after output load short circuit	Restore the setting of short circuit detection error after the output device short circuit is cleared.	Auto	Error is automatically cleared when the short circuit is fixed.	○	Unit
			Manual	Even when the short circuit is fixed, error is not cleared until the power is supplied again.		
7	Open circuit detection	Generates error when the disconnection of the output device is detected.	Enable	Generates an error.		Channel
			Disable	Does not generate an error.	○	
8	Output setting during communication fault *2	Sets output when Communication error is occurred.	Clear	Turn off the output	○	Channel
			Hold	Hold the output		
			ForceON	Turn on the output forcefully		
9	Output setting for communication idling *2 *3	Sets output during communication idling.	Clear	Turn off the output	○	Channel
			Hold	Hold the output		
			ForceON	Turn on the output forcefully		

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•Digital I/O unit parameters (2)

No.	Parameter	Definition	Item	Content	Default setting	Parameter setting range
10	Input or Output ON/OFF counter	Generates error when the operation count exceeds the set value. *4	Enable	Generates an error. Val: 1 to 65000 *5		Channel
			Disable	Does not generate an error.	○	
11	Input or Output ON/OFF counter clear	Clears the Input or Output ON/OFF counter to 0.	-	-	-	-

∗1: Could be incorrectly recognized as short circuit depending on used load (ex.: lamp load). If detection is incorrect, disable the parameter setting.

∗2: This function is valid only when "Hold/Clear priority" of the system parameter is set to "Via software".

∗3: Some PLC does not support an idle mode.

∗4: The count is memorized every hour. When the power supply is turned on again, counting starts from the last value memorized.

∗5: Times for setting is set value x1000 times.

•Analogue input unit parameters

No.	Parameter	Definition	Item	Content	Default setting	Parameter setting range
1	The power supply short circuit detection for the input device	Generates error when the short circuit of the power supply for the input device is detected.	Enable	Generates an error.	○	Unit
			Disable	Does not generate an error.		
2	Analogue input range	Sets the analogue input device range.	-10..10 V	Selects the analogue input range. (AXB: Cannot select -10..10 V/-5..5 V/ -20..20 mA)	-10..10 V (AXA) 1..5 V (AXB)	Channel
			-5..5 V			
			-20..20 mA			
			0..10 V			
			0..5 V			
			1..5 V			
			0..20 mA			
			4..20 mA			
3	Analogue data format	Sets analogue data type which is output to PLC.	Offset binary	Offset binary.	○	Unit
			Sign & Magnitude	Signed binary.		
			2s complement	2's complement.		
			Scaled	Scale conversion type (Only for AXB)		
4	Analogue average filter	Sets analogue filtering time.	None	None		Channel
			2AVG	2 value average	○	
			4AVG	4 value average		
			8AVG	8 value average		
5	Over range detection	Generates error when the input value exceeds 0.5% of full span.	Enable	Generates an error.	○	Unit
			Disable	Does not generate an error.		
6	Under range detection	Generates error when the input value falls below 0.5% of full span.	Enable	Generates an error.	○	Unit
			Disable	Does not generate an error.		
7	User setting value upper limit error	Generates error when the input value exceeds the set value.	Enable	Generates an error. [1]		Channel
			Disable	Does not generate an error.	○	
8	User setting value lower limit error	Generates error when the input value falls below the set value.	Enable	Generates an error. [1]		Channel
			Disable	Does not generate an error.	○	

∗1: Set value shall be set per analogue input range within settable range in the table below.
  When the analogue input range is changed, check the set value and change it to an appropriate value.

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Table. Settable range of user set value

Range	Settable value range	
	Lower limit	Upper limit
-10..+10 V	-10.50 to +10.45 V	-10.45 to +10.50 V
-5..+5 V	-5.25 to +5.22 V	-5.22 to +5.25 V
-20..+20 mA	-21.00 to +20.90 mA	-20.90 to +21.00 mA
0..10 V	0.00 to +10.45 V	+0.05 to +10.50 V
0..5 V	0.00 to +5.22 V	+0.03 to +5.25 V
1..5 V	+0.75 to +5.22 V	+0.78 to +5.25 V
0..20 mA	0.00 to +20.90 mA	+0.10 to +21.00 mA
4..20 mA	+3.00 to +20.90 mA	+3.10 to +21.00 mA

Correspondence table for user set upper or lower limit

Range	Via E.O. [1]	Via W.S. [2]	Expected value
-10..+10 V	0 to 1050 32768 to 33818	0 to 1050 -0 to -1050	+0.00 to +10.50 V -0.00 to -10.50 V
-5..+5 V	0 to 525 32768 to 33293	0 to 525 -0 to -525	+0.00 to +5.25 V -0.00 to -5.25 V
-20..+20 mA	0 to 2100 32768 to 34868	0 to 2100 -0 to -2100	+0.00 to +21.00 mA -0.00 to -21.00 mA
0..10 V	0 to 1050	0 to 1050	+0.00 to +10.50 V
0..5 V	0 to 525	0 to 525	+0.00 to +5.25 V
1..5 V	75 to 525	75 to 525	+0.75 to +5.25 V
0..20 mA	0 to 2100	0 to 2100	+0.00 to +21.00 mA
4..20 mA	300 to 2100	300 to 2100	+3.00 to +21.00 mA

∗1: Follow the methods below when assigning the user set upper and lower limit by E.O.
  •Assigning positive value: Input the required data x 100 in decimal system.
   Example: +10.50 V is assigned --- Assign 10.50 x 100 = 1050 by E.O.
  •Assigning negative value: Convert the absolute value x 100 to be assigned in 16bit binary. Then, change the most significant bit to "1" before inputting.
   Example: -10.50 V is assigned --- Assign 10.50 x 100 = 1050 → 10000011010b → 1000010000011010b → 33818 by E.O.

∗2: When assigning the user set upper and lower limit by W.S., input the required data x 100 in decimal system.

•Analogue output unit parameters (1)

No.	Parameter	Definition	Item	Content	Default setting	Parameter setting range
1	The power supply short circuit detection for the output device	Generates error when the short circuit of the output device is detected.	Enable	Generates an error.	O	Unit
			Disable	Does not generate an error.		
2	Analogue output range	Sets the range of the analogue output device.	0..10 V	Selects the analogue output range.	0..10 V	Channel
			0..5 V			
			1..5 V			
			0..20 mA			
			4..20 mA			
3	Analogue data format	Sets analogue data type which is output to PLC.	Offset binary	Offset binary.	O	Unit
			Sign & Magnitude	Signed binary.		
			2s complement	2's complement.		
			Scaled	Scale conversion type.		
4	User setting value upper limit error	Generates error when the output value exceeds the set value.	Enable	Generates an error. [1]		Channel
			Disable	Does not generate an error.	O	
	Scale upper limit setting	Sets the scale upper limit. Generates error when the output value exceeds the upper limit.	Enable	Generates an error. Val: -32766 to 32767		
			Disable	Does not generate an error. Val: -32766 to 32767	O Val: 1000	
5	User setting value lower limit error	Generates error when the output value falls bellow the set value.	Enable	Generates an error. [1]		Channel
			Disable	Does not generate an error.	O	
	Scale lower limit setting	Sets the scale lower limit. Generates error when the output value falls below the lower limit.	Enable	Generates an error. Val: -32767 to 32766		
			Disable	Does not generate an error. Val: -32767 to 32766	O Val: 0	
6	Output setting for communication error [2]	Sets output when communication error is occurred.	Enable	Output will be user fault value. [1]		Channel
			Disable	Output will be held last state.	O	

• Analogue output unit parameters (2)

No.	Parameter	Definition	Item	Content	Default setting	Parameter setting range
7	Output setting for communication idling *2 *3	Sets output during communication idling.	Enable	Output will be user idle value. *1		Channel
			Disable	Output will be held last state.	○	

∗1: Set value shall be set per analogue input range within settable range in the table below.

　　When the analogue input range is changed, check the set value and change it to an appropriate value.

∗2: This function is valid only when "Hold/Clear priority" of the system parameter is set to "Via software".

∗3: Some PLC does not support an idle mode.

Settable range for user set upper or lower limit and output value at communication error and idling

Range	Settable range for user set upper or lower limit		Settable range for output value at communication error and idling
	Lower limit	Upper limit	
0..10 V	0.00 to +10.45 V	+0.05 to +10.50 V	0.00 to +10.50 V
0..5 V	0.00 to +5.22 V	+0.03 to +5.25 V	0.00 to +5.25 V
1..5 V	+0.75 to +5.22 V	+0.78 to +5.25 V	+0.75 to +5.25 V
0..20 mA	0.00 to +20.90 mA	+0.10 to +21.00 mA	0.00 to +21.00 mA
4..20 mA	+3.00 to +20.90 mA	+3.10 to +21.00 mA	+3.00 to +21.00 mA

Correspondence table for user set upper or lower limit and output value at communication error and idling (E.O./W.S.)
(Data format: other than scale conversion format)

Range	Set value (Offset Binary Signed Magnitude 2's Complement)	Expected value
0..10 V	0 to 1050	0.00 to +10.50 V
0..5 V	0 to 525	0.00 to +5.25 V
1..5 V	75 to 525	+0.75 to +5.25 V
0..20 mA	0 to 2100	0.00 to +21.00 mA
4..20 mA	300 to 2100	+3.00 to +21.00 mA

∗: When the data format is a type other than scale conversion, input the desired voltage or current x 100 in decimal system.

∗: If the data format is scaled data format, set the data as follows, regardless of the range setting.

Correspondence table for user set upper or lower limit and output value at communication error and idling (E.O./W.S.)
(Data format: scale conversion format)

E.O. set value	W.S. set value	Expected value
0 to 32767	0 to 32767	+0 to +32767
32768 to 65535	-0 to -32767	-0 to -32767

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Scaled data format
Function to set any value between "-32767 to 32767" as the AD value for output signal range. Resolution is determined by specifying the upper and lower scale limit.

$$\text{Resolution} = \frac{\text{Upper limit value of the range} - \text{Lower limit value of the range}}{\text{Upper limit value of the scale} - \text{Lower limit value of the scale}}$$

Example: when the range is 1 to 5 V output
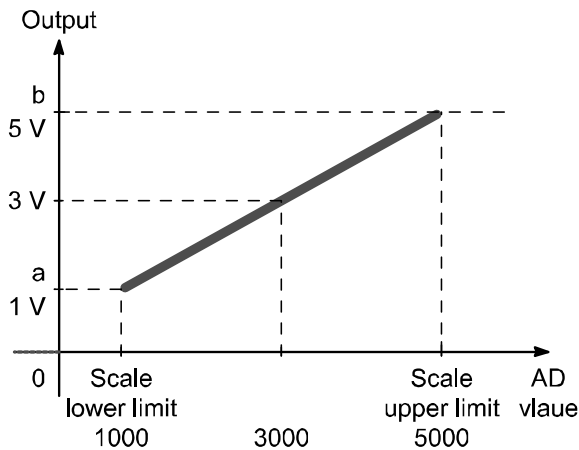
(1) Set the range to 1 to 5 V.
(2) When the upper limit of the scale is set to 5000, and the lower limit of the scale is set to 1000, the result will be as follows.
   1000···1 V output
   2000···2 V output
   3000···3 V output
   4000···4 V output
   5000···5 V output
(3) The resolution from 1 to 5 V is 1/1000 based on the calculation.
   (5 V – 1 V) / (5000 – 1000) = 1/1000

Scale set value (AD value)		Output signal range (a to b)				
	Decimal number	Voltage [V]			Current [mA]	
		0 to 10	1 to 5	0 to 5	0 to 20	4 to 20
Scale upper limit	-32766 to 32767	10	5	5	20	20
Scale lower limit	-32767 to 32766	0	1	0	0	4

∗: If the data format is scaled data format, set the data as follows, regardless of the range setting.

Correspondence table for scale upper or lower limit and output value at communication error and idling (E.O./W.S.)
(Data format: scale conversion format)

E.O. set value	W.S. set value	Expected value
0 to 32767	0 to 32767	+0 to +32767
32768 to 65535	-0 to -32767	-0 to -32767

Example: To set the Fault Value to 4 V when the range is 1 to 5 V (analogue output range), scale upper limit 5000, and scale lower limit 1000, set 4000 to Fault Value using the PLC.

• Analogue I/O unit parameters (1)

No.	Parameter	Definition	Item	Content	Default setting	Parameter setting range
1	The power supply short circuit detection for the input or output device	Generates error when the short circuit of the input device power supply or output device is detected.	Enable	Generates an error.	○	Unit
			Disable	Does not generate an error.		
2	Analogue input or output range	Sets the analogue input or output range.	0..10 V	Select the analogue input or output range.	1..5 V	Channel
			0..5 V			
			1..5 V			
			0..20 mA			
			4..20 mA			
3	Analogue data format	Sets analogue data type which is output to PLC.	Offset binary	Offset binary.	○	Unit
			Sign & Magnitude	Signed binary.		
			2s complement	2's complement.		
			Scaled	Scale conversion type.		
4	Analogue average filter	Sets analogue input filtering time.	None	None		Channel
			2AVG	2 value average	○	
			4AVG	4 value average		
			8AVG	8 value average		
5	Over range detection	Generates error when the input value exceeds 0.5% of full span.	Enable	Generates an error.		Unit
			Disable	Does not generate an error.	○	
6	Under range detection	Generates error when the input value falls below 0.5% of full span.	Enable	Generates an error.		Unit
			Disable	Does not generate an error.	○	
7	User's set value upper limit error	Generates error when the input or output value exceeds the set value.	Enable	Generates an error. [1]		Channel
			Disable	Does not generate an error.	○	
	Scale upper limit setting	Sets the scale upper limit. Generates error when the input or output value exceeds the upper limit.	Enable	Generates an error. Val: -32766 to 32767		
			Disable	Does not generated an error. Val: -32766 to 32767	○ Val: 1000	

•Analogue I/O unit parameters (2)

No.	Parameter	Definition	Item	Content	Default setting	Parameter setting range
8	User's set value lower limit error	Generates error when the input or output value falls below the lower limit.	Enable	Generates an error. *1		Channel
			Disable	Does not generate an error.	○	
	Scale lower limit setting	Sets the scale lower limit. Generates error when the input or output value falls below the lower limit.	Enable	Generates an error. Val: -32767 to 32766		
			Disable	Does not generate an error. Val: -32767 to 32766	○ Val: 0	
9	Output setting for communication fault *2	Sets output when communication error is occurred.	Enable	Output will be user fault value. *1		Channel
			Disable	Output will be held last state.	○	
10	Output setting for communication idling *2 *3	Sets output during communication idling.	Enable	Output will be user idle value. *1		Channel
			Disable	Output will be held last state.	○	

∗1: Set value shall be set per analogue output range within settable range in the table below.
   When the analogue output range is changed, check the set value and change it to an appropriate value.

∗2: This function is valid only when "Hold/Clear priority" of the system parameter is set to "Via software".

∗3: Some PLC does not support an idle mode.

Settable range for user set upper or lower limit and output value at communication error and idling

Range	Settable range for user set upper or lower limit		Settable range for output value at communication error and idling
	Lower limit	Upper limit	
0..10 V	0.00 to +10.45 V	+0.05 to +10.50 V	0.00 to +10.50 V
0..5 V	0.00 to +5.22 V	+0.03 to +5.25 V	0.00 to +5.25 V
1..5 V	+0.75 to +5.22 V	+0.78 to +5.25 V	+0.75 to +5.25 V
0..20 mA	0.00 to +20.90 mA	+0.10 to +21.00 mA	0.00 to +21.00 mA
4..20 mA	+3.00 to +20.90 mA	+3.10 to +21.00 mA	+3.00 to +21.00 mA

Correspondence table for user set upper or lower limit and output value at communication error and idling (E.O./W.S.)
(Data format: other than scale conversion format)

Range	Value (Offset Binary Signed Magnitude 2's Complement)	Expected value
0..10 V	0 to 1050	0.00 to +10.50 V
0..5 V	0 to 525	0.00 to +5.25 V
1..5 V	75 to 525	+0.75 to +5.25 V
0..20 mA	0 to 2100	0.00 to +21.00 mA
4..20 mA	300 to 2100	+3.00 to +21.00 mA

∗: When the data format is a type other than scale conversion, input the required voltage or current x 100 in decimal system.

∗: If the data format is scaled data format, set the data as follows, regardless of the range setting.

Correspondence table for user set upper or lower limit and output value at communication error and idling (E.O./W.S.)
(Data format: scale conversion format)

E.O. set value	W.S. set value	Expected value
0 to 32767	0 to 32767	+0 to +32767
32768 to 65535	-0 to -32767	-0 to -32767

Scaled data format
Function to set any value between "-32767 to 32767" as the AD value for I/O signal range. Resolution is determined by specifying the upper and lower scale limit.

$$\text{Resolution} = \frac{\text{Upper limit value of the range} - \text{Lower limit value of the range}}{\text{Upper limit value of the scale} - \text{Lower limit value of the scale}}$$

Example: when the range is 1 to 5 V output
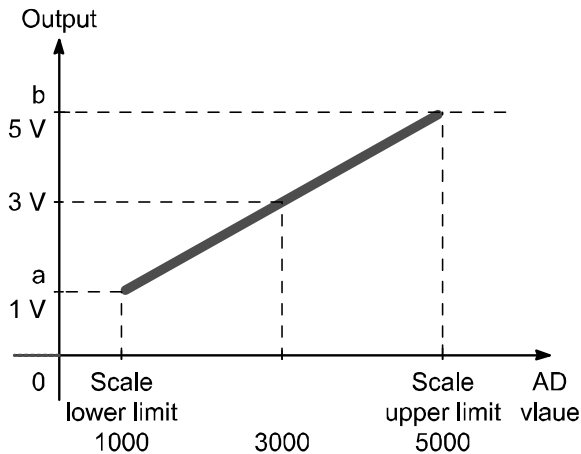
(1) Set the range to 1 to 5 V.
(2) When the upper limit of the scale is set to 5000, and the lower limit of the scale is set to 1000, the result will be as follows.
   1000···1 V output
   2000···2 V output
   3000···3 V output
   4000···4 V output
   5000···5 V output
(3) The resolution from 1 to 5 V is 1/1000 based on the calculation.
   (5 V – 1 V) / (5000 – 1000) = 1/1000

Scale set value (AD value)		Input/Output signal range (a to b)				
	Decimal number	Voltage [V]			Current [mA]	
		0 to 10	1 to 5	0 to 5	0 to 20	4 to 20
Scale upper limit	-32766 to 32767	10	5	5	20	20
Scale lower limit	-32767 to 32766	0	1	0	0	4

∗: If the data format is scaled data format, set the data as follows, regardless of the range setting.

Correspondence table for scale upper or lower limit and output value at communication error and idling (E.O./W.S.)
(Data format: scale conversion format)

E.O. set value	W.S. set value	Expected value
0 to 32767	0 to 32767	+0 to +32767
32768 to 65535	-0 to -32767	-0 to -32767

Example: To set the Fault Value to 4 V when the range is 1 to 5 V (analogue output range), scale upper limit 5000, and scale lower limit 1000, set 4000 to Fault Value using the PLC.

•Frequency count unit parameters

No.	Parameter	Definition	Item	Content	Default setting	Parameter setting range
1	The power supply for control and input short circuit detection	Generates error when the short circuit of the power supply for for control and input is detected.	Enable	Generates an error.	○	Unit
			Disable	Does not generate an error.		
2	Filter	Sets filtering time for the frequency count value.	None	None		Unit
			2AVG	2 value average	○	
			4AVG	4 value average		
			8AVG	8 value average		
3	User setting value upper limit error	Generates error when the frequency count value exceeds the set value.	Enable	Generates an error. Val: 0 to 65535	○ Val:65000 *5	Channel
			Disable	Does not generate an error.		
4	User setting value lower limit error	Generates error when the frequency count value falls below the set value.	Enable	Generates an error. Val: 0 to 65535	○ Val:0 *5	Channel
			Disable	Does not generate an error.		
5	Cutoff frequency	The frequency data is set to zero when the frequency count value falls below the set value.	Cutoff frequency value	Val:0 to 10000	20 ※5	Channel

*5: Frequency for setting is set value x 0.1 Hz.

