No.EX※※-OMA1023

Operation Manual

PRODUCT NAME

Fieldbus system
EtherCAT compatible SI Unit

MODEL / Series / Product Number

EX600-SEC3/SEC4
EX600-ED#

SMC Corporation

Table of Contents

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.

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.

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.

●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.

•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/UKCA 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.

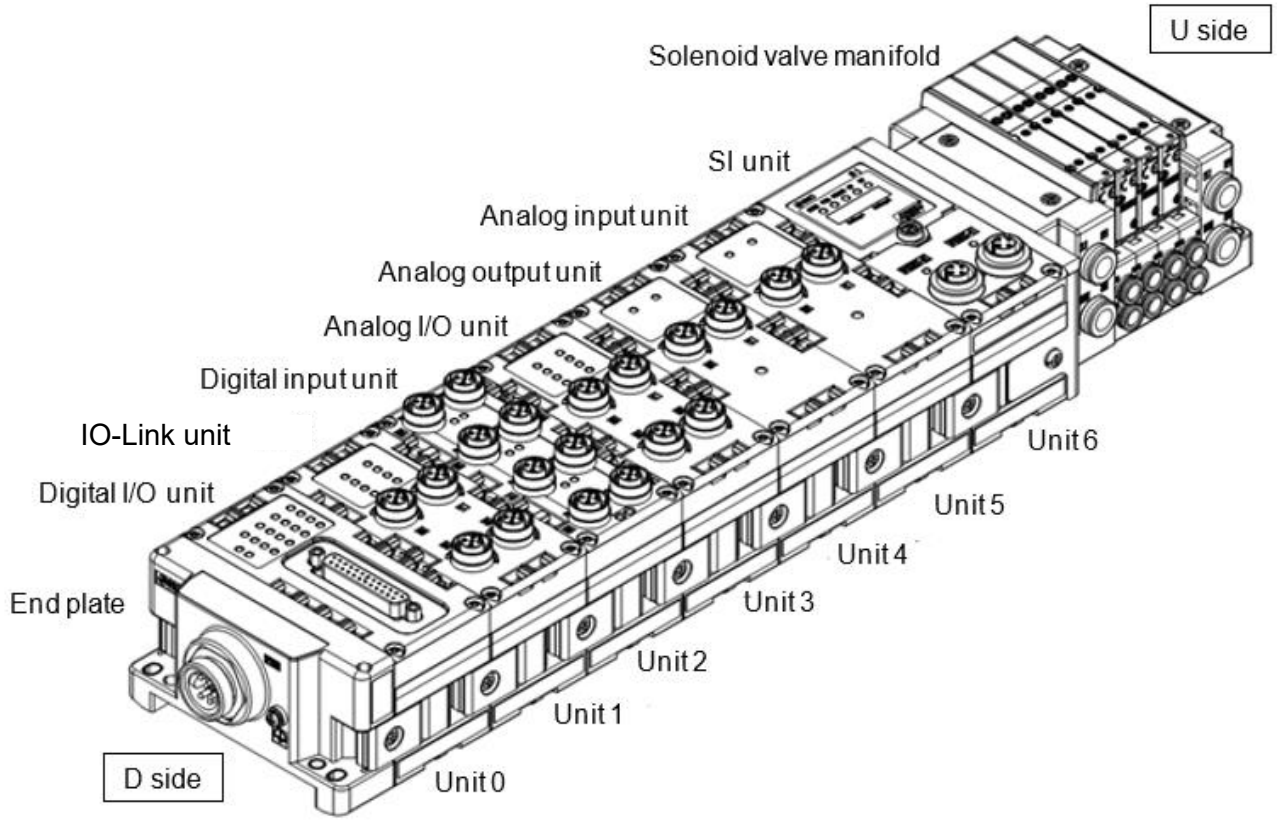
∗Adjustment and Operation
•Set the switches by using a sharp-pointed screwdriver etc. When setting the switch, do not touch other unrelated parts.
This can cause parts damage or malfunction due to a short circuit.
•Perform settings suitable for the operating conditions.
Incorrect setting can cause operation 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.