•Temperature measurement unit parameters.

No.	Parameter	Definition	Item	Content	Default setting	Parameter setting range
1	Data format	Sets data type which is output to PLC.	Signed Magnitude	Signed binary.		Unit
			2s complement	2's complement.	○	
2	Temperature unit.	Sets unit of temperature display.	C	Celsius	○	Unit
			F	Fahrenheit		
3	Number of wires	Sets the number of wires in resistance temperature detector (sensor).	2-wire RTD	2-wire RTD		Channel
			3-wire RTD	3-wire RTD	○	
			4-wire RTD	4-wire RTD		
4	Average filter time.	Sets average filtering time.	None	None	○	Channel
			2AVG	2 value average		
			4AVG	4 value average		
			8AVG	8 value average		

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•IO-Link master unit parameters (1)

No.	Parameter	Definition	Item	Content	Default setting	Parameter setting range
1	Process Data Mapping	Define the process data size of each port of the IO-Link master, which is occupied by the EtherNet/IP communication.	2/2/2/2 byte	I/O size of port 1 to 4: 2 byte/2 byte for each	○	Unit
			4/4/4/4 byte	I/O size of port 1 to 4: 4 byte/4 byte for each		
			8/8/8/8 byte	I/O size of port 1 to 4: 8 byte/8 byte for each		
			16/16/2/2 byte	I/O size of port 1 and 2: 16 byte/16 byte for each I/O size of port 3 and 4: 2 byte/2 byte for each		
			32/2/2/2 byte	I/O size of port 1: 32 byte/32 byte each I/O size of port 2 to 4: 2 byte/2 byte for each		
			16/16/8/8 byte	I/O size of port 1 and 2: 16 byte/16 byte for each I/O size of port 3 and 4: 8 byte/8 byte for each		
			16/16/16/16 byte	I/O size of port 1 to 4: 16 byte/16 byte for each		
			24/24/8/8 byte	I/O size of port 1 and 2: 24 byte/24 byte for each I/O size of port 3 and 4: 8 byte/8 byte for each		
			24/24/24/24 byte	I/O size of port 1 to 4: 24 byte/24 byte for each		
			32/32/8/8 byte	I/O size of port 1 and 2: 32 byte/32 byte for each I/O size of port 3 and 4: 8 byte/8 byte for each		
			32/32/32/32 byte	I/O size of port 1 to 4: 32 byte/32 byte for each		
2	InOut Byte Swap [1]	Swap the byte order of the process data, which is sent and received between EtherNet/IP communication and IO-Link master.	direct	Data order is not swapped.	○	Unit
			swap 16 bit	Swap in the word unit.		
			swap 32 bit	Swap in the double word unit.		
			swap All	Swap all bytes.		

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No.EX※※-OMZ0024

•IO-Link master unit parameters (2)

No.	Parameter	Definition	Item	Content	Default setting	Parameter setting range
3	Short Circuit Monitor	Either of the following detects the short-circuit, diagnostics is generated. •L+ power supply •C/Q signal •P24 power supply	Enable	Diagnostics is generated.	○	Unit
			Disable	Diagnostics is not generated.		
4	Output setting during Communication Fault (IO-Link) [2]	Set the IO-Link communication process data output when the EtherNet/IP communication error is occurred.	Clear/ PD Out valid	All outputs are turned OFF while maintaining the process data output valid.		Unit
			Hold	Maintain the process data output that the IO-Link master finally receives while maintaining the process data output valid.		
			Clear/ PD Out invalid	All outputs are turned OFF while maintaining the process data output invalid.	○	
5	Output setting during Communication Fault (DO_C/Q) [2]	Set the digital output signal when an EtherNet/IP communication error is occurred.	Clear	Turn OFF the digital output.	○	Unit
			Hold	Maintain the digital output that the IO-Link master finally receives.		
			Force ON	Turn ON the digital output.		
6	Output setting during Communication Idle (IO-Link) [2]	Set the IO-Link communication process data output when the EtherNet/IP communication is idling.	Clear/ PD Out valid	All outputs are turned OFF while maintaining the process data output valid.		Unit
			Hold	Maintain the process data output that the IO-Link master finally receives while maintaining the process data output valid.		
			Clear/ PD Out invalid	All outputs are turned OFF while maintaining the process data output invalid.	○	

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•IO-Link master unit parameters (3)

No.	Parameter	Definition	Item	Content	Default setting	Parameter setting range
7	Output setting during Communication Idle (DO_C/Q) [*2]	Set the digital output signal when EtherNet/IP communication is idling.	Clear	Turn OFF the digital output.	○	Unit
			Hold	Maintain the digital output that the IO-Link master finally receives.		
			Force ON	Turn ON the digital output.		
8	PortMode	Set the operation mode of each port.	Deactivated	Deactivate the port.	○	Channel
			IOL_Manual	Start-up IO-LINK communication based on the IO-Link device comparison function.		
			IOL_Autostart	Start up the IO-Link communication instead of comparing IO-Link device.		
			DI_C/Q	Digital input only.		
			DO_C/Q	Digital output only.		
9	Validation & Backup [*3]	Set the function of the comparison function (comparison of vendor ID and device ID) of the connected device and data storage (DS).	No Device Check	Comparison function: invalid DS function: invalid	○	Channel
			Type compatible Device V1.0	Connected device: V1.0 Comparison function: valid DS function: invalid		
			Type compatible Device V1.1	Connected device: V1.1 Comparison function: valid DS function: invalid		
			Type compatible Device V1.1, Backup + Restore	Connected device: V1.1 Comparison function: valid DS function: Valid (Backup & restore)		
			Type compatible Device V1.1, Restore	Connected device: V1.1 Comparison function: valid DS function: valid (for restore only)		

•IO-Link master unit parameters (4)

No.	Parameter	Definition	Item	Content	Default setting	Parameter setting range
10	PortCycle Time	Set the IO-Link device and communication cycle time in the following range. 0.4-6.3 ms (by 0.1 ms) 6.4-31.6 ms (by 0.4 ms) 32-132.8 ms (by 1.6 ms)	0 to 255	0: Automatic setting 1 to 255: 0.4 to 132.8 ms	0	Channel
11	VendorID	Set the vendor ID which is compared when the IO-Link device comparison function is valid.	0x0001 to 0xFFFF	Set the vendor ID of the device to be connected.	0x0001	Channel
12	DeviceID	Set the device ID which is compared when the IO-Link device comparison function is valid.	0x000001 to 0xFFFFFF	Set the device ID of the device to be connected.	0x000001	Channel

∗1: The available byte swap parameters vary depending on the process data of the device to be connected. Refer to I/O byte swap function (page 77) for details.

∗2: Refer to Output setting / IO-LINK communication mode when the EtherNet/IP communication error is generated or idling (page 77) for difference in operation of the connected device due to difference in setting.

∗3: Valid when the IO-Link port operation mode is in "IOL_Manual".

Output setting / IO-LINK communication mode when the EtherNet/IP communication error is generated or idling

When the EtherNet/IP communication is abnormal or idling, the connected device will operate as follows based on the IO-Link master setting.

IO-Link master setting (Output setting when master communication is abnormal or is idling)		Operation of the connected device
Setting item	Details	
Clear/PD Out valid	All outputs are turned OFF while maintaining the process data output valid.	Output is cleared.
Hold	Maintain the process data output that the IO-Link master finally receives from the master while maintaining the process data output valid.	Output is held.
Clear/PD Out invalid	All outputs are turned OFF while maintaining the process data output invalid.	Based on the output setting function when the IO-Link communication error is generated.

I/O byte swap function

•Data construction in each setting
The data construction of each parameter of the byte swap function is as follows based on the connected device process data size and the mapping size of the master communication process data.

When the process data size of the connected device and mapping size of the master communication process data are identical
(E.g.: connected device process data size: 8-byte, mapping size: 8-byte)

Parameter	Data construction
direct	0x0123 4567 89AB CDEF
swap	0x2301 6745 AB89 EFCD
swap 32 bit	0x6745 2301 EFCD AB89
swap All	0xEFCD AB89 6745 2301

∗: When the mapping size is 2-byte, even if the swap is set to 32bit, the byte will not be swapped.

When the process data size of the connected device and mapping size of the master communication process data are different
(E.g.: connected device process data size: 10-byte, mapping size: 16-byte)

Parameter	Data construction
direct	0x0123 4567 89AB CDEF GHIJ 0000 0000 0000
swap 16 bit	0x2301 6745 AB89 EFCD IJGH 0000 0000 0000
swap 32 bit	0x6745 2301 EFCD AB89 0000 IJGH 0000 0000
swap All	0x0000 0000 0000 IJGH EFCD AB89 6745 2301

∗: When the mapping size is 2-bytes, even if the swap is set to 32 bit, the bytes will not be swapped.

∗: When the mapping size of the master connection process data and the process data size of the connected device are different, swap the byte including the blank byte zero.

Port cycle time setting

Port cycle time selects the cycle when IO-Link communication is updated.
It is set automatically or selected from the range of 0 to 255, which mean 0.4 ms to 132.8 ms as the following table shows.

∗: The port cycle time depends on the minimum cycle time, transmission speed, process data size, etc. Even if the parameter is set to the value which is too fast for the IO-Link master to respond, it is changed to the responsible cycle time when the IO-Link master executes the communication.

Value	Setting range
0	Based on the automatic setting (device minimum cycle time).
1 to 3	0.4 ms
4 to 63	0.4 ms to 6.3 ms (by 0.1 ms)
64 to 127	6.4 ms to 31.6 ms (by 0.4 ms)
128 to 191	32.0 ms to 132.8 ms (by 1.6 ms)
192 to 255	132.8 ms

Values are calculated based on the following calculation.

Bit line

Bit								Details
7	6	5	4	3	2	1	0	
Time base		Multiplier						Bit 0 to 5: Multiplier (000000 to 111111) Bit 6 to 7: time base (00, 01, 10)

Calculation condition

Time base	Time base value	Calculation	Cycle time
00	0.1 ms	Multiplier x Time base	0.4 ms to 6.3 ms
01	0.4 ms	6.4 ms + multiplier x Time base	6.4 ms to 31.6 ms
10	1.6 ms	32.0 ms + multiplier x Time base	32.0 ms to 132.8 ms

Data storage function

The data storage function is available when the IO-Link port operation mode is "Manual" and Validation & Backup is "Type compatible, Device V1.1, Backup + Restore" or "Type compatible, Device V1.1, Restore".

•Outline of backup and restore

The parameter setting data for each IO-Link device can be stored (referred to as "backup") in the IO-Link master.

When the IO-Link device is replaced by another identical device, the backup paretmeters in the IO-Link master can be transferred to the replacement IO-Link device (referred to as "restore").

•Condition of the backup / restore operation when the IO-Link communication starts up

The data storage operation will be as follows based on the Data storage status of the IO-Link master and whether the IO-link device parmeters have been changed.

Validation & Backup set value	Condition			Data storage operation
	Data storage status	Backup requirement from the device	Checksum of the data storage and device parameter	
No Device Check	-	-	-	Cleared
Type compatible, Device V1.0	-	-	-	Cleared
Type compatible, Device V1.1	-	-	-	Cleared
Type compatible, Device V1.1, Backup + Restore	Data exits	Required	-	Backup
	Data exits	No requirement	Not identical	Restore
	Data exits	Required	Identical	Nothing occurs
	No data	-	-	Backup
Type compatible, Device V1.1, Restore	Data exits	Required	-	Nothing occurs
	Data exits	No requirement	Not identical	Restore
	Data exits	No requirement	Identical	Nothing occurs
	No data	-	-	Nothing occurs

∗1: When the vendor ID or device ID are changed, the data storage will be cleared.

∗2: When the IO-Link port operation mode is changed to a setting other than "Manual", Validation & Backup values are automatically changed to "No Device Check". Therefore, the data storage will be cleared.

I/O Map

Allocated EX600 input and output bytes for each unit type
Allocated input and output size are changable according to the diagnostic setting and connected EX600 unit type. The allocated input and output bytes for each EX600 unit are shown below.
For I/O map in EX600-SEN1/2 compatibility mode, refer to the operation manual for EX600-SEN1/2 (EX※※-OMN0032).

Unit	Unit part number	Allocated bytes	
		Input	Output
SI unit	EX600-SEN7/8 (32 outputs)	0	4
	EX600-SEN7/8 (32 outputs) (with diagnostic data)	4	4
Digital input unit	EX600-DX#B (8 inputs)	1	0
	EX600-DX#C (8 inputs)	1	0
	EX600-DX#C1 (8 inputs) (with open circuit detection)	1	0
	EX600-DX#D (16 inputs)	2	0
	EX600-DX#E (16 inputs)	2	0
	EX600-DX#F (16 inputs)	2	0
Digital output unit	EX600-DY#B (8 outputs)	0	1
	EX600-DY#E (16 outputs)	0	2
	EX600-DY#F (16 outputs)	0	2
Digital I/O unit	EX600-DM#E (8 inputs/8 outputs)	1	1
	EX600-DM#F (8 inputs/8 outputs)	1	1

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Allocated bytes (continued)

Unit	Unit part number	Allocated bytes	
		Input	Output
Analogue input Unit	EX600-AXA (2 channels)	4 (2 bytes per channel)	0
	EX600-AXB (4 channels)	8 (2 bytes per channel)	0
Analogue output Unit	EX600-AYA (2 channels)	0	4 (2 bytes per channel)
Analogue I/O Unit	EX600-AMB (2/2 channels)	4 (2 bytes per channel)	4 (2 bytes per channel)
Temperature measurement Unit	EX600-AT# (4 channels)	8 (2 bytes per channel)	0
Frequency count Unit	EX600-DFB (4 channels)	8 (2 bytes per channel)	0
IO-Link master Class A	EX600-LAB1 (4 ports)	44, 70 or 134	44, 70 or 134
IO-Link master Class B	EX600-LBB1 (4 ports)	44, 70 or 134	44, 70 or 134

∗1: The allocated bytes of the IO-Link master is able to be changed by the IO-Link master setting switch.

I/O map example

EX600 I/O data is mapped from unit 0 in order, and when the diagnostics is valid, the diagnostic data is mapped on top of the input data. At the same time, when the I/O data size is set, the following precautions should be followed.

•The minimum data size is 2 bytes for both input and output. When the data size total is 0 or 1 byte, padding data is added and the data size will be 2 bytes.
•When the input or output data size is odd, padding data of 1 byte is added, which will make the byte count even.

The I/O map is shown with the following unit configuration as an example.
<Example 1>

	Unit 0	Unit 1	
End plate	DY#B Digital output unit 1 byte output	SEN7 SI unit 4 bytes output	Valve

Input data: None

Output data: (Unit 0) Digital output unit (EX600-DY#B): 1 byte occupied
　　　　　　 (Unit 1) SI unit (EX600-SEN7): 4 bytes occupied

•When Diagnostic mode 0 is selected

Input data		Output data		
Byte 0	Padding data	Byte 0	DY#B (Unit 0)	Output 0 to 7
Byte 1		Byte 1	SEN7 (Unit 1)	Output 0 to 7
Byte 2		Byte 2		Output 8 to 15
Byte 3		Byte 3		Output 16 to 23
Byte 4		Byte 4		Output 24 to 31
Byte 5		Byte 5	Padding data	
Total	2 bytes	Total	6 bytes	

•When Diagnostic mode 1 is selected

Input data		Output data		
Byte 0	Diagnostic data byte0	Byte 0	DY#B (Unit 0)	Output 0 to 7
Byte 1	Diagnostic data byte1	Byte 1	SEN7 (Unit 1)	Output 0 to 7
Byte 2	Diagnostic data byte2	Byte 2		Output 8 to 15
Byte 3	Diagnostic data byte3	Byte 3		Output 16 to 23
Byte 4		Byte 4		Output 24 to 31
Byte 5		Byte 5	Padding data	
Total	4 bytes	Total	6 bytes	

<Example 2>

	Unit 0	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	
End plate	AXA Analogue input 4 byte Input	DY#B Digital output 1 byte Output	DY#B Digital output 1 byte Output	DX#B Digita input 1 byte Input	DX#D Digital input 2 byte Input	SEN7 SI unit 4 byte Output	Valve

Input data: (Unit 0) Analogue input unit (EX600-AXA): 4 bytes occupied
        (Unit 3) Digital input unit (EX600-DX#B): 1 byte occupied
        (Unit 4) Digital input unit (EX600-DX#D): 2 bytes occupied

Output data: (Unit 1) Digital output unit (EX600-DY#B): 1 byte occupied
         (Unit 2) Digital output unit (EX600-DY#B): 1 byte occupied
         (Unit 5) SI unit (EX600-SEN7): 4 bytes occupied

•When Diagnostic mode 0 and byte order of analogue value **(LSB-MSB)** are selected. [1]

	Input data			Output data	
Byte 0	AXA channel 0	**Lo byte**	Byte 0	DY#B (Unit 1)	Output 0 to 7
Byte 1	(Unit 0)	**Hi byte**	Byte 1	DY#B (Unit 2)	Output 0 to 7
Byte 2	AXA channel 1	**Lo byte**	Byte 2		Output 0 to 7
Byte 3	(Unit 0)	**Hi byte**	Byte 3	SEN7 (Unit 5)	Output 8 to 15
Byte 4	DX#B (Unit 3)	Input 0 to 7	Byte 4		Output 16 to 23
Byte 5	DX#D (Unit 4)	Input 0 to 7	Byte 5		Output 24 to 31
Byte 6		Input 8 to 15	Byte 6		
Byte 7	Padding data		Byte 7		
Total	8 bytes		Total	6 bytes	

•When Diagnostic mode 0 and byte order of analogue value **(MSB-LSB)** are selected. [1]

	Input data			Output data	
Byte 0	AXA channel 0	**Hi byte**	Byte 0	DY#B (Unit 1)	Output 0 to 7
Byte 1	(Unit 0)	**Lo byte**	Byte 1	DY#B (Unit 2)	Output 0 to 7
Byte 2	AXA channel 1	**Hi byte**	Byte 2		Output 0 to 7
Byte 3	(Unit 0)	**Lo byte**	Byte 3	SEN7 (Unit 5)	Output 8 to 15
Byte 4	DX#B (Unit 3)	Input 0 to 7	Byte 4		Output 16 to 23
Byte 5	DX#D (Unit 4)	Input 0 to 7	Byte 5		Output 24 to 31
Byte 6		Input 8 to 15	Byte 6		
Byte 7	Padding data		Byte 7		
Total	8 bytes		Total	6 bytes	

∗1: Refer to "Parameter Setting" (page 55) for setting the byte order of analogue value.

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<Example 3> When the switch of the IO-Link master setting is set to 44 bytes

	Unit 0	Unit 1	Unit 2	Unit 3	Unit 4	
End plate	DX#B Digital input 1 byte Input	DY#B Digital input 1 byte Output	LAB1 IO-Link Class A 44 byte Input 44 byte Output	LBB1 IO-Link Class B 44 byte Input 44 byte Output	SEN7 SI unit 4 byte Output	Valve

Input date: (Unit 0) Digital input unit (EX600-DX#B): 1 byte occupied
        (Unit 2) IO-Link master unit (EX600-LAB1): 44 byte occupied
        (Unit 3) IO-Link master unit (EX600-LBB1): 44 byte occupied

Output date: (Unit 1) Digital output unit (EX600-DY#B): 1 byte occupied
          (Unit 2) IO-Link master unit (EX600-LAB1): 44 byte occupied
          (Unit 3) IO-Link maser unit (EX600-LBB1): 44 byte occupied
          (Unit 4) SI unit (EX600-SEN7): 4 byte occupied

•When Diagnostic mode 0

	Input data			Output data	
Byte 0	DX☐B (Unit 0)	Input 0 to 7	Byte 0	DY☐B (Unit 1)	Output 0 to 7
Byte 1			Byte 1		
:	LAB1 (Unit 2)	Process data	:	LAB1 (Unit 2)	Process data
Byte 44			Byte 44		
Byte 45			Byte 45		
:	LBB1 (Unit 3)	Process data	:	LBB1 (Unit 3)	Process data
Byte 88			Byte 88		
Byte 89	Padding data (0)		Byte 89		Output 0 to 7
Byte 90			Byte 90	SEN7 (Unit5)	Output 8 to 15
Byte 91			Byte 91		Output 16 to 23
Byte 92			Byte 92		Output 24 to 31
Byte 93			Byte 93	Padding data	
Total	90 byte		Total	94 byte	

■Details of I/O map of the IO-Link master unit

I/O map of the IO-Link master unit is described below. (Common for EX600-LAB1 and EX600-LBB1)

Byte			Input								Output							
Size 44	Size 70	Size 134	Bit 7							Bit 0	Bit 7							Bit 0
Byte 0			X2	X4	X2	X4	X2	X4	X2	X4	-	Y4	-	Y4	-	Y4	-	Y4
			Port 4		Port 3		Port 2		Port 1		Port 4		Port 3		Port 2		Port 1	
Byte 1			Reserved (fixed value: 0)								Reserved (fixed value: 0)							
2 to 39	2 to 65	2 to 129	Input process data Process data is assigned to each port based on the process data mapping size setting								Output process data Process data is assigned to each port based on the process data mapping size setting							
40	66	130	Port 1 status (PQI)								Reserved (fixed value: 0)							
41	67	131	Port 2 status (PQI)								Reserved (fixed value: 0)							
42	68	132	Port 3 status (PQI)								Reserved (fixed value: 0)							
43	69	133	Port 4 status (PQI)								Reserved (fixed value: 0)							

∗: X2: Input signal of Pin No.2 (Only for EX600-LAB1)

　　X4: Input signal of Pin No.4 when the IO-Link port operation mode is set to digital input mode (DI_C/Q)

　　Y4: Output signal of Pin No.4 when the IO-Link port operation mode is set to digital output mode (DO_C/Q)

∗: The process data size of the master unit port is fixed to 32 bytes input / 32 bytes output.

∗: The size 44/70/134 indicates the IO-Link master size setting. Input and output process data size is changed along with the setting as above.

•Port status (PQI) details

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte n	PQ	Dev-Err	Dev-Com	DSStatus	CQ-Short	Pwr-Short	PDmapping-Mismatch	ID-Mismatch

Bit	Description	Details	Value
0	ID-Mismatch	Connection device matching error	0: Match 1: Mismatch
1	PDmapping-Mismatch	Process data mapping size error ∗1	0: Set size or less 1: Exceeding size
2	PwrShort	L+ short circuit or P24 short circuit	0: No short circuit 1: Short circuited
3	CQShort	C/Q short circuit	0: No short circuit 1: Short circuited
4	DSStatus	Data storage (DS) saved	0: DS saved data error, no DS data 1: DS saved data is valid
5	DevCom	Port communication status	0: Device not connected 1: Operation or preparation
6	DevErr	Event (Device or master event status)	0: No event or notification 1: Warning or Error
7	PQ	Received input process data Valid (normal) / invalid (abnormal) ∗2	0: Invalid (abnormal) 1: Valid (normal)

∗1: An error is detected when the process data size of the actually connected device exceeds the size which is set in the process data mapping.

∗2: Process data is maintained when the received input process data is abnormal (Process Data Invalid).

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■An example of process data mapping when IO-Link master size is 44 bytes

•A mapping example is shown below when the process data mapping is set to port 2 byte

Byte	Input data								Output data							
	Bit 7							Bit 0	Bit 7							Bit 0
0	X2	X4	X2	X4	X2	X4	X2	X4	-	Y4	-	Y4	-	Y4	-	Y4
	Port 4		Port 3		Port 2		Port 1		Port 4		Port 3		Port 2		Port 1	
1	Reserved (fixed value: 0)								Reserved (fixed value: 0)							
2	Port 1 process data								Port 1 process data							
3																
4	Port 2 process data								Port 2 process data							
5																
6	Port 3 process data								Port 3 process data							
7																
8	Port 4 process data								Port 4 process data							
9																
10 : 39	(fixed value: 0)								(fixed value: 0)							
40	Port 1 status (PQI)								Reserved (fixed value: 0)							
41	Port 2 status (PQI)								Reserved (fixed value: 0)							
42	Port 3 status (PQI)								Reserved (fixed value: 0)							
43	Port 4 status (PQI)								Reserved (fixed value: 0)							

∗: Make the IO-Link master size larger than the amount of process data size at each communication port plus 6 bytes. (page 20)

In the case of above setting example:

When the master size is 44 bytes and the process data size at each communication port is 2 bytes:

The amount of the process data size at each port is 8 byte and 44 bytes > 8+6= 14 bytes, therefore the setting is OK.

If the master size is 44 bytes and the process data size at each port is 32 bytes:

The amount of the process data size at each port is 128 byte and 44 bytes < 128+6= 134 bytes, therefore the setting is invalid.

Set the master size to 134 byte if you would like to set the process data size at each port to 32 bytes.

Diagnostics

By changing the diagnosis switch, the diagnostic data shown below is assigned to the head of input data of the I/O map. (Refer to "Setting and adjustment (page 18)" for setting the switch.)

Diagnostic mode	Normal mode		EX600-SEN1/2 compatibility mode	
	Diagnostic data	Diagnostic size	Diagnostic data	Diagnostic size
0	No diagnostic data.	0 byte	No diagnostic data.	0 byte
1	System diagnosis + Unit diagnosis	4 bytes	System diagnosis	4 bytes
2	-	-	System diagnosis + Unit diagnosis	6 bytes

System diagnosis

Channel diagnosis

Unit diagnosis
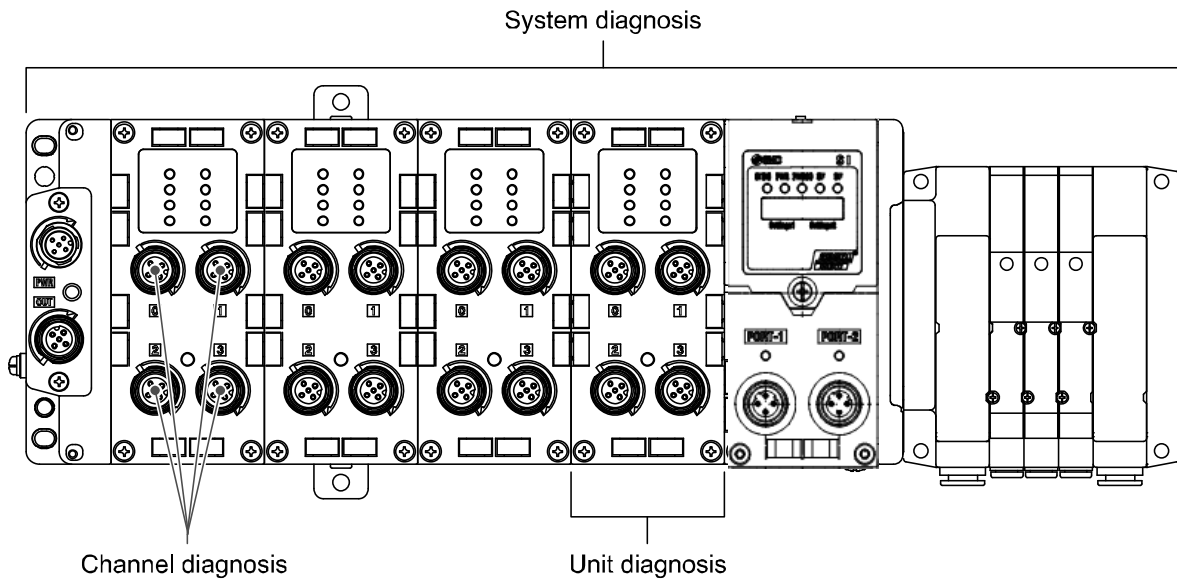
■Details of diagnostic data

In normal mode

Byte	Bit No.	Diagnostic content	Type
0	0	1: The analogue input or output value has fallen below the user set value.	System
	1	1: The analogue input or outpurt value has exceeded the user set value.	
	2	1: The analogue input value has fallen below the setting range.	
	3	1: The analogue input value has exceeded the setting range.	
	4	1: The ON/OFF counter has exceeded the set value.	
	5	1: The open circuit has been detected.	
	6	1: The short circuit of the valve output or digital output has been detected.	
	7	1: The short circuit of the power supply for the input device has been detected.	
1	0	1: The power supply voltage for output device is outside of the specification.	System
	1	1: The power supply voltage for control and input device is outside of the pecification.	
	2	1: IO-Link master process data mapping fault	
	3	1: There is a connection failure between each unit (During operation).	
	4	1: There is a connection failure between each unit (When the power supply is applied).	
	5	Reserved	
	6	1: System error occurred.	
	7	1: Hardware error occurred.	
2	0	1: There is an error in unit 0.	Unit
	1	1: There is an error in unit 1.	
	2	1: There is an error in unit 2.	
	3	1: There is an error in unit 3.	
	4	1: There is an error in unit 4.	
	5	1: There is an error in unit 5.	
	6	1: There is an error in unit 6.	
	7	1: There is an error in unit 7.	
3	0	1: There is an error in unit 8.	Unit
	1	1: There is an error in unit 9.	
	2	Reserved	
	3	Reserved	
	4	Reserved	
	5	Reserved	
	6	Reserved	
	7	Reserved	

∗: The data of diagnostic content: "0" means No error and "1" means Error.

In EX600-SEN1/2 compatibility mode

Byte	Bit No.	Diagnostic content	Type
0	0	1: The analogue input or output value has fallen below the user set value.	System
	1	1: The analogue input or outpurt value has exceeded the user set value.	
	2	1: The analogue input value has fallen below the setting range.	
	3	1: The analogue input value has exceeded the setting range.	
	4	1: The ON/OFF counter has exceeded the set value.	
	5	1: The open circuit has been detected.	
	6	1: The short circuit of the valve output or digital output has been detected.	
	7	1: The short circuit of the power supply for the input device has been detected.	
1	0	1: The power supply voltage for output device is outside of the specification.	System
	1	1: The power supply voltage for control and input device is outside of the specification.	
	2	1: IO-Link master process data mapping fault	
	3	1: There is a connection failure between each unit (During operation).	
	4	1: There is a connection failure between each unit (When the power supply is applied).	
	5	Reserved	
	6	1: System error occurred.	
	7	1: Hardware error occurred.	
2	0-7	Reserved	System
3	0	1: Diagnosis of digital input unit is generated.	System
	1	1: Diagnosis of digital output unit is generated.	
	2	1: Diagnosis of analogue input unit is generated.	
	3	1: Diagnosis of analogue output unit is generated.	
	4	1: Diagnosis of SI unit is generated.	
	5	1: Diagnosis of IO-Link master unit is generated.	
	6-7	Reserved	
4	0	1: There is an error in unit 0.	Unit
	1	1: There is an error in unit 1.	
	2	1: There is an error in unit 2.	
	3	1: There is an error in unit 3.	
	4	1: There is an error in unit 4.	
	5	1: There is an error in unit 5.	
	6	1: There is an error in unit 6.	
	7	1: There is an error in unit 7.	
5	0	1: There is an error in unit 8.	Unit
	1	1: There is an error in unit 9.	
	2-7	Reserved	

*: The data of diagnostic content: "0" means No error and "1" means Error.

■Diagnosis of IO-Link master unit data

The EX600 IO-Link master unit has a diagnostic function for each port. The diagnostics are shown via the LED display and process data input (PQI) in accordance with the diagnostic contents.
The details of LED display, PQI and event code for each diagnostic are shown below.

Port diagnostics function	Details	Port LED status	PQI Bit No. (Description)	Event code
L+ short circuit detection	Pin No. 1-3 short circuit diagnostics	Red ON	2 (PwrShort)	0x1806
P24 short circuit detection	Pin No. 2-5 short circuit diagnostics	Red ON	2 (PwrShort)	0x180F
C/Q short circuit	Pin No. 1-4 or 3-4 short circuit diagnostics	Red ON	3 (CQShort)	0x1804 0x1813
Connected device matching error	Dagnositics are available when the port operation mode is IO-Link and the communication port is set as "Type Compatible". If the detected Vendor ID and Device ID are not matched with registerd values, an error is diagnosed.	Green flashing	0 (ID Mismatch)	0x1803
Device process data mapping error *1	If connected device has longer process data than mapped data, an error will be diagnosed. This diagnostic is valid during port operation mode is IO-Link.	Green flashing	1 (PDmapping-Mismatch)	0x1F01
Device disconnection is detected *2	When the pin function / operation mode is set to IO-Link, device disconnection is detected.	Green flashing	5 (DevCom)	0x1800
P24 power supply reduction	Power supply reduction of class B type Pin No. 2-5 is diagnosed.	OFF (P24)	-	0x180E

*1: Under the mapping error, all of the process data input and output are zero.

*2: When the port is not connected to devices, all of the input process data will be zero.

*: Diagnostics other than the short circuit detection (L+, P24, C/Q) are not handled as the EX600 diagnostic data, so check for the LED display and PQI of the IO-Link master.

Hardware Configuration

The following instruction is for the configuration in normal mode. For the configuration in EX600-SEN1/2 compatibility mode, refer to the operation manual for the EX600-SEN1/2 (EX※※-OMN0032).

■EDS file and icon

The EDS file can be used to configure the EX600. Furthermore, icons are necessary for the display icon of the EX600 on the configuration.

EDS file: ex600_sen_3_4_v10.eds
Icon: ex600_1.ico

■Setting using Logix Designer™

When connecting the EX600 series, use Logix Designer™ software by Rockwell Automation.
Refer to the manual of Logix Designer™ for a detailed manner of operation.
The following examples show the case of using EDS file and the case of Generic Ethernet Module, respectively.

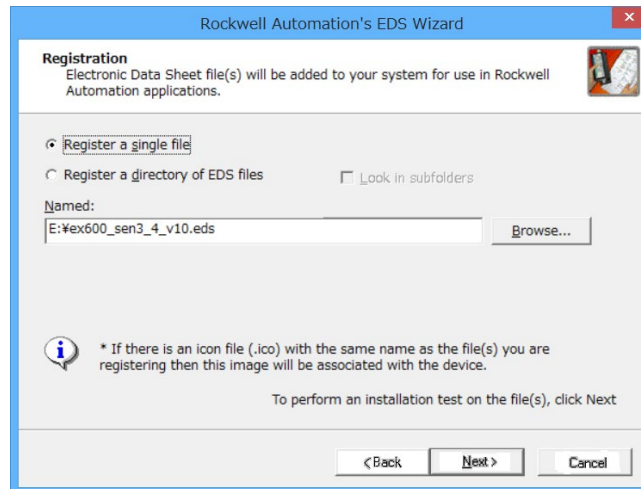### 1. Example of setting using EDS file
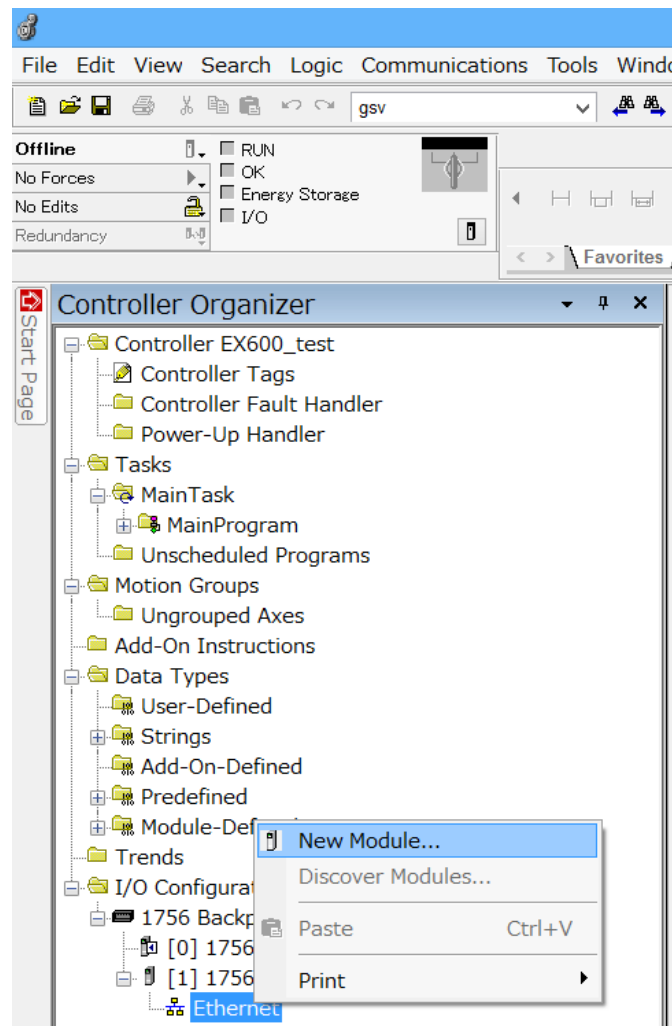•Select [EDS Hardware Installation Tool] from the [Tools] menu.
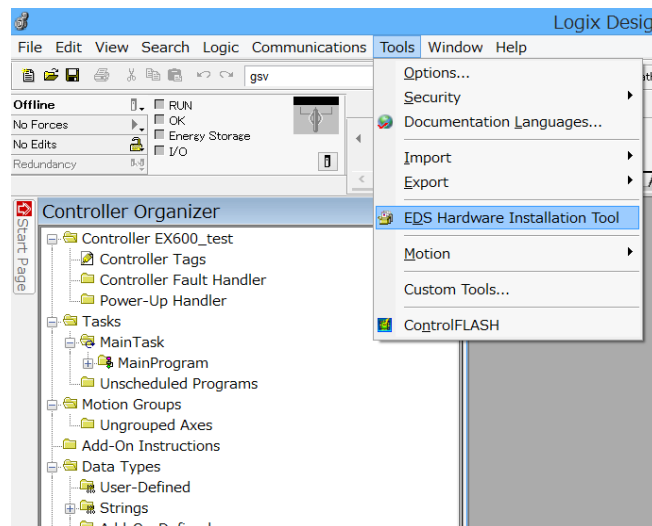
•Select [Register an EDS file(s)] from the [Options] menu. Then Select [Next].
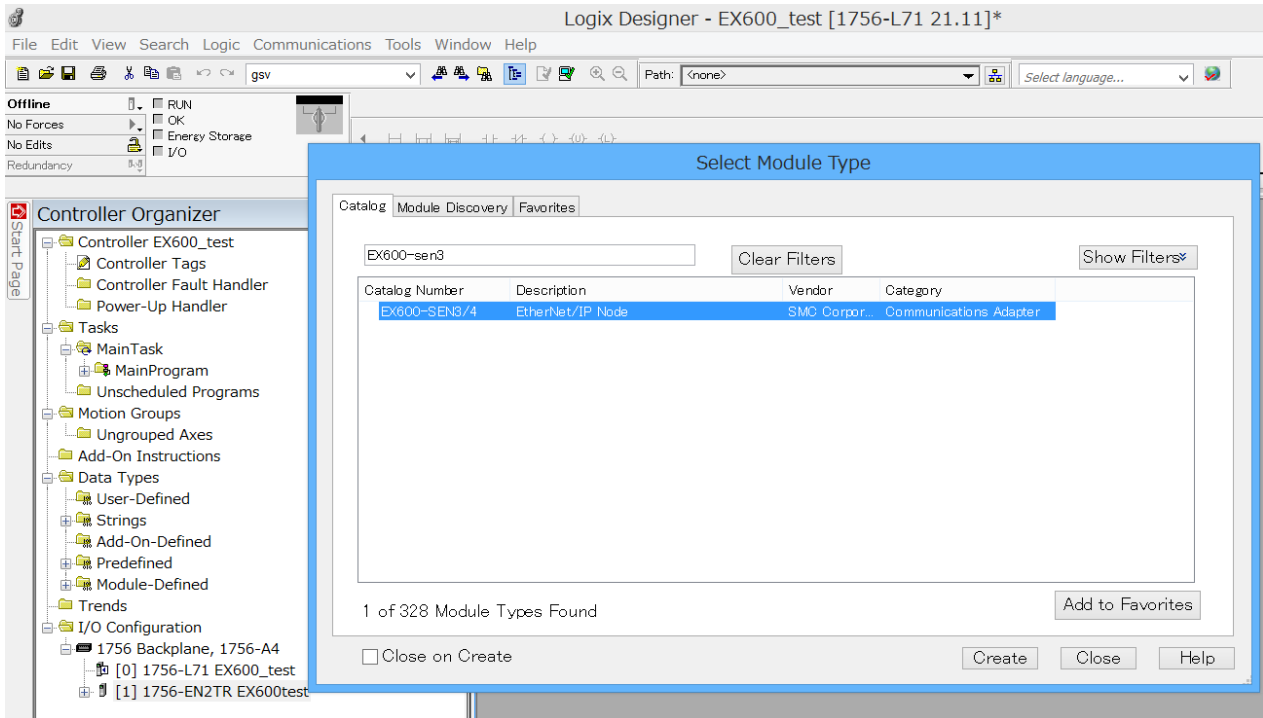
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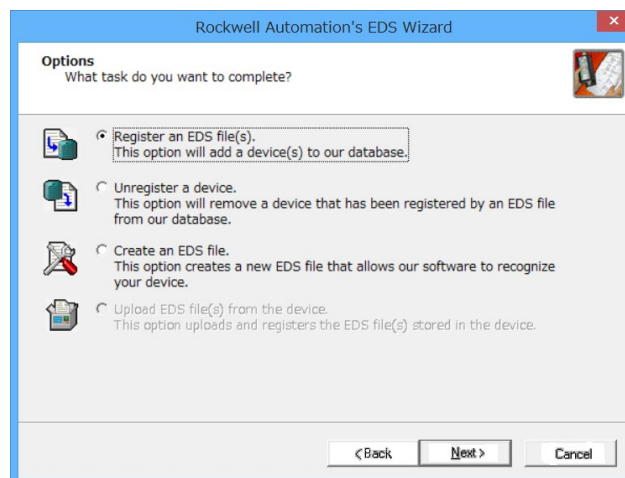
•Select the EDS file to be installed, and select [Next].