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 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 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

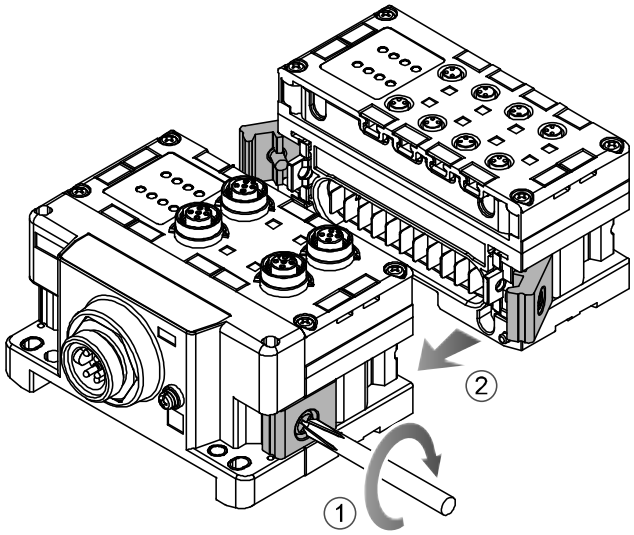
	Terminology	Definition
100	100BASE-TX	Standard of LAN transmission line with communication speed of 100 Mbps.
C	Current consumption	The current necessary to operate each unit.
D	DIN rail	A metal rail conforming with the DIN (German) standard.
	D Side	The side connected to the end plate when the product is connected to a manifold.
E	ESI	An ESI file is an EtherCAT Slave Information file. 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.
I	Idle	The operation mode of the SI unit has shifted from OP to SAFEOP. For details, refer to the manuals of each PLC manufacturer.
M	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.
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

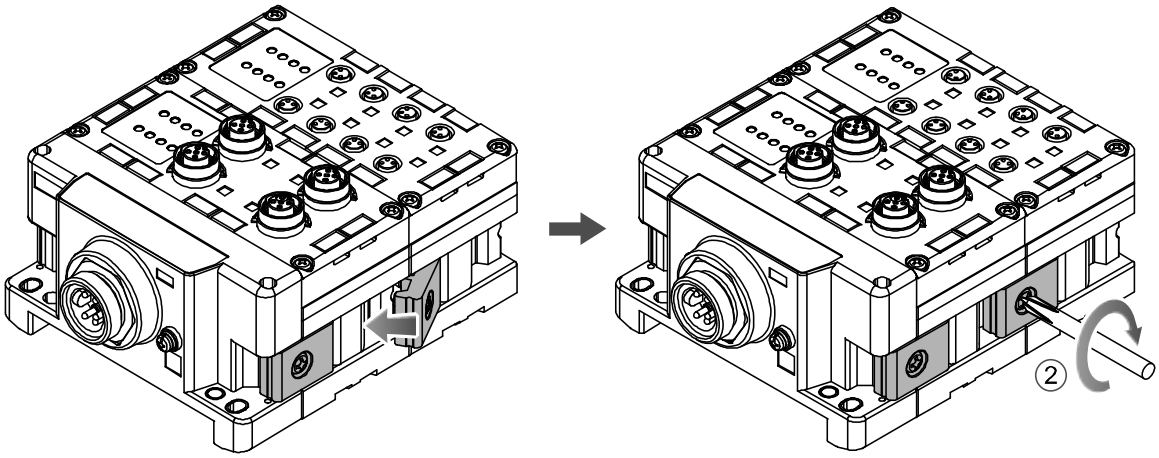
●Composing the unit as a manifold

∗: 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)



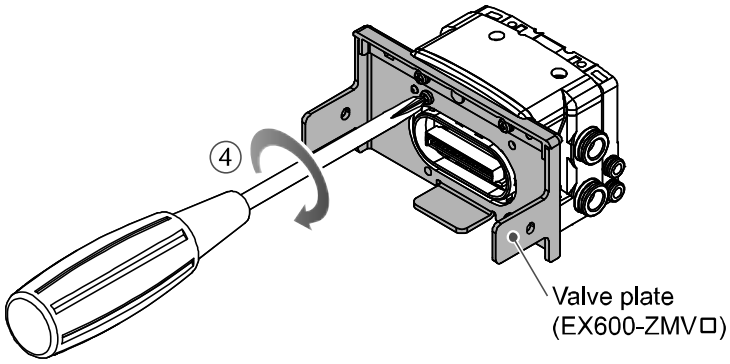
(2) Add more units.
Up to 10 units (including the SI unit) can be connected to one manifold.