•Right-click on the selection [Ethernet] in the [I/O Configuration] folder, and select [New Module].

•The [Select Module Type] screen is displayed. Select [EX600-SEN7/8] and select [Create].

Logix Designer - EX600_test [1756-L71 21.11]*

File Edit View Search Logic Communications Tools Window Help

Path: <none>

Offline
No Forces
No Edits
Redundancy

RUN
OK
Energy Storage
I/O

Controller Organizer
- Controller EX600_test
  - Controller Tags
  - Controller Fault Handler
  - Power-Up Handler
- Tasks
  - MainTask
    - MainProgram
  - Unscheduled Programs
- Motion Groups
  - Ungrouped Axes
- Add-On Instructions
- Data Types
  - User-Defined
  - Strings
  - Add-On-Defined
  - Predefined
  - Module-Defined
- Trends
- I/O Configuration
  - 1756 Backplane, 1756-A4
    - [0] 1756-L71 EX600_test
    - [1] 1756-EN2TR EX600test

Select Module Type

Catalog | Module Discovery | Favorites

EX600-sen3   Clear Filters   Show Filters

Catalog Number	Description	Vendor	Category
EX600-SEN3/4	EtherNet/IP Node	SMC Corpor...	Communications Adapter

1 of 328 Module Types Found   Add to Favorites

Close on Create   Create   Close   Help

•When the [New Module] screen is displayed, input the information below.
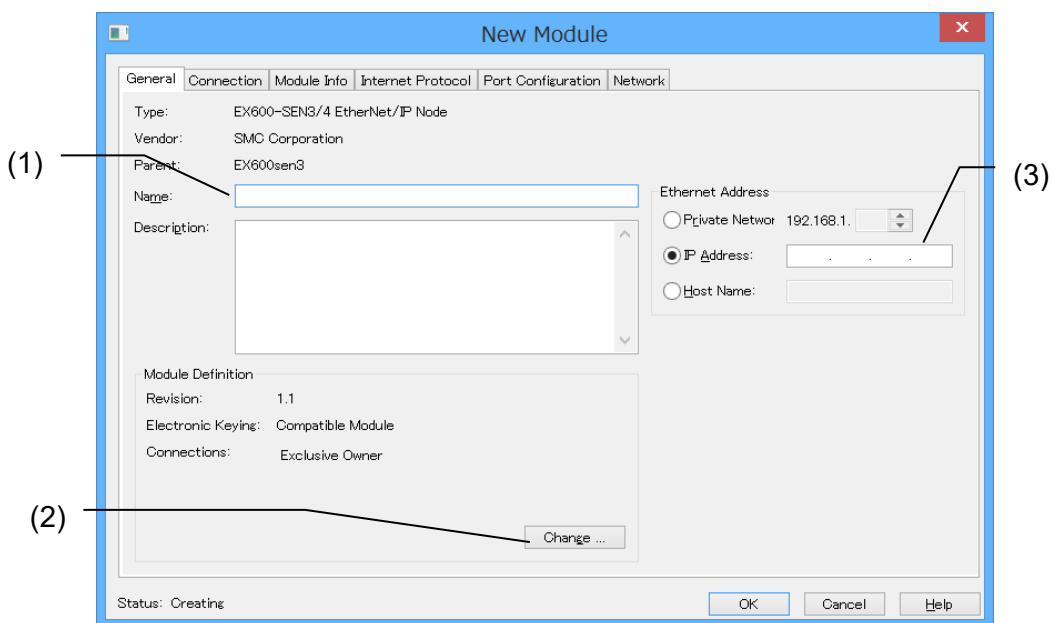(1) Name: Enter the required unit name.
(2) Module Description: Input/Output data size which is actually connected when the [Change] button is pressed.
* : When connecting to a Rockwell Automation PLC, the maximum Input/Output size is as follows
   •Input: 500 bytes, Output: 496 bytes
    When using PLCs other than those manufactured by Rockwell Automation, please contact the PLC manufacturer for the maximum input/output size.
(3) IP Address: The IP address setting for the SI unit.

New Module

General | Connection | Module Info | Internet Protocol | Port Configuration | Network

Type: EX600-SEN3/4 EtherNet/IP Node
Vendor: SMC Corporation
Parent: EX600sen3
Name: _____

Description:

Ethernet Address
  Private Networ 192.168.1.
  IP Address: .   .   .
  Host Name:

Module Definition
  Revision: 1.1
  Electronic Keying: Compatible Module
  Connections: Exclusive Owner

Change ...

Status: Creating   OK   Cancel   Help

(1)   (2)   (3)

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2. Example of setting using the Generic Ethernet Module
   •Right-click on the selection [Ethernet] in the [I/O Configuration] folder, and select [New Module].
   •The [Select Module Type] screen is displayed. Select [Generic Ethernet Module] and select [Create].
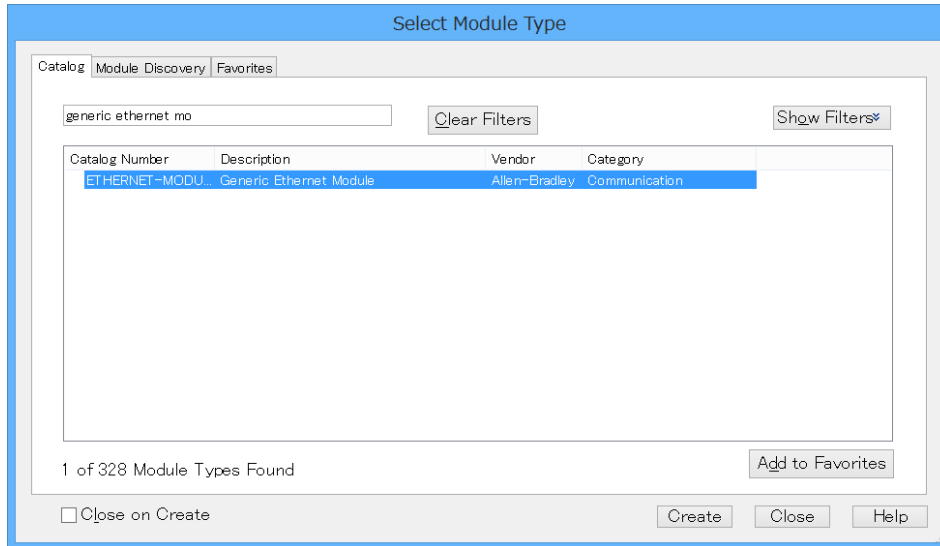
•The [Module Properties] screen is displayed, to perform setup.
 (1) Name: Enter the required unit name.
 (2) Select the data format of Comm: Connection Parameters.
 (3) IP Address: Enter the IP address setting for the SI unit.
 (4) Assembly Instance: Perform setting as shown below.

Description	Decimal	
Common Format	"Data-INT"	"Data-SINT"
Input	100	100
Output	150	150
Configuration	105	105

(5) Size: Perform setting as shown below.

Description	Decimal	
Common Format	"Data-INT"	"Data-SINT"
Input *	MIN. 1 word MAX.250 words	MIN. 2 byte MAX.500 byte
Output *	MIN. 1 word MAX.248 words	MIN. 2 byte MAX.496 byte
Configuration	•When configuration assembly fundtion is not used: Set to "0". •When using the configuration assembly funuction: According to unit part number and unit quantity, it needs to calculate the total cinfiguration data size. If the total data size is not set correctly, EtherNet/IP communication can not be established.	

∗: Select the setting according to the existence of diagnostic data and the unit type connected.

∗: When the EX600 connects to the PLC made by Rockwell Automation, Inc., the maximun size of input and output are as follows.
　•Input: 500 bytes
　•Output 496 bytes
　In the case of using a PLC made by another company, contact the PLC maker about maximum size of input and output.

SMC
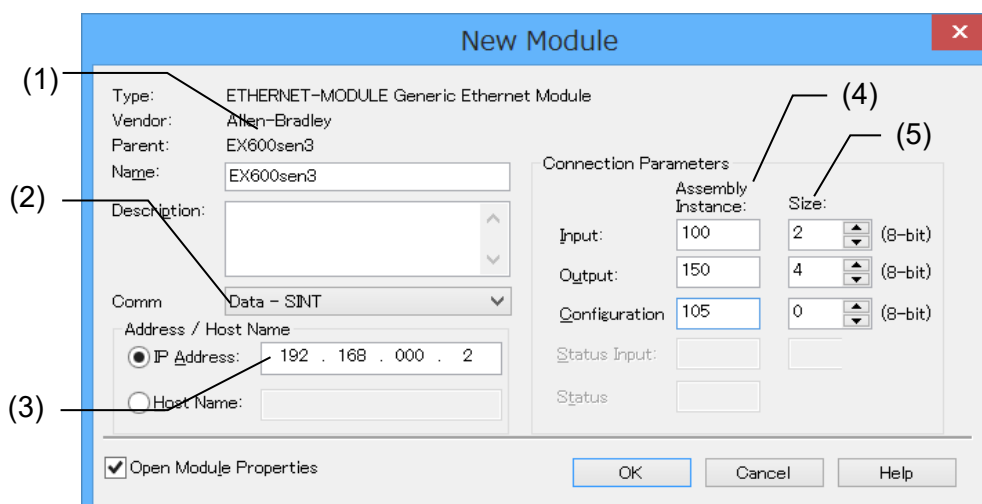
Configuration assembly

■Parameter setting of EX600 with configuration assembly
The Configuration assembly function enables a PLC to send parameters to the EX600 under the EtherNet/IP communication connection.

∗: This function may not be available due to the PLC type.

∗: The settable data size in the configuration assembly is 400 bytes maximum.

∗: Configuration assembly is unsupported in EX600-SEN1/2 compatibility mode.

•**Unit ID list**
Each unit has an individual unit ID. Describe the set value by specifying "the total number of Unit No. and parameter" and "Unit ID".
Unit IDs are described below.

Unit	Unit part number	Unit ID	Configuration data size [byte]
SI unit	EX600-SEN7/8 (32 outputs)	9Bh	27
Digital input unit	EX600-DX#B (8 inputs)	01h	4
	EX600-DX#C (8 inputs)	03h	4
	EX600-DX#D (16 inputs)	05h	5
	EX600-DX#E (16 inputs)	14h	5
	EX600-DX#F (16 inputs)	16h	5
	EX600-DX#C1 (8 inputs)	0Dh	5
Digital output unit	EX600-DY#B (8 outputs)	08h	9
	EX600-DY#E (16 outputs)	18h	15
	EX600-DY#F (16 outputs)	1Ah	15
Digital I/O unit	EX600-DM#E (8 inputs/8 outputs)	1Ch	10
	EX600-DM#F (8 inputs/8 outputs)	1Eh	10
Analogue input unit	EX600-AXA (2 inputs)	20h	14
	EX600-AXB (4 inputs)	24h	25
Analogue output unit	EX600-AYA (2 outputs)	22h	21
Analogue I/O unit	EX600-AMB (b2 inputs/2 outputs)	23h	32
Temperature measurement unit	EX600-AT# (4 inputs)	26h	25
Frequency count unit	EX600-DFB (4 inputs)	28h	29
IO-Link unit	EX600-LAB1 (Class A)	3Bh	46
	EX600-LBB1 (Class B)	3Ch	46

• EtherNet/IP™ configuration assembly
The Configuration data per unit type is described below.

Configuration format (EX600-SEN7/8)

Byte	Bit	EX600-SEN7/8 (27 byte)	
		Parameter	Setting value
0	0..3	Unit No.	0..9
	4..7	Parameter type	1
1	0..7	Unit ID	9B (Hex)
Unit parameter			
2	0	Reserved	0
	1	Monitor short circuit (Output)	0: disable, 1: enable
	2	Reserved	0
	3	Restart after short circuit	0: manual, 1: auto
	4	Power supply voltage monitor (Control/Input)	0: disable, 1: enable
	5	Power supply voltage monitor (Output)	0: disable, 1: enable
	6	Hold /Clear	0: Via switch, 1: Via parameter
	7	Reserved	0
Channel parameter – Channel 0 to 7			
3	0	(Ch0) Monitor count	0: disable, 1: enable
	:	:	:
	7	(Ch7) Monitor count	0: disable, 1: enable
4	0	(Ch0) Monitor open circuit	0: disable, 1: enable
	:	:	:
	7	(Ch7) Monitor open circuit	0: disable, 1: enable
5	0	(Ch0) Output setting during communication fault	0: hold, 1: depend on fault value
	:	:	:
	7	(Ch7) Output setting during communication fault	0: hold, 1: depend on fault value
6	0	(Ch0) Fault value	0: clear, 1: force ON
	:	:	:
	7	(Ch7) Fault value	0: clear, 1: force ON
7	0	(Ch0) Output setting during communication idle	0: hold 1: depend on idle value
	:	:	:
	7	(Ch7) Output setting during communication idle	0: hold 1: depend on idle value
8	0	(Ch0) Idle value	0: clear, 1: force ON
	:	:	:
	7	(Ch7) Idle value	0: clear, 1: force ON
Channel parameter – Channel 8 to 15			
9..14	0..7	Refer to above	Refer to above
Channel parameter – Channel 16 to 23			
15..20	0..7	Refer to above	Refer to above
Channel parameter – Channel 24 to 31			
21..26	0..7	Refer to above	Refer to above

Configuration format (EX600-DX#B/C)

Byte	Bit	EX600-DX#B/C (4 byte)	
		Parameter	Setting value
0	0..3	Unit No.	0..8
	4..7	Parameter type	1
1	0..7	Unit ID	EX600-DX#B: 01 (Hex) EX600-DX#C: 03 (Hex)
Unit parameter			
2	0	Monitor short circuit (power)	0: disable, 1: enable
	1	Reserved	0
	2	Inrush current filter	0: disable, 1: enable
	3	Reserved	0
	4..5	Input filtering time	0: 0.1 ms, 1: 1 ms, 2: 10 ms, 3: 20 ms
	6..7	Input extension time	0: 1 ms, 1: 15 ms, 2: 100 ms, 3: 200 ms
Channel parameter – Channel 0 to 7			
3	0	(Ch0 input) Monitor counter	0: disable, 1: enable
	:	:	:
	7	(Ch7 input) Monitor counter	0: disable, 1: enable

Configuration format (EX600-DX#C1)

Byte	Bit	EX600-DX#C1 (5 byte)	
		Parameter	Setting value
0	0..3	Unit No.	0..8
	4..7	Parameter type	1
1	0..7	Unit ID	EX600-DX#C1: 0D (Hex)
Unit parameter			
2	0	Monitor short circuit (power)	0: disable, 1: enable
	1	Reserved	0
	2	Inrush current filter	0: disable, 1: enable
	3	Reserved	0
	4..5	Input filtering time	0: 0.1 ms, 1: 1 ms, 2: 10 ms, 3: 20 ms
	6..7	Input extension time	0: 1 ms, 1: 15 ms, 2: 100 ms, 3: 200 ms
Channel parameter – Channel 0 to 7			
3	0	(Ch0 input) Monitor counter	0: disable, 1: enable
	:	:	:
	7	(Ch7 input) Monitor counter	0: disable, 1: enable
4	0	(Ch0 input) Monitor open circuit	0: disable, 1: enable
	:	:	:
	7	(Ch7 input) Monitor open circuit	0: disable, 1: enable

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Configuration format (EX600-DX#D/E/F)

Byte	Bit	EX600-DX#D/E/F (5 byte)	
		Parameter	Setting value
0	0..3	Unit No.	0..8
	4..7	Parameter type	1
1	0..7	Unit ID	EX600-DX#D: 05 (Hex) EX600-DX#E: 14 (Hex) EX600-DX#F: 16 (Hex)
Unit parameter			
2	0	Monitor short circuit (power)	0: disable, 1: enable
	1	Reserved	0
	2	Inrush current filter	0: disable, 1: enable
	3	Reserved	0
	4..5	Input filtering time	0: 0.1 ms, 1: 1 ms, 2: 10 ms, 3: 20 ms
	6..7	Input extension time	0: 1 ms, 1: 15 ms, 2: 100 ms, 3: 200 ms
Channel parameter – Channel 0 to 7			
3	0	(Ch0 input) Monitor counter	0: disable, 1: enable
	:	:	:
	7	(Ch7 input) Monitor counter	0: disable, 1: enable
Channel parameter – Channel 8 to 15			
4	0	(Ch8 input) Monitor counter	0: disable, 1: enable
	:	:	:
	7	(Ch15 input) Monitor counter	0: disable, 1: enable

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Configuration format (EX600-DY#B)

Byte	Bit	EX600-DY#B (9 byte)	
		Parameter	Setting value
0	0..3	Unit No.	0..8
	4..7	Parameter type	1
1	0..7	Unit ID	08 (Hex)
Unit parameter			
2	0	Reserved	0
	1	Monitor short circuit (out)	0: disable, 1: enable
	2	Reserved	0
	3	Restart after short circuit	0: manual, 1: auto
	4..7	Reserved	0
Channel parameter – Channel 0 to 7			
3	0	(Ch0 output) Monitor counter	0: disable, 1: enable
	:	:	:
	7	(Ch7 output) Monitor counter	0: disable, 1: enable
4	0	(Ch0 output) Monitor open circuit	0: disable, 1: enable
	:	:	:
	7	(Ch7 output) Monitor open circuit	0: disable, 1: enable
5	0	(Ch0 output) Output setting during communication Fault	0: hold 1: depend on fault value
	:	:	:
	7	(Ch7 output) Output setting during communication Fault	0: hold 1: depend on fault value
6	0	(Ch0 output) Fault value	0: clear, 1: ON
	:	:	:
	7	(Ch7 output) Fault value	0: clear, 1: ON
7	0	(Ch0 output) Output setting during communication idling	0: hold 1: depend on Idle value
	:	:	:
	7	(Ch7 output) Output setting during communication idling	0: hold 1: depend on Idle value
8	0	(Ch0 output) Idle value	0: clear, 1: ON
	:	:	:
	7	(Ch7 output) Idle value	0: clear, 1: ON

Configuration format (EX600-DY#E/F)

Byte	Bit	EX600-DY#E/F (15 byte)	
		Parameter	Setting value
0	0..3	Unit No.	0..8
	4..7	Parameter type	1
1	0..7	Unit ID	EX600-DY#E: 18 (Hex) EX600-DY#F: 1A (Hex)
Unit parameter			
2	0	Reserved	0
	1	Monitor short circuit (out)	0: disable, 1: enable
	2	Reserved	0
	3	Restart after output load short circuit	0: manual, 1: auto
	4..7	Reserved	0
Channel parameter – Channel 0 to 7			
3	0	(Ch0 output) Monitor counter	0: disable, 1: enable
	:	:	:
	7	(Ch7 output) Monitor counter	0: disable, 1: enable
4	0	(Ch0 output) Monitor open circuit	0: disable, 1: enable
	:	:	:
	7	(Ch7 output) Monitor open circuit	0: disable, 1: enable
5	0	(Ch0 output) Output setting during communication Fault	0: hold 1: depend on fault value
	:	:	:
	7	(Ch7 output) Output setting during communication Fault	0: hold 1: depend on fault value
6	0	(Ch0 output) Fault value	0: clear, 1: ON
	:	:	:
	7	(Ch7 output) Fault value	0: clear, 1: ON
7	0	(Ch0 output) Output setting during communication idling	0: hold 1: depend on Idle value
	:	:	:
	7	(Ch7 output) Output setting during communication idling	0: hold 1: depend on Idle value
8	0	(Ch0 output) Idle value	0: clear, 1: ON
	:	:	:
	7	(Ch7 output) Idle value	0: clear, 1: ON
Channel parameter – Channel 8 to 15			
9..14	0..7	Refer to above	Refer to above

Configuration format (EX600-DM#E/F)

Byte	Bit	EX600-DM#E/F (10 byte)	
		Parameter	Setting value
0	0..3	Unit No.	0..8
	4..7	Parameter type	1
1	0..7	Unit ID	EX600-DM#E: 1C (Hex) EX600-DM#F: 1E (Hex)
Unit parameter			
2	0	Monitor short circuit (power)	0: disable, 1: enable
	1	Monitor short circuit (out)	0: disable, 1: enable
	2	Inrush current filter	0: disable, 1: enable
	3	Restart after short circuit (Output)	0: manual, 1: auto
	4..5	Input filtering time	0: 0.1 ms, 1: 1 ms, 2: 10 ms, 3: 20 ms
	6..7	Input extension time	0: 1 ms, 1: 15 ms, 2: 100 ms, 3: 200 ms
Channel parameter – Channel 0 to 7			
3	0	(Ch0 input) Monitor counter	0: disable, 1: enable
	:	:	:
	7	(Ch7 input) Monitor counter	0: disable, 1: enable
4	0	(Ch0 output) Monitor counter	0: disable, 1: enable
	:	:	:
	7	(Ch7 output) Monitor counter	0: disable, 1: enable
5	0	(Ch0 output) Monitor open circuit	0: disable, 1: enable
	:	:	:
	7	(Ch7 output) Monitor open circuit	0: disable, 1: enable
6	0	(Ch0 output) Output setting during communication Fault	0: hold 1: depend on fault value
	:	:	:
	7	(Ch7 output) Output setting during communication Fault	0: hold 1: depend on fault value
7	0	(Ch0 output) Fault value	0: clear, 1: ON
	:	:	:
	7	(Ch7 output) Fault value	0: clear, 1: ON
8	0	(Ch0 output) Output setting during communication idling	0: hold 1: depend on Idle value
	:	:	:
	7	(Ch7 output) Output setting during communication idling	0: hold 1: depend on Idle value
9	0	(Ch0 output) Idle value	0: clear, 1: ON
	:	:	:
	7	(Ch7 output) Idle value	0: clear, 1: ON

Configuration format (EX600-AXA)

Byte	Bit	EX600-AXA (14 byte)	
		Parameter	Setting value
0	0..3	Unit No.	0..8
	4..7	Parameter type	1
1	0..7	Unit ID	20 (Hex)
Unit parameter			
2	0	Monitor short circuit	0: disable, 1: enable
	1..3	Reserved	-
	4	(Ch0&1 in) Monitor over range	0: disable, 1: enable
	5	(Ch0&1 in) Monitor under range	0: disable, 1: enable
	6..7	Data format	0: offset binary 1: signed magnitude 2: 2's complement
Channel parameter – Channel 0 to 1			
3	0..2	(Ch0 in) Analogue input range	0: -10..+10 V, 1: -5..+5 V, 2: -20..+20 mA, 3: 0..10 V, 4: 0..5 V, 5: 1..5 V, 6: 0..20 mA, 7: 4..20 mA
	3	Reserved	-
	4..6	(Ch1 in) Analogue input range	0: -10..+10 V, 1: -5..+5 V, 2: -20..+20 mA, 3: 0..10 V, 4: 0..5 V, 5: 1..5 V, 6: 0..20 mA, 7: 4..20 mA
	7	Reserved	-
4	0..1	(Ch0 in) Analogue average filter	0: None 1: 2 value average 2: 4 value average 3: 8 value average
	2..3	Reserved	-
	4..5	(Ch1 in) Analogue average filter	0: None 1: 2 value average 2: 4 value average 3: 8 value average
	6..7	Reserved	-
5	0	(Ch0 in) Monitor upper limit	0: disable, 1: enable
	1	(Ch1 in) Monitor upper limit	0: disable, 1: enable
	2..3	Reserved	-
	4	(Ch0 in) Monitor lower limit	0: disable, 1: enable
	5	(Ch1 in) Monitor lower limit	0: disable, 1: enable
	6..7	Reserved	-
6..7	0..7	(Ch0 in) Upper limit value	0 to 65535 (Low byte first)
8..9	0..7	(Ch0 in) Lower limit value	0 to 65535 (Low byte first)
10..11	0..7	(Ch1 in) Upper limit value	0 to 65535 (Low byte first)
12..13	0..7	(Ch1 in) Lower limit value	0 to 65535 (Low byte first)

Configuration format (EX600-AXB)

Byte	Bit	Parameter	Setting value
		EX600-AXB (25 byte)	
		Parameter	Setting value
0	0..3	Unit No.	0..8
	4..7	Parameter type	1
1	0..7	Unit ID	24 (Hex)
Unit parameter			
2	0	Monitor short circuit	0: disable, 1: enable
	1..3	Reserved	-
	4	(Ch0&1 in) Monitor over range	0: disable, 1: enable
	5	(Ch0&1 in) Monitor under range	0: disable, 1: enable
	6..7	Data format	0: Offset binary 1: Signed magnitude 2: 2's complement 3: Scaled
Channel parameter – Channel 0 to 1			
3	0..2	(Ch0 in) Analogue input range	0..2: Keep old setting, 3: 0..10 V, 4: 0..5V, 5: 1..5 V, 6: 0..20 mA, 7: 4..20 mA
	3	Reserved	-
	4..6	(Ch1 in) Analogue input range	0..2: Keep old setting, 3: 0..10 V, 4: 0..5 V, 5: 1..5 V, 6: 0..20 mA, 7: 4..20 mA
	7	Reserved	-
4	0..1	(Ch0 in) Analogue average filter	0: None, 1: 2 value average, 2: 4 value average, 3: 8 value average, 4: 16 value average, 5: 32 value average, 6: 64 value average
	2..3	Reserved	-
	4..5	(Ch1 in) Analogue average filter	0: None, 1: 2 value average, 2: 4 value average, 3: 8 value average, 4: 16 value average, 5: 32 value average, 6: 64 value average
	6..7	Reserved	-
5	0	(Ch0 in) Monitor upper limit	0: disable, 1: enable
	1	(Ch1 in) Monitor upper limit	0: disable, 1: enable
	2..3	Reserved	-
	4	(Ch0 in) Monitor lower limit	0: disable, 1: enable
	5	(Ch1 in) Monitor lower limit	0: disable, 1: enable
	6..7	Reserved	-
6..7	0..7	(Ch0 in) Upper limit value	0 to 65535 (Low byte first)
8..9	0..7	(Ch0 in) Lower limit value	0 to 65535 (Low byte first)
10..11	0..7	(Ch1 in) Upper limit value	0 to 65535 (Low byte first)
12..13	0..7	(Ch1 in) Lower limit value	0 to 65535 (Low byte first)
Channel parameter – Channel 2 to 3			
14..24	0..7	Refer to above	Refer to above

Configuration format (EX600-AYA)

Byte	Bit	EX600-AYA (21byte)	
		Parameter	Setting value
0	0..3	Unit No.	0..8
	4..7	Parameter type	1
1	0..7	Unit ID	22 (Hex)
Unit parameter			
2	0	Monitor short circuit	0: disable, 1: enable
	1..5	Reserved	-
	6..7	Analogue data format	0: offset binary 1: signed magnitude 2: 2's complement 3: Linear scaled,
Channel parameter – Channel 0 to 1			
3	0..2	(Ch0 out) Analogue output range	3: 0..10 V, 4: 0..5 V, 5: 1..5 V, 6: 0..20 mA, 7: 4..20 mA
	3	Reserved	-
	4..6	(Ch1 out) Analogue output range	0 to 3: 0..10 V, 4: 0..5 V, 5: 1..5 V, 6: 0..20 mA, 7: 4..20 mA
	7	Reserved	-
4	0	(Ch0 out) Output setting for communication fault	0: hold, 1: depend on fault value
	1	(Ch1 out) Output setting for communication fault	0: hold, 1: depend on fault value
	2	(Ch0 out) Monitor upper limit value	0:disable, 1:enable
	3	(Ch1 out) Monitor upper limit value	0:disable, 1:enable
	4	(Ch0 out) Output setting for communication idling	0: hold, 1: depend on Idle
	5	(Ch1 out) Output setting for communication idling	0: hold, 1: depend on Idle
	6	(Ch0 out) Monitor lower limit value	0:disable, 1:enable
	7	(Ch1 out) Monitor lower limit value	0:disable, 1:enable
5..6	0..7	(Ch0 out) Upper limit value	0 to 65535 (Low byte first)
7..8	0..7	(Ch0 out) Lower limit value	0 to 65535 (Low byte first)
9..10	0..7	(Ch0 out) Fault value	0 to 65535 (Low byte first)
11..12	0..7	(Ch0 out) Idle value	0 to 65535 (Low byte first)
13..14	0..7	(Ch1 out) Upper limit value	0 to 65535 (Low byte first)
15..16	0..7	(Ch1 out) Lower limit value	0 to 65535 (Low byte first)
17..18	0..7	(Ch1 out) Fault value	0 to 65535 (Low byte first)
19..20	0..7	(Ch1 out) Idle value	0 to 65535 (Low byte first)

Configuration format (EX600-AMB) Byte 0 to 6

Byte	Bit	Parameter	Setting value
		EX600-AMB (32 byte)	
		Parameter	Setting value
0	0..3	Unit No.	0..8
	4..7	Parameter type	1
1	0..7	Unit ID	23 (Hex)
Unit parameter			
2	0	Monitor short circuit	0: disable, 1: enable
	1..3	Reserved	-
	4	(Ch0&1 in) Monitor over range	0: disable, 1: enable
	5	(Ch0&1 in) Monitor under range	0: disable, 1: enable
	6..7	Analogue data format	0: offset binary 1: signed magnitude 2: 2's complement 3: linear scaled
Channel parameter – Channel 0 to 1			
3	0..2	(Ch0 in) Analogue input or output range	3: 0..10 V, 4: 0..5 V, 5: 1..5 V, 6: 0..20 mA, 7: 4..20 mA
	3	Reserved	-
	4..6	(Ch1 in) Analogue input or output range	3: 0..10 V, 4: 0..5 V, 5: 1..5 V, 6: 0..20 mA, 7: 4..20 mA
	7	Reserved	-
4	0..2	(Ch0 out) Analogue input or output range	0 to 3: 0..10 V, 4: 0..5 V, 5: 1..5 V, 6: 0..20 mA, 7: 4..20 mA
	3	Reserved	-
	4..6	(Ch1 out) Analogue input or output range	0 to 3: 0..10 V, 4: 0..5 V, 5: 1..5 V, 6: 0..20 mA, 7: 4..20 mA
	7	Reserved	-
5	0..3	(Ch0 in) Analogue average filter	0: None, 1: 2 value average, 2: 4 value average, 3: 8 value average,
	4..7	(Ch1 in) Analogue average filter	0: None, 1: 2 value average, 2: 4 value average, 3: 8 value average,
6	0	(Ch0 in) Monitor upper limit	0: disable, 1: enable
	1	(Ch1 in) Monitor upper limit	0: disable, 1: enable
	2..3	Reserved	-
	4	(Ch0 in) Monitor lower limit	0: disable, 1: enable
	5	(Ch1 in) Monitor lower limit	0: disable, 1: enable
	6..7	Reserved	-

Configuration format (EX600-AMB) Byte 7 to 31

Byte	Bit	EX600-AMB (32 byte)	
		Parameter	Setting value
7	0	(Ch0 out) Output setting for communication fault	0: hold, 1: depend on fault value
	1	(Ch1 out) Output setting during communication Fault	0: hold, 1: depend on fault value
	2	(Ch0 out) Monitor upper limit value	0:disable, 1:enable
	3	(Ch1 out) Monitor upper limit value	0:disable, 1:enable
	4	(Ch0 out) Output setting for communication idling	0: hold, 1: depend on Idle value
	5	(Ch1 out) Output setting for communication idling	0: hold, 1: depend on Idle value
	6	(Ch0 out) Monitor lower limit value	0:disable, 1:enable
	7	(Ch1 out) Monitor lower limit value	0:disable, 1:enable
8..9	0..7	(Ch0 in) Monitor upper limit value	0 to 65535 (Low byte first)
10..11	0..7	(Ch0 in) Monitor lower limit value	0 to 65535 (Low byte first)
12..13	0..7	(Ch0 out) Upper limit value	0 to 65535 (Low byte first)
14..15	0..7	(Ch0 out) Lower limit value	0 to 65535 (Low byte first)
16..17	0..7	(Ch0 out) Fault value	0 to 65535 (Low byte first)
18..19	0..7	(Ch0 out) Idle value	0 to 65535 (Low byte first)
20..21	0..7	(Ch1 in) Monitor upper limit value	0 to 65535 (Low byte first)
22..23	0..7	(Ch1 in) Monitor lower limit value	0 to 65535 (Low byte first)
24..25	0..7	(Ch1 out) Upper limit value	0 to 65535 (Low byte first)
26..27	0..7	(Ch1 out) Lower limit value	0 to 65535 (Low byte first)
28..29	0..7	(Ch1 out) Fault value	0 to 65535 (Low byte first)
30..31	0..7	(Ch1 out) Idle value	0 to 65535 (Low byte first)

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Configuration format (EX600-AT#)

Byte	Bit	EX600-AT# (25 byte)	
		Parameter	Setting value
0	0..3	Unit No.	0..8
	4..7	Parameter type	1
1	0..7	Unit ID	26 (Hex)
Unit parameter			
2	0..3	Reserved	-
	4	Temperature result format	0: C, 1:F
	5	Reserved	-
	6..7	Data format	1: Signed magnitude 2: 2's complement
Channel parameter – Channel 0 to 1			
3	0..2	(Ch0) Number of wires	4: 2-Wire RTD 5: 3-Wire RTD 6: 4-Wire RTD
	3	Reserved	-
	4..6	(Ch1) Number of wires	4: 2-Wire RTD 5: 3-Wire RTD 6: 4-Wire RTD
	7	Reserved	-
4	0..2	(Ch0) Filtering mode	0: None 1: 2AVG 2: 4AVG 3: 8AVG
	3	Reserved	-
	4..6	(Ch1) Filtering mode	0: None 1: 2AVG 2: 4AVG 3: 8AVG
	7	Reserved	-
5..13	0..7	Reserved	-
Channel parameter – Channel 2 to 3			
14..24	0..7	Refer to above	Refer to above

Configuration format (EX600-DFB)

Byte	Bit	EX600-DFB (29 byte)	
		Parameter	Setting value
0	0..3	Unit No.	0..8
	4..7	Parameter type	1
1	0..7	Unit ID	28 (Hex)
Unit parameter			
2	0	Monitor short circuit	0: disable, 1: enable
	1..7	Reserved	0
Channel parameter – Channel 0 to 3			
3	0..1	(ch0) Filtering mode	0: None, 1: 2AVG, 2: 4AVG, 3: 8AVG
	2..3	(ch1) Filtering mode	0: None, 1: 2AVG, 2: 4AVG, 3: 8AVG
	4..5	(ch2) Filtering mode	0: None, 1: 2AVG, 2: 4AVG, 3: 8AVG
	6..7	(ch3) Filtering mode	0: None, 1: 2AVG, 2: 4AVG, 3: 8AVG
4	0	(ch0) Monitor upper limit	0: disable, 1: enable
	1	(ch1) Monitor upper limit	0: disable, 1: enable
	2	(ch2) Monitor upper limit	0: disable, 1: enable
	3	(ch3) Monitor upper limit	0: disable, 1: enable
	4	(ch0) Monitor lower limit	0: disable, 1: enable
	5	(ch1) Monitor lower limit	0: disable, 1: enable
	6	(ch2) Monitor lower limit	0: disable, 1: enable
	7	(ch3) Monitor lower limit	0: disable, 1: enable
5..6	0..7	(ch0) Upper limit value	0x0000..0xFFFF
7..8	0..7	(ch0) Lower limit value	0x0000..0xFFFF
9..10	0..7	(ch0) Cut-off value	0x0000..0xFFFF
11..12	0..7	(ch1) Upper limit value	0x0000..0xFFFF
13..14	0..7	(ch1) Lower limit value	0x0000..0xFFFF
15..16	0..7	(ch1) Cut-off value	0x0000..0xFFFF
17..18	0..7	(ch2) Upper limit value	0x0000..0xFFFF
19..20	0..7	(ch2) Lower limit value	0x0000..0xFFFF
21..22	0..7	(ch2) Cut-off value	0x0000..0xFFFF
23..24	0..7	(ch3) Upper limit value	0x0000..0xFFFF
25..26	0..7	(ch3) Lower limit value	0x0000..0xFFFF
27..28	0..7	(ch3) Cut-off value	0x0000..0xFFFF

Configuration format (EX600-LAB1 / EX600-LBB1) Byte 0 to 5

Byte	Bit	EX600-LAB1 / EX600-LBB1 (46 byte)	
		Parameter	Setting value
0	0..3	Unit No.	0..8
	4..7	Parameter type	1
1	0..7	Unit ID	EX600-LAB1:3B (Hex) EX600-LBB1:3C (Hex)
Unit parameter			
2	0	Monitor short circuit	0: disable, 1: enable
	1	Reserved	0
	2..3	Byte swap	0: direct, 1: 16 bit, 2: 32 bit, 3: all
	4..7	Reserved	0
3	0..1	Fault output (IO-Link)	0: Clear/PD Out valid 1: Hold 2: Clear/PD Out invalid
	2..3	Fault output (DO)	0: Clear 1: Hold 2: Force ON
	4..5	Idle output (IO-Link)	0: Clear/PD Out valid 1: Hold 2: Clear/PD Out invalid
	6..7	Idle output (DO)	0: Clear 1: Hold 2: Force ON
4	0..7	Process data mapping Port1/Port2/Port3/Port4 (Input and Output)	0: 2/2/2/2 1: 4/4/4/4 2: 8/8/8/8 3: 16/16/2/2 4: 32/2/2/2 5: 16/16/8/8 6: 16/16/16/16 7: 24/24/8/8 8: 24/24/24/24 9: 32/32/8/8 10: 32/32/32/32
5	0..7	Reserved	0

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Configuration format (EX600-LAB1 / EX600-LBB1) Byte 6 to 45

| Byte | Bit | EX600-LAB1 / EX600-LBB1 (46 byte) | |
		Parameter	Setting value
PortConfig – Port 1			
6	0..7	PortMode	0: Deactivated 1: IOL_Manual 2: IOL_Autostart 3: DI_C/Q 4: DQ_C/Q

7	0..7	Validation&Backup	0: No Device Check
			1: Type compatible Device V1.0
			2: Type compatible Device V1.1
			3: Type compatible Device V1.1,
			    Backup+Restore
			4: Type compatible Device
			    V1.1,Restore

8	0..7	Reserved	0
9	0..7	PortCycleTime	0: Automatic setting 1 to 3: 0.4 ms 4 to 63: 0.4 to 6.3 ms (by 0.1 ms) 64 to 127: 6.4 to 31.6 ms (by 0.4 ms) 128 to 191: 32 to 132.8 ms (by 1.6 ms) 192 to 255: 132.8 ms
10	0..7	VendorID[0] (MSB)	Vendor ID for validation comparison
11	0..7	VendorID[1] (LSB)	
12	0..7	DeviceID[0] (MSB)	Device ID for validation comparison
13	0..7	DeviceID[1]	
14	0..7	DeviceID[2]	
15	0..7	DeviceID[3] (LSB)	
PortConfig – Por t 2			
16..25	0..7	Refer to above	Refer to above
PortConfig – Por t 3			
26..35	0..7	Refer to above	Refer to above
PortConfig – Por t 4			
36..45	0..7	Refer to above	Refer to above

■Parameter setting of IO-Link device with configuration assembly

The Configuration assembly function enables PCL to send parameters to the IO-Link device, which is connected to the IO-Link master, under the EtherNet/IP communication connection.