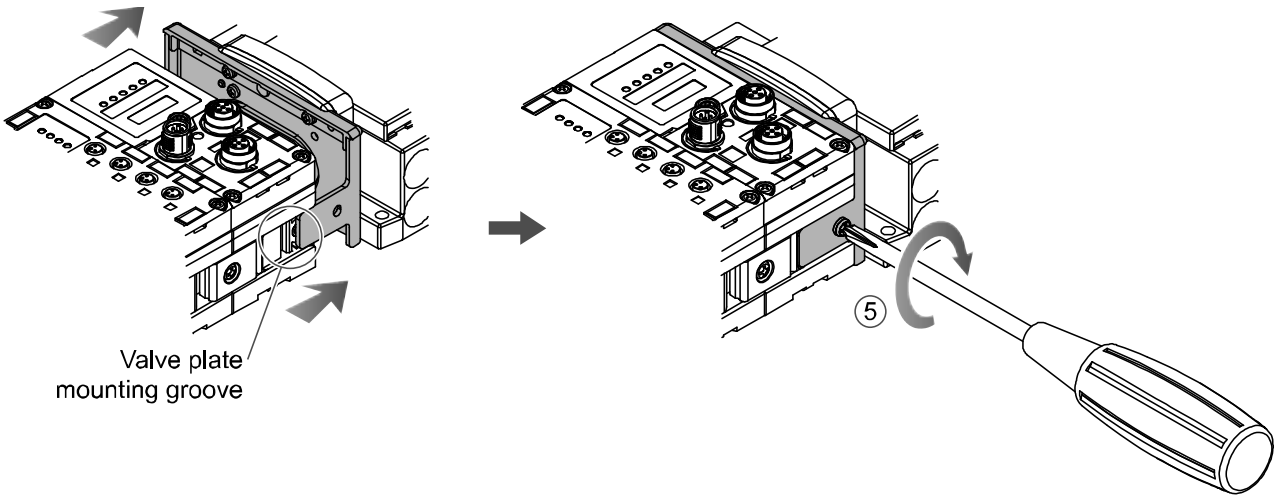
(3) Connecting the SI unit.
After connecting the necessary I/O units, connect the SI unit.
Connecting method is the same as above (1), (2).

(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



(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)



●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.