Set the Index, subindex and data to be changed by specifying the Unit No., Unit ID and IO-Link port in accordance with the Operation Manual of the IO-Link device.

∗: This function may not be available due to the PLC type.

∗: The settable data size in the configuration assembly is 400 bytes maximum.

Configuration format (EX600-LAB1 / EX600-LBB1)

Byte	Bit	EX600-LAB1 / EX600-LBB1	
		Parameter	Setting value
0	0..3	Unit No.	0..9
	4..7	Parameter type	2
1	0..7	Unit ID	EX600-LAB1: 3B (Hex) EX600-LBB1: 3C (Hex)
On-request Data			
2	0..7	Port	1..4
3	0..7	Number of Parameter	1..N
IO-Link Device_Parameter1			
4	0..7	Parameter1_Length	1..232
5	0..7	Parameter1_Index[0] (MSB)	Refer to Operation Manual of IO-Link Device
6	0..7	Parameter1_Index[1] (LSB)	Refer to Operation Manual of IO-Link Device
7	0..7	Parameter1_Subindex	Refer to Operation Manual of IO-Link Device
8	0..7	Parameter1_Data[0]	Refer to Operation Manual of IO-Link Device
..	..	..	..
..	0..7	Parameter1_Data[#] # relies on the data length	Refer to Operation Manual of IO-Link Device
IO-Link Device_Parameter2 (When the number of Parameter is 1, no setting is necessary for the data afterwards)			
..	..	Parameter2_Lenght	1..232
..	0..7	Parameter2_Index[0] (MSB)	Refer to Operation Manual of IO-Link Device
	0..7	Parameter2_Index[1] (LSB)	Refer to Operation Manual of IO-Link Device
..	0..7	Parameter2_Subindex	Refer to Operation Manual of IO-Link Device
..	0..7	Parameter2_Data[0]	Refer to Operation Manual of IO-Link Device
..	..	..	..
..	0..7	Parameter2_Data[#] # relies on the data length	Refer to Operation Manual of IO-Link Device

■Configuration assembly setting method example

The parameter setting for the manifold using Rockwell Automation Logix Designer™ is described below.

	Unit 0	Unit 1	Unit 2	Unit 3	
End plate	AXA Analogue Input Config size 14 byte	AMB Analogue I/O Config size 32 byte	LAB1 IO-Link Config size 46 byte	SEN7 SI unit (32 outputs) Config size 27 byte	Valve manifold (32 coils)

Pressure switch IO-Link compatible
ISE20B-L
(Connect to Port1)
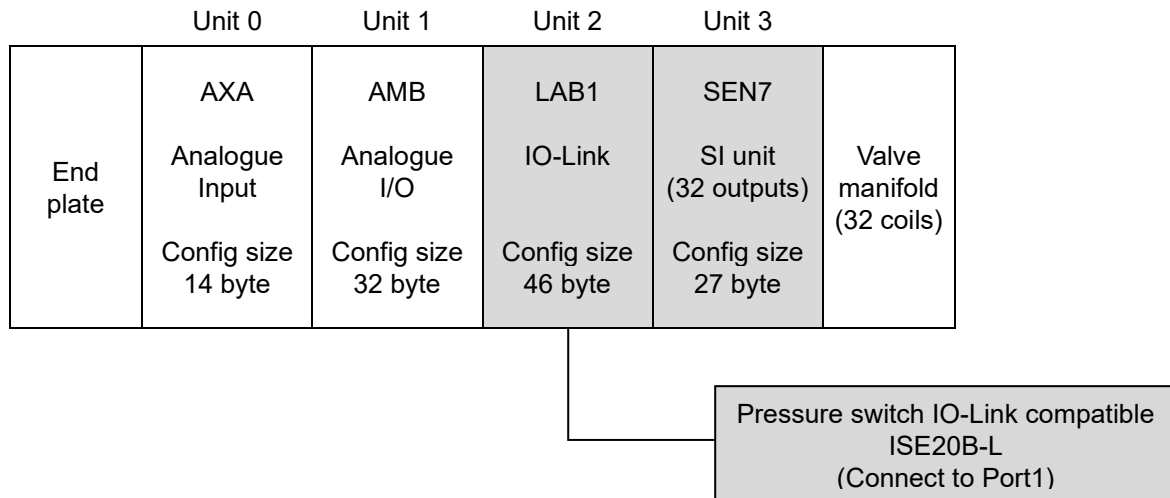
•Parameter setting devices
 1. EX600-LAB1 (Unit 2)
 2. EX600-SEN7 (Unit 3)
 3. ISE20B-L (Connect to IO-Link device, digital pressure switch and port 1 of unit 2)

(1) Preparation of configuration data

Prepare the following configuration data with reference to page 96 to 112. Refer to Operation Manual of IO-Link Device for the index, subindex and set value required for setting the parameter of the IO-Link device.

As shown in the following table, the configuration data size is 88 byte.

Applicable parameter setting	Byte	Parameter	Setting value	Notes
EX600-LAB1 (Unit2) Occupies 46 bytes	0	0x02 (Unit No.) + 0x10 (parameter type)	0x12	Total unit No. and parameter type
	1	Unit ID	0x3B	EX600-LAB1 ID
	2 to 5	Unit parameter		Unit parameter (Refer to page 110)
	6 to 15	Port config – Port 1		Port parameter (Refer to page 111)
	16 to 25	Port config – Port 2		
	26 to 35	Port config – Port 3		
	36 to 45	Port config – Port 4		
EX600-SEN7 (Unit3) Occupies 27 bytes	46	0x03(Unit No.) + 0x10 (parameter type)	0x13	Total unit No. and parameter type
	47	Unit ID	0x9B	EX600-SEN7 ID
	48	Unit parameter		Unit parameter (Refer to page 97)
	49 to 54	Channel parameter (CH0 to 7)		Channel parameter (Refer to page 97)
	55 to 60	Channel parameter (CH8 to 15)		
	61 to 66	Channel parameter (CH16 to 23)		
	67 to 72	Channel parameter (CH24 to 31)		
ISE20B-L (Connected to Port 1 of Unit 2) Occupied size varies depending on the number of parameters and parameter type	73	0x02 (Unit No.) + 0x20 (parameter type)	0x22	Total unit No. and parameter type
	74	Unit ID	0x3B	EX600-LAB1 ID
	75	Port No.	1	Port No. to which the IO-Link device is connected
	76	Number of Parameter: 1 to N	2	Number of parameters to be set
	77	Set value data size (Refer to Operation Manual of IO-Link Device)	1	1 byte
	78 to 79	Parameter1_Index (Refer to Operation Manual of IO-Link Device)	0x03E8	Setting of pressure display unit
	80	Parameter1_Subindex (Refer to Operation Manual of IO-Link Device)	0	
	81	Set value (Refer to Operation Manual of IO-Link Device)	1	Set the display unit to "kPa"
	82	Set value data size (Refer to Operation Manual of IO-Link Device)	2	2 byte
	83 to 84	Parameter1_Index (Refer to Operation Manual of IO-Link Device)	0x03F5	OUT1 hysteresis setting
	85	Parameter1_Subindex (Refer to Operation Manual of IO-Link Device)	0	
	86 to 87	Set value (Refer to Operation Manual of IO-Link Device)	0x0BB8	Set hysteresis to 1,000

<u>Byte size: 88 byte</u>

(2) Configuration size setting

Enter the byte size of the configuration data, which has been prepared in (1), in the Configuration size column of the Connection Parameters. The settable data size in the configuration assembly is 400 bytes maximum.
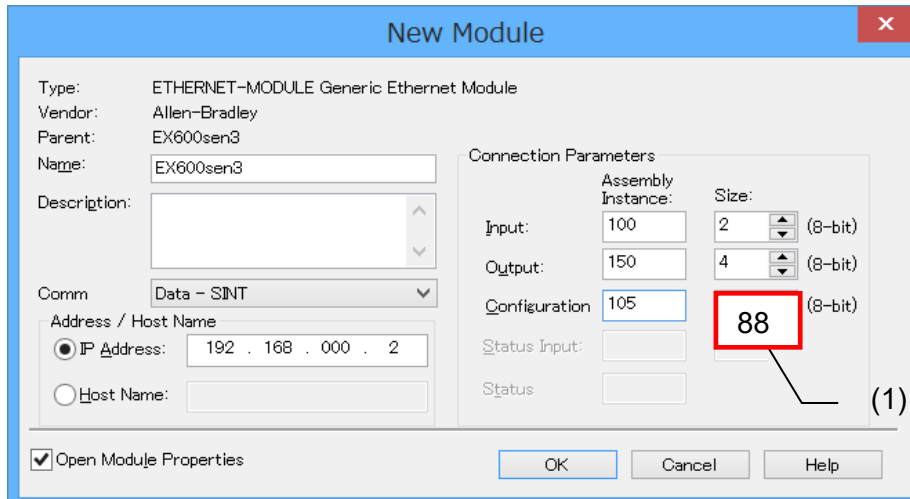
(3) Controller Tags

Set the data for 88 bytes to the Value of Tags.
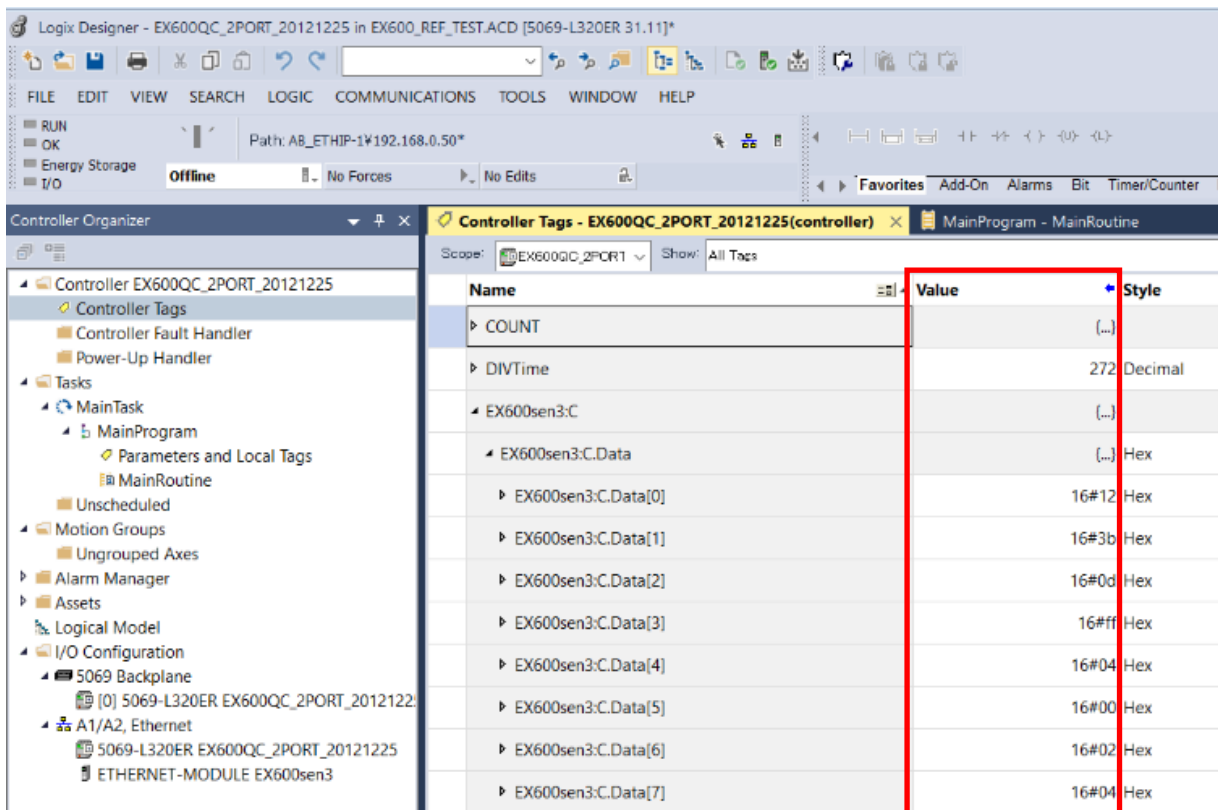
■Device Level Ring (DLR) function
This SI unit can be used as an EtherNet/IP™ compliant node for network rings with the DLR function.
To enable the DLR function, all of the ring nodes need to be applicable to the DLR function. Since all of the DLR function settings are performed by the Ring Supervisor, there is no need to perform any settings to the SI unit. Refer to the manual for the Ring Supervisor for detailed settings.

■QuickConnect™ function
This SI unit can be used as an EtherNet/IP compliant node for networks with the QuickConnect™ function.
To enable the QuickConnect™ function, it is necessary to perform communication setting and QuickConnect™ function setting to the SI units, as shown below. After satisfying these conditions, setting of the QuickConnect™ compliant EtherNet/IP module (master), must be performed according to the specified procedure. Refer to the manual for the EtherNet/IP module (master) for the procedure.

1. Communication setting
Disable the auto negotiation of the ports being used, set the communication speed to 100 Mbps, and the communication method to full duplex. Change the EtherNet Link Object to the values shown below.
<u>Please return setting to "0001 0000", when the QuickConnect**™** function unused.</u>

(1) PORT1 port setting

Class	Instance	Attribute	Value (Word)	QuickConnect™ setting
0xF6	0x01	0X06	0001 0000: Auto-negotiation (default setting)	
			0002 0064: Force 100 Mbps/Full duplex	○

(2) PORT2 port setting

Class	Instance	Attribute	Value (Word)	QuickConnect™ setting
0xF6	0x02	0X06	0001 0000: Auto-negotiation (default setting)	
			0002 0064: Force 100 Mbps/Full duplex	○
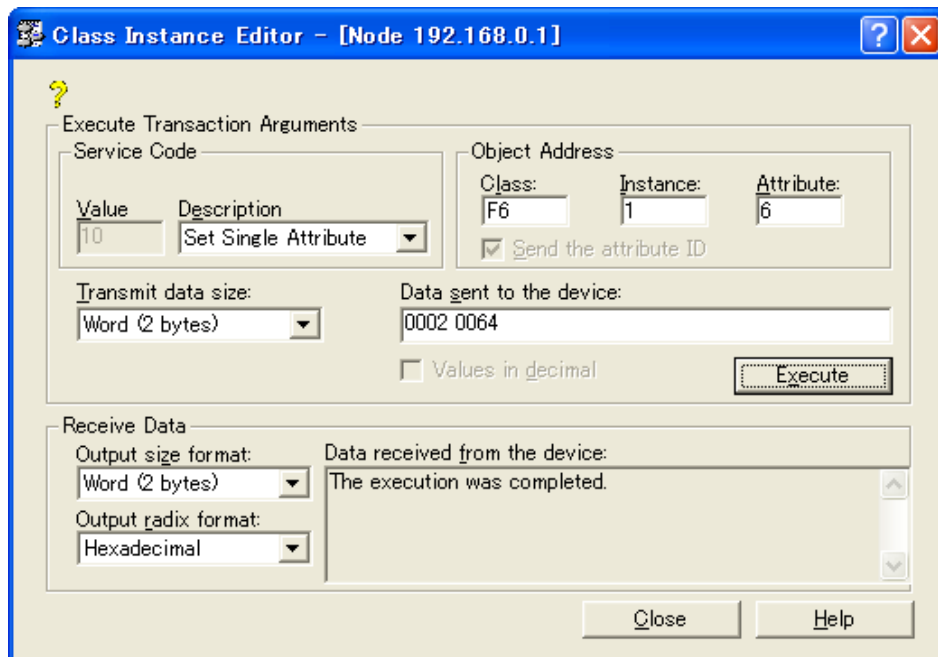
Ex. Configuration of the PORT1 port

2. QuickConnect^{TM} function setting

Change the TCP/IP Object to the values shown below.

Make sure the value is set to "0" when the QuickConnect^{TM} function is not used.

Class	Instance	Attribute	Value	QuickConnect^{TM} setting
0xF5	0x01	0X0C	0: disabled (default setting)	
			1: enabled	○

∗**: Upon configuration of QuickConnect^{TM} functions, the polarities of the communication ports reverse, as shown in the table below. Please be aware when selecting communication cables and the polarity of the communication port of the connected device.**

Quick Connect^{TM} setting	BUS IN Port	BUS OUT Port
Disabled	AUTO MDI/MDI-X	AUTO MDI/MDI-X
Enabled	MDI	MDI-X

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EtherNet/IP™ Object

You can use the EtherNet/IP™ Explicite Message to check diagnostic data and read and write various parameters.
The data format is as follows

System diagnostic object (Class: 66h)

Instance	Attribute	Access	Name	Type	Value
01h	64h	Get	Input data length	UINT	I/O mapping input data length (Byte)
	65h		Output data length	UINT	I/O mapping output data length (Byte)
	6Dh		Number of units connected	USINT	Number of units connected
	79h	Get/Set	Hold/Clear	BOOL	0: via switch 1: via software (Web Server or EtherNet/IP™ object)
	7Ah	Get	System Diagnosis 1	BYTE	0: No error 1: Error Bit0: The analogue value has fallen below the user set value. Bit1: The analogue value has exceeded the user set value. Bit2: The analogue input value has fallen below the set range. Bit3: The analogue input value has exceeded the set range. Bit4: The ON/OFF counter has exceeded the set value. Bit5: The open circuit has been detected. Bit6: The short circuit of the valve output or digital output has been detected. Bit7: The short circuit of the power supply for the input/output device has been detected.
	7Bh		System Diagnosis 2	BYTE	0: No error 1: Error Bit0: The power supply voltage for output device is outside of the specification. Bit1: The power supply voltage for control and input is outside of the specification. Bit2: IO-Link master process data mapping fault Bit3: There is a connection failure between each unit (During operation). Bit4: There is a connection failure between each unit (When the power supply is applied). Bit5: Reserved Bit6: System error occurred. Bit7: Hardware error occurred.
	7Ch		System Diagnosis 3	BYTE	0

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System diagnostic object (Class: 66h) (continued)

Instance	Attribute	Access	Name	Type	Value
01h	7Dh	Get	System Diagnosis 4	BYTE	0: No error 1: Error Bit0: At digital input unit Bit1: At digital output unit Bit2: At analogue input unit Bit3: At analogue output unit Bit4: At SI unit Bit5: At IO-Link master unit Bit6: Reserved Bit7: Reserved
	9Ch		Unit connecting condition 1	BYTE	0: No error 1: Error Bit0: There is an error in unit 0. Bit1: There is an error in unit 1. Bit2: There is an error in unit 2. Bit3: There is an error in unit 3. Bit4: There is an error in unit 4. Bit5: There is an error in unit 5. Bit6: There is an error in unit 6. Bit7: There is an error in unit 7.
	9Dh		Unit connecting condition 2	BYTE	0: No error 1: Error Bit0: There is an error in unit 8. Bit1: There is an error in unit 9. Bit2: Reserved 　　　　: Bit7: Reserved
	B0h	Get/Set	Analogue data endian	BOOL	0: LSB-MSB 1: MSB-LSB

Unit/Channel diagnosis object (Class: 67h)

Instance	Attribute	Access	Name	Type	Value
01h to 0Ah *1	6Ch	Get	Unit diagnosis 1	BYTE	0: No error 1: Error Bit0: The analogue value has fallen below the user set value. Bit1: The analogue value has exceeded the user set value. Bit2: The analogue input value has fallen below the set range. Bit3: The analogue input value has exceeded the set range. Bit4: The ON/OFF counter has exceeded the set value. Bit5: The open circuit has been detected. Bit6: The short circuit of the valve output or digital output has been detected. Bit7: The short circuit of the power supply for the input/output device has been detected
	6Dh		Unit diagnosis 2	BYTE	0: No error 1: Error Bit0: The power supply voltage for output device is outside of the specification. Bit1: The power supply voltage for control and input is outside of the specification. Bit2: IO-Link master process data mapping fault Bit3: There is a connection failure between each unit (During operation). Bit4: There is a connection failure between each unit (When the power supply is applied). Bit5: Reserved Bit6: System error occurred. Bit7: Hardware error occurred.
	6Eh		Channel diagnosis Ch0 to Ch7	BYTE	0: No error 1: Error Bit0: There is an error in channel 0. : Bit7: There is an error in channel 7.
	6Fh		Channel diagnosis Ch8 to Ch15	BYTE	0: No error 1: Error Bit0: There is an error in channel 8. : Bit7: There is an error in channel 15.
	70h		Channel diagnosis Ch16 to Ch23	BYTE	0: No error 1: Error Bit0: There is an error in channel 16. : Bit7: There is an error in channel 23.
	71h		Channel diagnosis Ch24 to Ch31	BYTE	0: No error 1: Error Bit0: There is an error in channel 24. : Bit7: There is an error in channel 31.