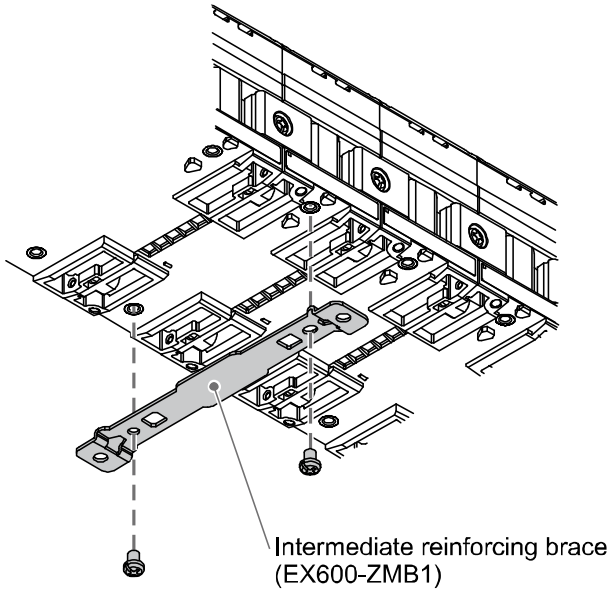
Mounting and Installation

■Installation

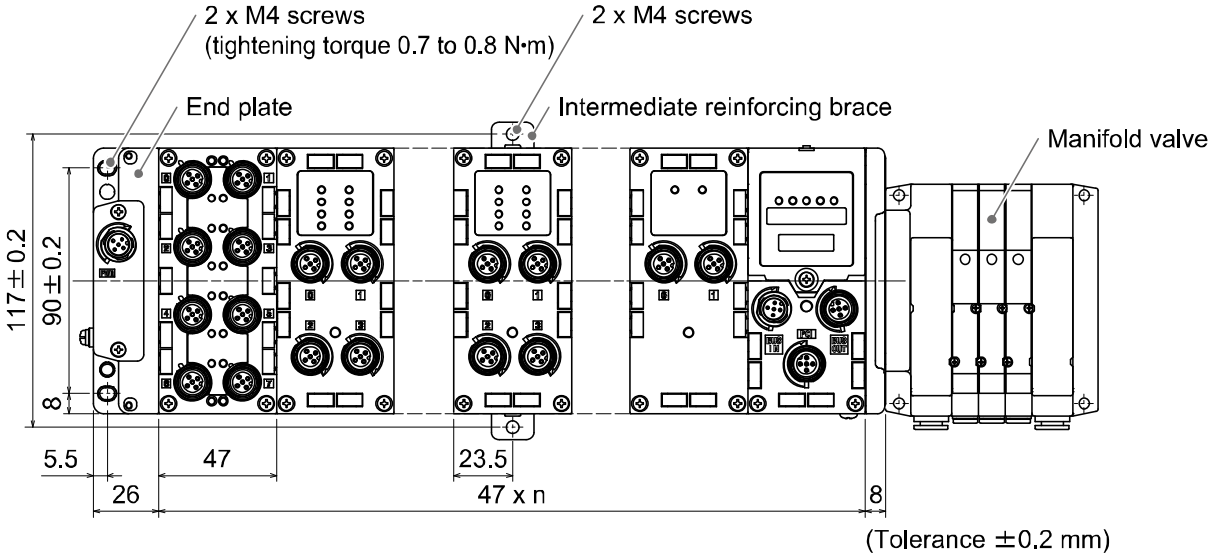
•Direct mounting

(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)



(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

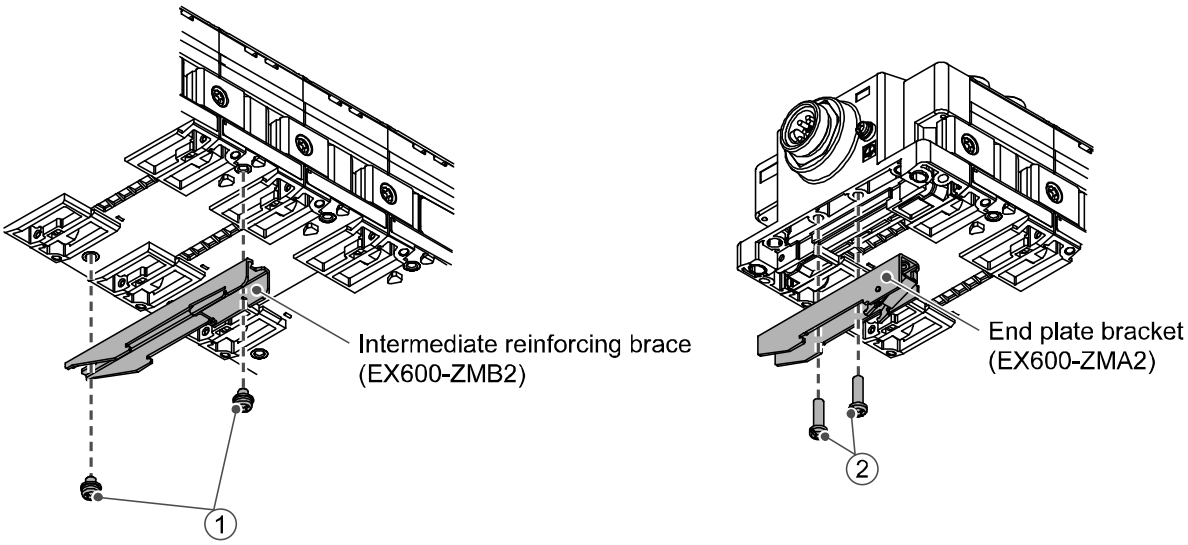
•When joining six or more units, fix the middle part of the complete unit with an intermediate reinforcing brace to prevent incorrect connection between the units due to deflection.

•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)

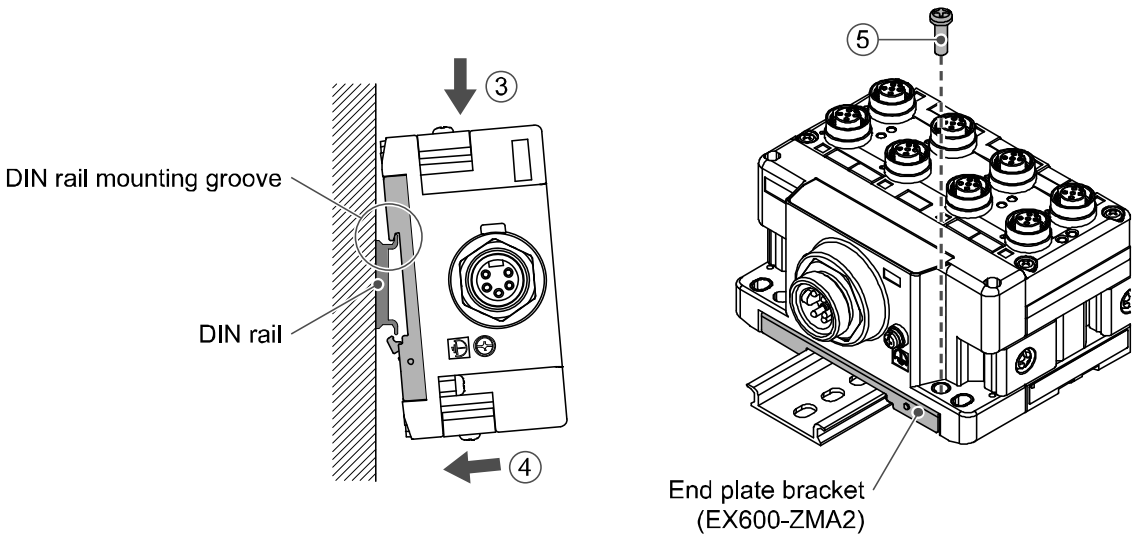
(2) Mount the end plate bracket (EX600-ZMA2) to the end plate at the opposite end to the valves, using 2-M4 x 14 mm screws. (Tightening torque: 0.7 to 0.8 N•m)



(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.



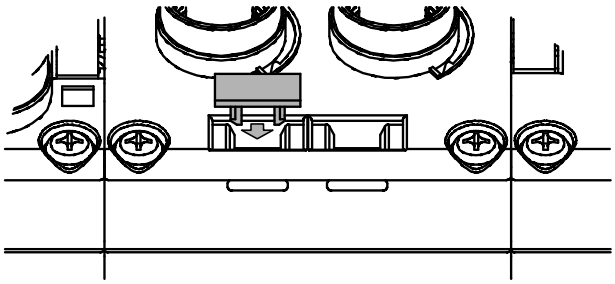
●Precautions for handling

•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.

•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.



SI Unit

Model Indication and How to Order

EX600-S EC 3

SI unit

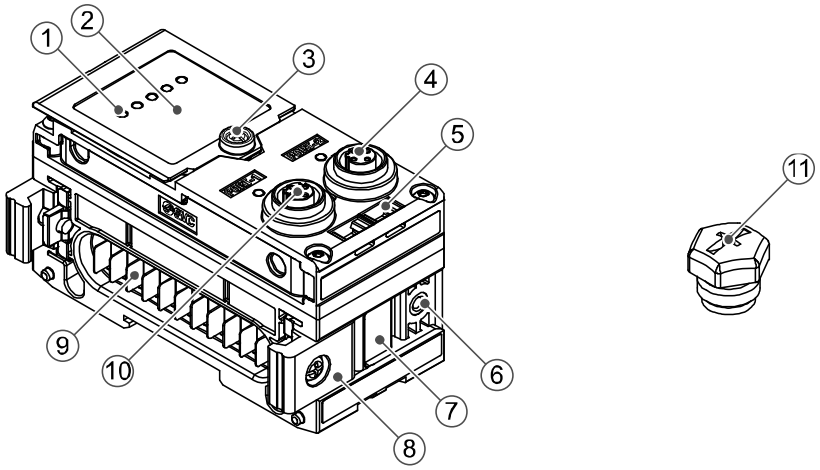
Protocol

Symbol	Content
EC	EtherCAT

Polarity of output

Symbol	Content
3	PNP (Negative common)
4	NPN (Positive common)