∗1: The instance number 01h to 0Ah is allocated to the Unit No. from 0 to 9.

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Details of channel diagnosis object (Class: 77h)

Instance	Attribute	Access	Name	Type	Value
01h to 0Ah *1	64h to 83h *2	Get	Channel diagnosis Ch0 to 31	BYTE	0: No error 1: Error Bit0: The analogue value has fallen below the user set value. Bit1: The analogue value has exceeded the user set value. Bit2: The analogue input value has fallen below the set range. Bit3: The analogue input value has exceeded the set range. Bit4: The ON/OFF counter has exceeded the set value. Bit5: The open circuit has been detected. Bit6: The short circuit of the valve output or digital output has been detected. Bit7: The short circuit of the power supply for the input/output device has been detected.

∗1: The instance number 01h to 0Ah is allocated to the Unit No. from 0 to 9.

∗2: The attribute number from 64h to 83h is allocated to the channel No. from 0 to 31.

Unit parameter object (Class: 78h)

Instance	Attribute	Access	Name	Type	Value
01h to 0Ah *1	64h	Get/Set	Short circuit detection (Power supply for input device) •Digital input, I/O •Analogue input, output, I/O (L+, P24, C/Q) •IO-Link master	BOOL	0: Disable 1: Enable
	65h		Short circuit detection (Output) •SI •Digital output, I/O	BOOL	0: Disable 1: Enable
	66h		Analogue over range detection •Analogue input, I/O	BOOL	0: Disable 1: Enable
	67h		Analogue under range detection •Analogue input, I/O	BOOL	0: Disable 1: Enable
	68h		Inrush current filter •Digital input, I/O	BOOL	0: Disable 1: Enable
	69h		Restart after output load short circuit •SI •Digital output, I/O	BOOL	0: Manual 1: Auto
	6Ah		Input filtering time •Digital input, I/O	USINT	0: 0.1 ms 1: 1.0 ms 2: 10 ms 3: 20 ms
	6Bh		Input extension time •Digital input, I/O	USINT	0: 1.0 ms 1: 15 ms 2: 100 ms 3: 200 ms
	6Ch		Analogue data format •Analogue input, output, I/O	USINT	0: Offset binary 1: Sign and Magnitude 2: 2's complement 3: Scaled (Scaled cannot be set for analogue input)
	6Dh		Power supply for control and input voltage monitor •SI	BOOL	0: Disable 1: Enable
	6Eh		Power supply for output voltage monitor •SI	BOOL	0: Disable 1: Enable

∗1: The instance number 01h to 0Ah is allocated to the Unit No. from 0 to 9.

Unit parameter object (Class: 78h) (continued)

Instance	Attribute	Access	Name	Type	Value
01h to 0Ah *1	70h	Get/Set	IO-Link master •Fault output (IO-Link)	USINT	0: Clear/PD Out valid 1: Hold 2: Clear/PD Out invalid
	71h		IO-Link master •Fault output (DO)	USINT	0: Clear 1: Hold 2: Force ON
	72h		IO-Link master •Idle output (IO-Link)	USINT	0: Clear/PD Out valid 1: Hold 2: Clear/PD Out invalid
	73h		IO-Link master •Idle output (DO)	USINT	0: Clear 1: Hold 2: Force ON
	74h		IO-Link master •Byte swap	USINT	0: direct 1: swap 16 bit 2: swap 32 bit 3: swap all
	75h		IO-Link master •Process data mapping	USINT	0: 2/2/2/2 1: 4/4/4/4 2: 8/8/8/8 3: 16/16/2/2 4: 32/2/2/2 5: 16/16/8/8 6: 16/16/16/16 7: 24/24/8/8 8: 24/24/24/24 9: 32/32/8/8 10: 32/32/32/32 ∗: Port1/Port2/Port3/Port4 process data size (I/O byte)

∗1: The instance number 01h to 0Ah is allocated to the Unit No. from 0 to 9.

Channel parameter object (1) (Class: 79h to 7Fh)

Class	Instance	Attribute	Access	Name	Type	Value
79h	01h to 0Ah *1	64h to 83h *2	Get/Set	Open circuit detection •SI •Digital input (DX#C1) •Digital output, I/O	BOOL	0: Disable 1: Enable
7Ah				ON/OFF count upper limit detection •SI •Digital input, output, I/O	BOOL	0: Disable 1: Enable
7Bh				ON/OFF count upper limit value •SI •Digital input, output, I/O	UINT	1 to 65000 (Times diagnosis is detected=Set value x1000)
7Ch				Analogue user setting value upper limit detection •Analogue input, output, I/O	BOOL	0: Disable 1: Enable
7Dh				Analogue user setting value of upper limit •Analogue input, output, I/O	UINT	2 bytes AD value Refer to "Parameter Setting" for details.
7Eh				Analogue user setting value lower limit detection •Analogue input, output, I/O	BOOL	0: Disable 1: Enable
7Fh				Analogue user setting value of lower limit •Analogue input, output, I/O	UINT	2 bytes AD value Refer to "Parameter Setting" for details.

∗1: The instance number 01h to 0Ah is allocated to the Unit No. from 0 to 9.

∗2: The attribute number from 64h to 83h is allocated to the channel No. from 0 to 31.

Channel parameter object (2) (Class: 83h to 8Ah)

Class	Instance	Attribute	Access	Name	Type	Value
83h	01h to 0Ah *1	64h to 83h *2	Get/Set	Output setting at communication error •SI •Digital output, I/O •Analogue output, I/O	BOOL	0: Disable (Hold) 1: Enable (Clear or Force ON)
84h				Output setting at communication error (Digital) •SI •Digital output, I/O	BOOL	0: Off (Clear) 1: On (Force ON)
85h				Output setting at communication error (Analogue) •Analogue output, I/O	UINT	2 bytes AD value Refer to "Parameter Setting" for details.
86h				Output setting at communication idling •SI •Digital output, I/O •Analogue output, I/O	BOOL	0: Disable (Hold) 1: Enable (Clear or Force ON)
87h				Output setting value at communication idling (Digital) •SI •Digital output, I/O	BOOL	0: Off (Clear) 1: On (Force ON)
88h				Output setting value at communication idling (Analogue) •Analogue output, I/O	UINT	2 bytes AD value Refer to "Parameter Setting" for details.
89h				Analogue average filter •Analogue input, I/O	USINT	0: None 1: 2 value average 2: 4 value average 3: 8 value average
8Ah				Analogue range •Analogue input, output, I/O	USINT	0: -10…+10 V (AXA only) 1: -5…+5 V (AXA only) 2: -20…+20 mA (AXA only) 3: 0…10 V 4: 0…5 V 5: 1…5 V 6: 0…20 mA 7: 4…20 mA
8Bh				ON/OFF count •SI •Digital input, output, I/O	UDINT	Set: only 0x00000000 (To reset the count value)
8Eh				Cutoff frequency •Frequency count	UINT	Val: 0 to 10000 Frequency for setting is set value x 0.1 Hz.

∗1: The instance number 01h to 0Ah is allocated to the Unit No. from 0 to 9.

∗2: The attribute number from 64h to 83h is allocated to the channel No. from 0 to 31.

SMC

■IO-Link SMI service

Reading and writing of the IO-Link master and device parameter using EtherNet/IP™ Explicite Message.
The service code of the Explicit Message varies in reading and writing.

- •Reading: 32h
- •Writing: 33h

The following 5 types of data can be read or written in the SMI service.

No	Description	Data type	Read	Write
1	SMI_MasterIdentification	IO-Link master information	○	-
2	SMI_PortConfiguration	IO-Link master port parameter setting	○	○
3	SMI_PortStatus	Acquires IO-Link master port status	○	-
4	SMI_DeviceRead	Receives ISDU from IO-Link device	○	-
5	SMI_DeviceWrite	Sends ISDU to IO-Link device	-	○

1. SMI_MasterIdentification (acquires IO-Link master information: Read)

[Request]

Data	Value	Notes
Service code	0x32	
Class	0x90	
Instance	0x01 to 09	Unit No. +1
Attribute	0x64	
Data[0]	0x00	Fixed value
Data[1]	0x01	Fixed value

[Response]

Data	Value	Notes
Ack[0] to [3]	0xB2000000	When reading is successful: 0xB2000000
Data[0] to [1]	Vendor ID	Vendor ID for the IO-Link master (SMC: 0x0083)
Data[2] to [5]	Master ID	IO-Link master ID (EX600-LAB1: 0x0000003B, EX600-LBB1: 0x0000003C)
Data[6]	Master type	IO-Link master type (0x02)
Data[7] to [8]	Feature	Functions that IO-Link master supports (0x0400)
Data[9]	Max number of ports	Maximum IO-Link port quantity of the IO-Link master (0x04)
Data[10]	Port 1 type	Port type 0: Class A (EX600-LAB1) 2: Class B (EX600-LBB1)
Data[11]	Port 2 type	
Data[12]	Port 3 type	
Data[13]	Port 4 type	

2-1. SMI_PortConfigList (acquires IO-Link master port parameter: Read)

[Request]

Data	Value	Notes
Service code	0x32	
Class	0x90	
Instance	0x01 to 09	Unit No. +1
Attribute	0x65 to 68	Port No. 1 to 4
Data[0]	0x80	Fixed value
Data[1]	0x00	Fixed value

[Response]

Data	Value	備考
Ack[0] to [3]	0xB2000000	When reading is successful: 0xB200000000
Data[0]	Port mode	0: Deactivated 1: IOL_Manual 2: IOL_Autostart 3: DI_C/Q 4: DQ_C/Q
Data[1]	Validation&Backup	0: No Device Check 1: Type compatible Device V1.0 2: Type compatible Device V1.1 3: Type compatible Device V1.1,Backup+Restore 4: Type compatible Device V1.1,Restore
Data[2]	I/Q behavior (Pin2 at M12 Connector)	1:Digital input (For EX600-LAB1) 5:Power2 (For EX600-LBB1)
Data[3]	Port Cycle time	Port cycle type (Refer to page 78)
Data[4] to [5]	Vendor ID	Vendor ID for device comparison function
Data[6]	0x00	Reserved
Data[7] to [9]	Device ID	Vendor ID for device comparison function

2-2. SMI_PortConfigList (acquires IO-Link master port parameter: Write)

[Request]

Data	Value	Notes
Service code	0x33	Service code
Class	0x90	Class
Instance	0x01 to 09	Instance, unit No.+1
Attribute	0x65..68	Port No. 1 to 4
Data[0]	0x80	Fixed value
Data[1]	0x00	Fixed value
Data[2]	Port mode	0: Deactivated 1: IOL_Manual 2: IOL_Autostart 3: DI_C/Q 4: DQ_C/Q
Data[3]	Validation&Backup	0: No Device Check 1: Type compatible Device V1.0 2: Type compatible Device V1.1 3: Type compatible Device V1.1,Backup+Restore 4: Type compatible Device V1.1,Restore
Data[4]	0x00	Fixed value
Data[5]	Port cycle time	Sets port cycle type (Refer to page 78)
Data[6]	Vendor ID [0] (MSB)	Sets vendor ID for device comparison
Data[7]	Vendor ID [1] (LSB)	
Data[8]	0x00	Fixed value
Data[9]	Device ID [0] (MSB)	Sets vendor ID for device comparison
Data[10]	Device ID [1]	
Data[11]	Device ID [2] (LSB)	

[Response]

Data	Value	Notes
Ack[0] to [3]	0xB3000000	When writing is successful: 0xB300000000

3. SMI_PortStatusList (Acquires IO-Link master port status: Read)

[Request]

Data	Value	Notes
Service code	0x32	
Class	0x90	
Instance	0x01 to 09	Unit No.+1
Attribute	0x65 to 68	Port No. 1 to 4
Data[0]	0x90	Fixed value
Data[1]	0x00	Fixed value

[Response]

Data	Value	Notes
Ack[0] to [3]	0xB2000000	When reading is successful: 0xB200000000
Data[0]	PortStatusInfo	0: NO_DEVICE, 1: DEACTIVATED, 2: PORT_DIAG 3: PREOPERATE, 4: OPERATE, 5: DI_C/Q, 6: DO_C/Q
Data[1].bit0	PortQualityInfo input	0: Input process data valid 1: Input process data invalid
Data[1].bit1	PortQualityInfo output	0: Output process data valid 1: Output process data invalid
Data[2]	RevisionID	IO-Link device revision ID
Data[3]	TransmissionRate	Communication speed 0: NOT_DETECTED, 1: COM1, 2: COM2, 3: COM3
Data[4]	MasterCycleTime	Port cycle time
Data[5]	InputDataLength	Process input data length
Data[6]	OutputDataLength	Process output data length
Data[7] to [8]	Vendor ID	Vendor ID of the IO-Link device connected
Data[9]	0x00	Reserved
Data[10] to [12]	Device ID	Device ID of the IO-Link device connected
Data[13]	NumberOfDiags	Event quantity [1]
Data[14]	EventQualifier 1	EventQualifier1 [2]
Data[15] to [16]	EventCode	Event code of IO-Link master or device [3]
Data[17]	EventQualifier 2	EventQualifier2 [2]
Data[18] to [19]	EventCode	Event code of IO-Link master or device [3]
:	:	:

[1]: When the event quantity is "0", the data for Data[14] and later is not added.
  When the event quantity is "1", the total amount of EventQualifier and event code 2 bytes (total bytes: 3) will be added. Data will be added by 3 bytes according to the event quantity.

[2]: The specifications of EventQualifier# are described below.

Bit							
7	6	5	4	3	2	1	0
Mode		Type		Source	Instance		
0: Reserved 1: Event single shot 2: Event disappears 3: Event appears		0: Reserved 1: Notification 2: Warning 3: Error		0: Device 1: Master	0: Unknown 1-3: Reserved 4: Application 5-7: Reserved		

[3]: Refer to IO-Link master unit (page 90) for details of the event code of the IO-Link master.
  Refer to Operation Manual of IO-Link Device for details of the event code of the IO-Link device.

4. SMI_DeviceRead (Acquires IO-Link device marameters: Read)
[Request]

Data	Value	Notes
Service code	0x32	
Class	0x90	
Instance	0x01 to 09	Unit No. +1
Attribute	0x65 to 68	Port No. 1 to 4
Data[0]	0x30	Fixed value
Data[1]	0x00	Fixed value
Data[2]	Index[0] (MSB)	Refer to Operation Manual of IO-Link Device
Data[3]	Index[1] (LSB)	Refer to Operation Manual of IO-Link Device
Data[4]	Subindex	Refer to Operation Manual of IO-Link Device

[Response]

Data	Value	Notes
Ack[0] to [3]	0xB2000000	When reading is successful: 0xB2000000
Data[0] to [#]	On request data	Refer to Operation Manual of IO-Link Device

5. SMI_DeviceRead (IO-Link device parameter setting: Write)
[Request]

Data	Value	Notes
Service code	0x33	
Class	0x90	
Instance	0x01 to 09	Instance, Unit No. +1
Attribute	0x65..68	Port No. 1 to 4
Data[0]	0x30	Fixed value
Data[1]	0x00	Fixed value
Data[2]	Index[0] (MSB)	Refer to Operation Manual of IO-Link Device
Data[3]	Index[1] (LSB)	Refer to Operation Manual of IO-Link Device
Data[4]	Subindex	Refer to Operation Manual of IO-Link Device
Data[5] to [#]	On request data	Refer to Operation Manual of IO-Link Device

[Response]

Data	Value	Notes
Ack[0] to [3]	0xB3000000	When writing is successful: 0xB3000000

Web Server

EX600 Web server functional overview

The Web server function is provided by the EX600-SEN7/SEN8.

The functions available vary depending on the mode.

Function	Admin mode	Monitor only mode
I/O Monitor	Available	Available
Diagnostic status monitor	Available	Available
Parameter setting	Available	Not available
Force I/O setting	Available	Not available

The web browsers that have been confirmed to work correctly are as shown in the table below.

Web browser	Version
Google Chrome	Ver.85
Mozilla firefox	Ver.81
Microsoft Edge(Chromium)	Ver.85

∗: Internet Explorer is not supported.

NOTE

Web server functionality may not work correctly with browsers other than those in the above table.

Connecting to EX600-SEN7 (Ex. IP address of EX600-SEN7 is 192.168.0.1.)

(1) Connect PC and EX600-SEN7 with a communication cable and open the web browser.
(2) Match the top 3 octets of the IP address between the PC and EX600.
   Ex. PC IP address 192.168.0.250 (subnet mask 255.255.255.0)
(3) Type the IP address of EX600-SEN7 on the web browser. (Ex. http://192.168.0.1)
   The EX600 webpage should load after several seconds.

> **NOTE**
> Connect one SI unit to one PC.

Default setting
Password: admin

When "Administrator" is selected and inputting password, the screen is switched to "Admin mode".