Summary of Product parts

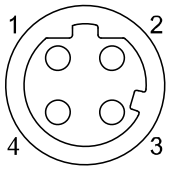


No.	Description	Function
1	Status display LED	Displays the status of the unit.
2	Display cover	Open when making the switch settings
3	Display cover screw	Loosen the screw to open the display cover.
4	BUS OUT connector (PORT 2)	Connection for the cable for fieldbus outputs.
5	Marker groove	Groove to mount 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	BUS IN 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 PORT 1 / PORT 2	Pin No.	Signal name
	1	TX+
	2	RX+
	3	TX-
	4	RX-

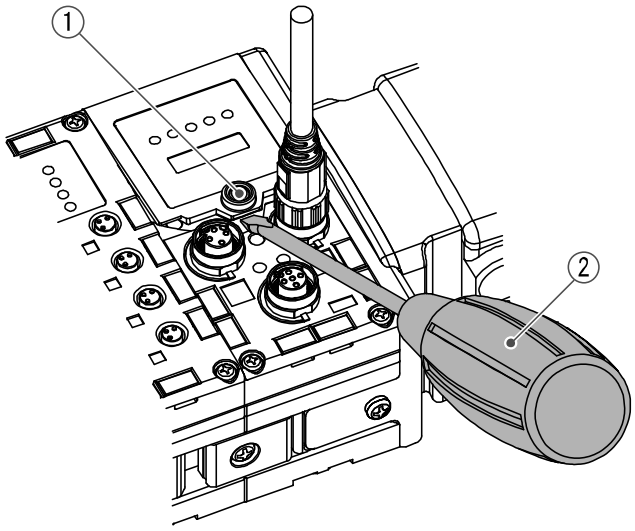
●Precautions for handling

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.

Setting and Adjustment

●Switch setting operation

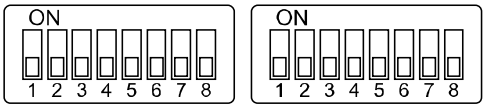
(1) Loosen the display cover screw (indicated by the arrow).
(2) Open the display cover using a flat blade screwdriver, etc.



(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

Settings 1		Settings 2	
1	V_SEL	1	IO-Link master size setting
2		2	
3	Diagnostics setting	3	EX600-SEC1/2 Compatibility mode *1
4		4	Fixed to OFF
5	Hold/Clear setting	5	
6	Fixed to OFF	6	
7		7	
8		8	

*1: When switch 3 of Settings2 is turned ON, the memory map and the functions change to EX600-SEC1/2 Compatibility mode. Use the ESI file for EX600-SEC1/2 in this mode.

●Precautions for handling
- Handle the switches with care. Excessive force can break the switch.
- Switch 6 to 8 of the Settings1 and switch 4 to 8 of the Setting2 are not used (Never turn it ON).

•V_SEL: Select the occupying number of the valve outputs.

Settings1		Content	SI unit output data size
1	2		
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

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

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

• Hold/Clear setting: Sets the output status for when the fieldbus has a communication error or is in idling state.

Settings1	Content
5	
OFF	Output is OFF (default setting)
ON	Holds the output.

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

∗: Communication error means that the SI unit is in a communication interrupted state.
Idle means that the operation mode of the SI unit has shifted from OP to SAFEOP.

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

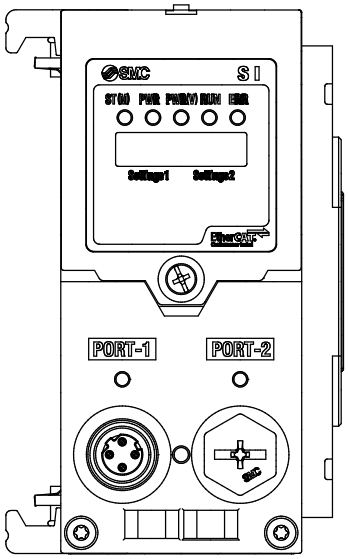
Settings2		Content	IO-Link master size setting (Process data size at each communication port)
1	2		
OFF	OFF	Port1/2/3/4 (Input and Output)	22 bytes (default setting) (4/4/4/4 bytes)
OFF	ON		38 bytes (8/8/8/8 bytes)
ON	OFF		70 bytes (16/16/16/16 bytes)
ON	ON		134 bytes (32/32/32/32 bytes)

• EX600-SEC1/2 Compatibility mode setting:

Settings2	Content
3	
OFF	Run in Normal mode. (default setting)
ON	Run in EX600-SEC1/2 compatibility mode.