When "Monitor only" is selected, the screen is switched to monitor only mode.
No Password is required.
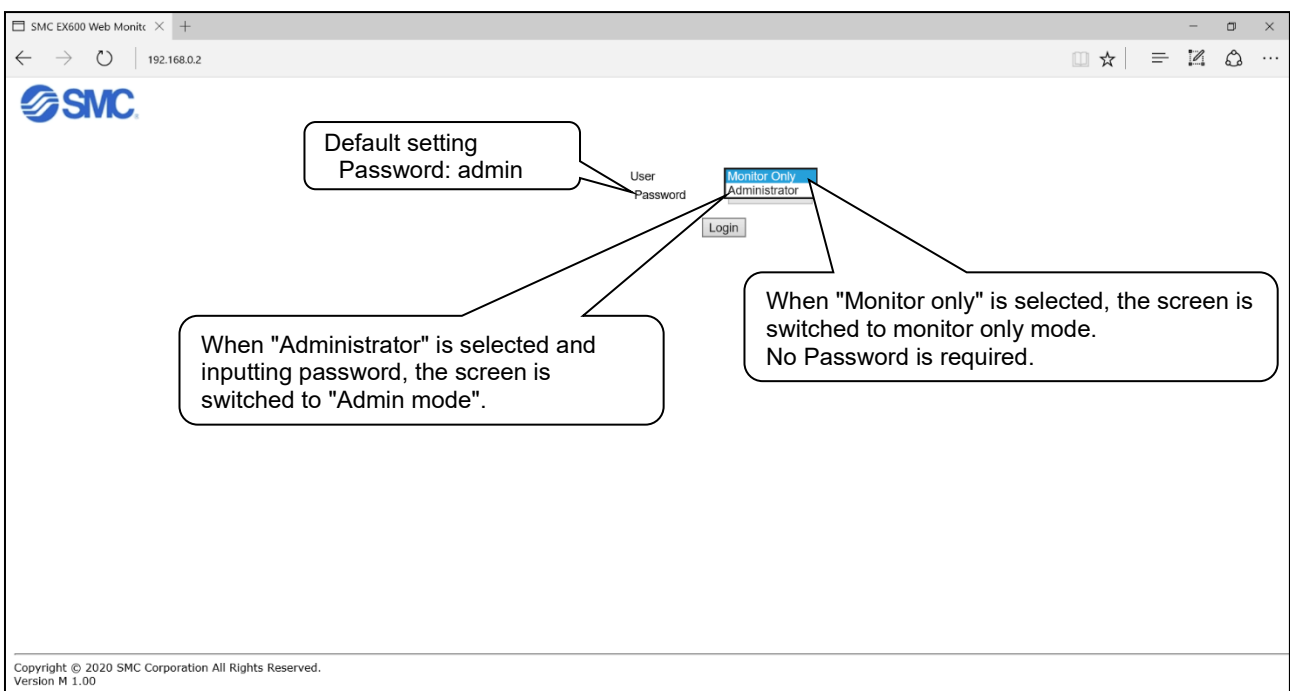
(4) After pressing the "Login" button, the "SYSTEM CONFIGURATION STATUS" web page is displayed. This page is the TOP web page of the EX600 webserver.

Web server communication status is displayed.

The total size of input/output is displayed.

Click here to logout.

Click "Unit name" to display the I/O Monitor.

Click here to change the password.

Click here to clear error log.

NOTE
The screen above shows the case when the manifold hardware configuration is as shown below.

Configuration

	No.0	No.1	No.2	No.3	No.4	No.5	No.6	No.7	No.8	No.9
End plate	EX600-LBB1	EX600-LBB1	EX600-LBB1	EX600-LAB1	EX600-DXPD	EX600-SEN7				

(5) When unit diagnosis is detected, the diagnostic information is displayed on the "SYSTEM CONFIGURATION STATUS" screen.

(6) When "Unit Name" is selected (i.e.left mouse button double clicked) on the "SYSTEM CONFIGURATION STATUS" screen, the "I/O MONITOR" screen is displayed. (EX. EX600-DX#D)

ON/OFF information can be monitored for each channel.

If the diagnostic is detected, diagnostic information will be displayed.

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(7) Select "UNIT PARAMETER" tab to display "UNIT PARAMETER" screen. (EX. EX600-DX#D)
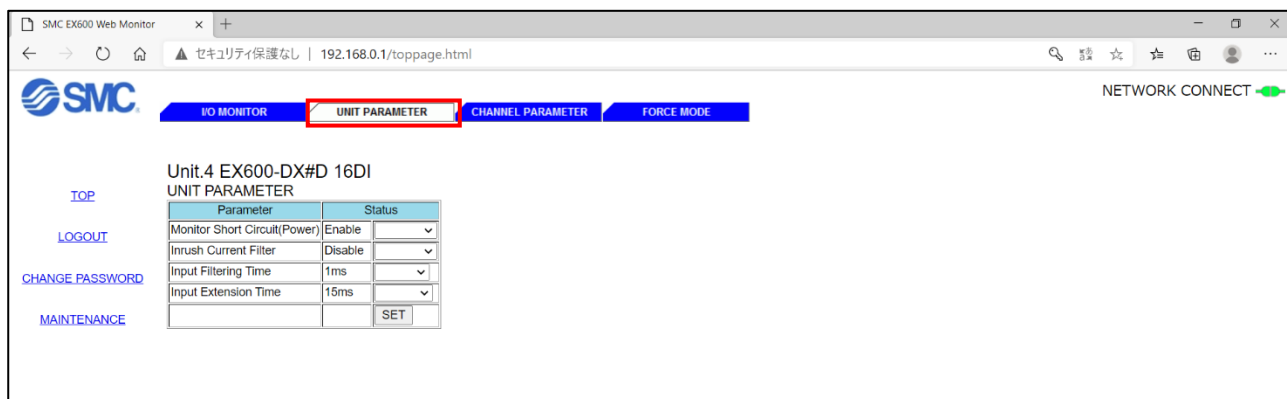
(8) Select "CHANNEL PARAMETER" tab to diplay "CHANNEL PARAMETER" screen. (EX. EX600-DX#D)

Input value and then press "SET" to change the parameter.
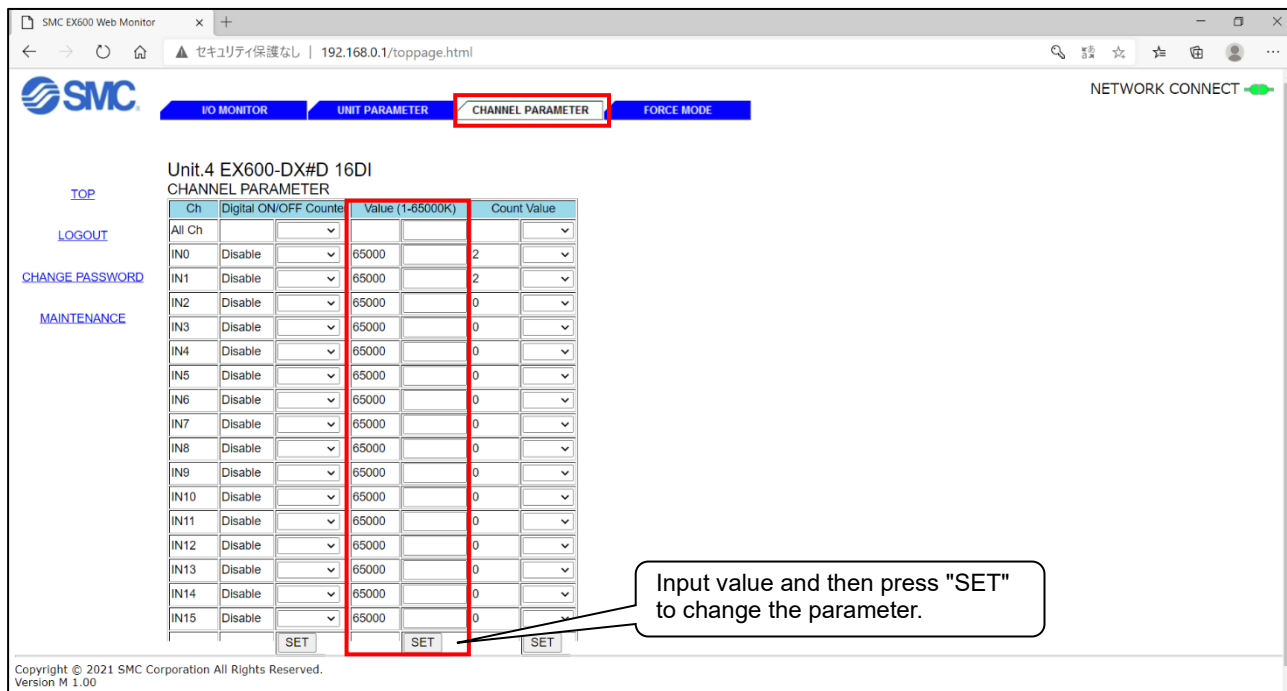
(9) Select "FORCE MODE" tab to display below screen.

After checking the safety of the surrounding and equipment, press "OK".

⚠Warning

■The forced input/output function is used to change the signal status forcibly. When operating this function, be sure to check the safety of the surrounding and equipment.
Otherwise, injury or equipment damage could result.

(10) Tick the check box on the "FORCE MODE" screen to enable forced mode.
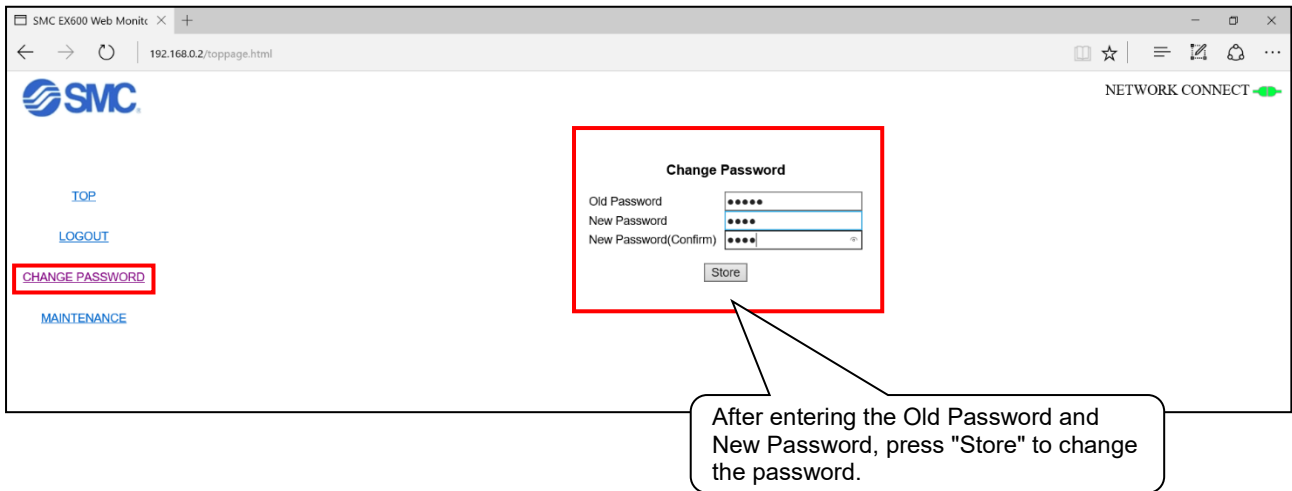
NOTE
There are two ways to cancel the forced mode: "press the RESET button" or "LOG OUT from the Web server".
Please note that if the forced mode is canceled while EtherNet/IP communication with the PLC is established, the input / output data with the PLC will be shown immediately.
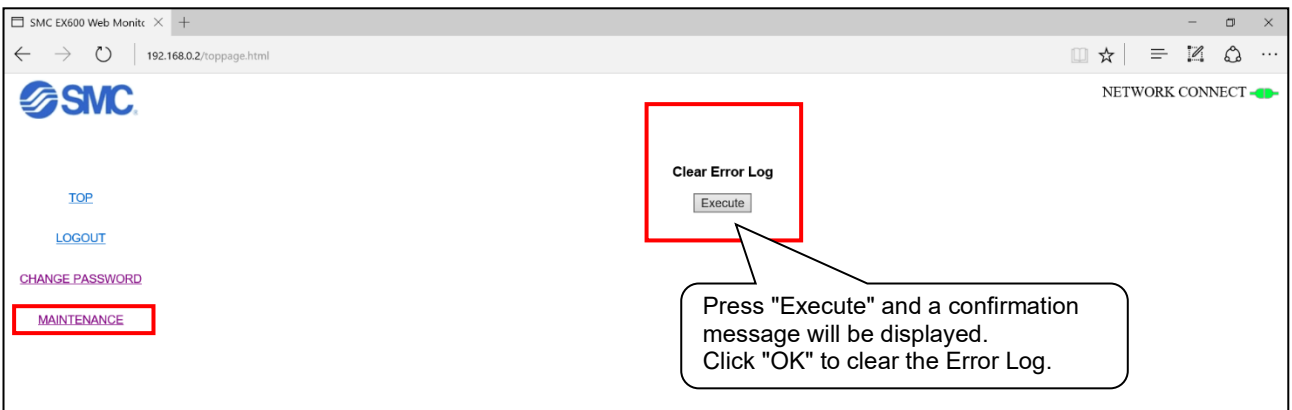
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(11) To change the Password, log in using Administrator mode and select "CHANGE PASSWORD".

After entering the Old Password and New Password, press "Store" to change the password.

(12) To clear the Error Log, log in using Administrator mode and select "MAINTENANCE".

Press "Execute" and a confirmation message will be displayed.
Click "OK" to clear the Error Log.

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Accessories

For the selection of accessories, refer to the catalogue.

⑴ Valve plate

    EX600-ZMV1
        Enclosed parts: Round head screw (M4 x 6), 2 pcs.
                          Round head screw (M3 x 8), 4 pcs.
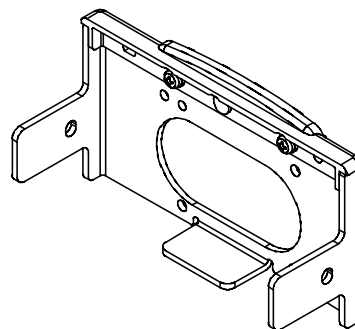
    EX600-ZMV2 (Specified for SY series)
        Enclosed parts: Round head screw (M4 x 6), 2 pcs.
                          Roun1d head screw (M3 x 8), 4 pcs.
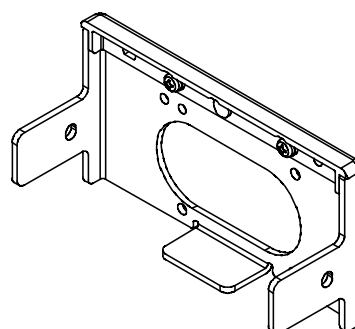
⑵ End plate bracket

    EX600-ZMA2
        Enclosed parts: Round head screw (M4 x 20), 1 pc.
                          P tithe screw (4 x 14), 2 pcs.
    EX600-ZMA3 (Specified for SY series)
        Enclosed parts: Round head screw (M4 x 20) with washer, 1 pc.
                          P tithe screw (4 x 14), 2 pcs.
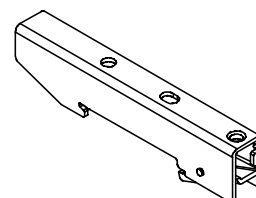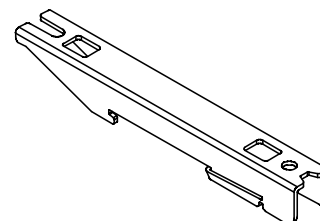
⑶ Intermediate support bracket

    EX600-ZMB1…for direct mounting
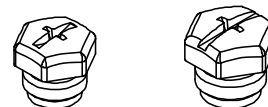   Enclosed parts: Round head screw (M4 x 5), 2 pcs.
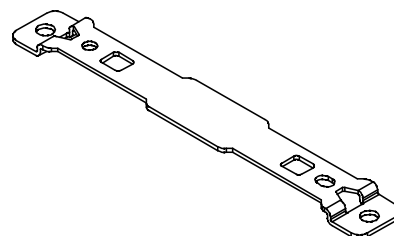
    EX600-ZMB2…for DIN rail mounting
        Enclosed parts: Round head screw (M4 x 6), 2 pcs.

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(4) Seal cap (10 pcs.)
　　EX9-AWES…for M8
　　EX9-AWTS…for M12

(5) Marker (1 sheet, 88 pcs.)
　　EX600-ZT1

(6) Assembled type connector
　　PCA-1446553:　For EtherNet/IP™ communication, M12 (4 pin) Plug, D code
　　PCA-1578078:　For power supply, 7/8 inch, Plug, Cable O.D. 12 to 14 mm
　　PCA-1578081:　For power supply, 7/8 inch, Socket, Cable O.D. 12 to 14 mm

(7) Power supply cable
　　PCA-1558810:　　Cable with 7/8 inch connector, Socket, Straight 2 m
　　PCA-1558823:　　Cable with 7/8 inch connector, Socket, Straight 6 m
　　PCA-1558836:　　Cable with 7/8 inch connector, Socket, Right angle 2 m
　　PCA-1558849:　　Cable with 7/8 inch connector, Socket, Right angle 6 m
　　PCA-1564927:　　Cable with M12 connector, B code, Socket, Straight 2 m, SPEEDCON compatible
　　PCA-1564930:　　Cable with M12 connector, B code, Socket, Straight 6 m, SPEEDCON compatible
　　PCA-1564943:　　Cable with M12 connector, B code, Socket, Right angle 2 m, SPEEDCON compatible
　　PCA-1564969:　　Cable with M12 connector, B code, Socket, Right angle 6 m, SPEEDCON compatible
　　EX500-AP010-S:　Cable with M12 connector, A code, Socket, Straight 1 m
　　EX500-AP050-S:　Cable with M12 connector, A code, Socket, Straight 5 m
　　EX500-AP010-A:　Cable with M12 connector, A code, Socket, Angle 1 m
　　EX500-AP050-A:　Cable with M12 connector, A code, Socket, Angle 5 m
　　PCA-1401804:　　Cable with M12 connector, A code, Socket, Straight 1.5 m, SPEEDCON compatible
　　PCA-1401805:　　Cable with M12 connector, A code, Socket, Straight 3 m, SPEEDCON compatible
　　PCA-1401806:　　Cable with M12 connector, A code, Socket, Straight 5 m, SPEEDCON compatible
　　PCA-1557769:　　Cable with M12 connector, A code, Socket, Plag, Straight 3 m, SPEEDCON compatible

(8) EtherNet/IP™ communication cable
    PCA-1446566:   Cable with M12 connector, D code, Plug, Straight 5 m, SPEEDCON compatible
    EX9-AC010EN-PSRJ: Cable with M12 connector, D code-RJ45, Plug, Straight 1 m
    EX9-AC020EN-PSRJ: Cable with M12 connector, D code-RJ45, Plug, Straight 2 m
    EX9-AC030EN-PSRJ: Cable with M12 connector, D code-RJ45, Plug, Straight 3 m
    EX9-AC050EN-PSRJ: Cable with M12 connector, D code-RJ45, Plug, Straight 5 m
    EX9-AC100EN-PSRJ: Cable with M12 connector, D code-RJ45, Plug, Straight 10 m
    EX9-AC005EN-PSPS: Cable with M12 connector, dual-side D code Plug, Straight 0.5 m
    EX9-AC010EN-PSPS: Cable with M12 connector, dual-side D code Plug, Straight 1 m
    EX9-AC020EN-PSPS: Cable with M12 connector, dual-side D code Plug, Straight 2 m
    EX9-AC030EN-PSPS: Cable with M12 connector, dual-side D code Plug, Straight 3 m
    EX9-AC050EN-PSPS: Cable with M12 connector, dual-side D code Plug, Straight 5 m
    EX9-AC100EN-PSPS: Cable with M12 connector, dual-side D code Plug, Straight 10 m
    EX9-AC005EN-PAPA: Cable with M12 connector, dual-side D code Plug, Angle 0.5 m
    EX9-AC010EN-PAPA: Cable with M12 connector, dual-side D code Plug, Angle 1 m
    EX9-AC020EN-PAPA: Cable with M12 connector, dual-side D code Plug, Angle 2 m
    EX9-AC030EN-PAPA: Cable with M12 connector, dual-side D code Plug, Angle 3 m
    EX9-AC050EN-PAPA: Cable with M12 connector, dual-side D code Plug, Angle 5 m
    EX9-AC100EN-PAPA: Cable with M12 connector, dual-side D code Plug, Angle 10 m

(9) IO-Link communication cable
    EX9-AC005-SSPS: Cable with M12 connector, Socket, Plug, Straight 0.5 m
    EX9-AC010-SSPS: Cable with M12 connector, Socket, Plug, Straight 1.0 m
    EX9-AC020-SSPS: Cable with M12 connector, Socket, Plug, Straight 2.0 m
    EX9-AC030-SSPS: Cable with M12 connector, Socket, Plug, Straight 3.0 m
    EX9-AC050-SSPS: Cable with M12 connector, Socket, Plug, Straight 5.0 m
    EX9-AC100-SSPS: Cable with M12 connector, Socket, Plug, Straight 10.0 m

Revision history

No.EX※※-OMZ0024