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.
RUN	Displays the EtherCAT device status.
ERR	Displays the communication error status.

Display	Content
PORT-1	Displays the communication status of the BUS IN side.
PORT-2	Displays the communication status of the BUS OUT 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.
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)

•RUN-LED

LED display	Content
OFF	INIT state
Green blinking	PRE-OPERATIONAL state
Green single flashing	SAFE-OPERATIONAL state
Green flickering	BOOTSTRAP state
Green ON	OPERATIONAL state

•ERR-LED

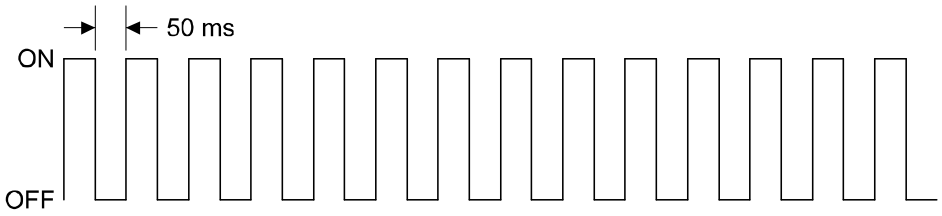
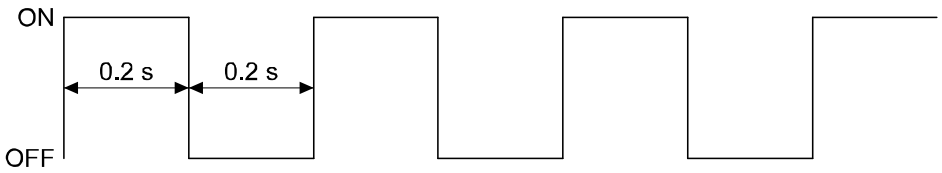
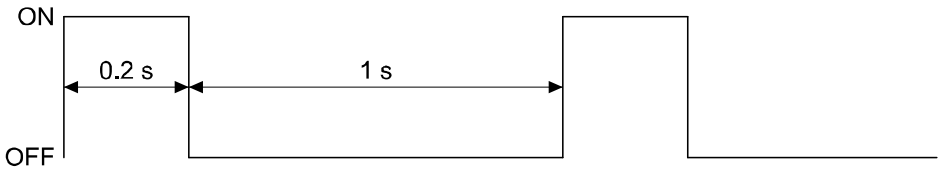
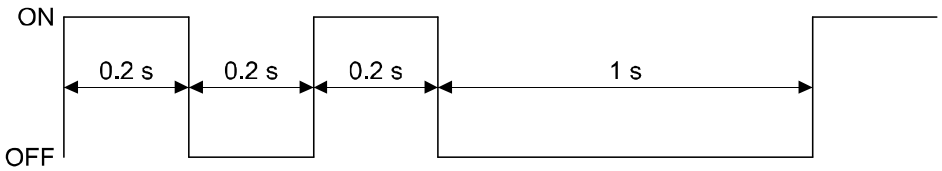
LED display	Content
OFF	No communication errors
Red blinking	Invalid configuration
Red single flashing	Synchronization error, communication data error
Red double flashing	Communication error (Application watchdog timeout)

•L/A PORT1-LED

LED display	Content
OFF	No Link , No Activity (BUS IN side)
Green ON	100 Mbps Link, No Activity (BUS IN side)
Green flickering	100 Mpps Link, Activity (BUS IN side)

•L/A PORT2-LED

LED display	Content
OFF	No Link , No Activity (BUS OUT side)
Green ON	100 Mbps Link, No Activity (BUS OUT side)
Green flickering	100 Mpps Link, Activity (BUS OUT side)

Flickering	
Blinking	
Single flashing	
Double flashing	

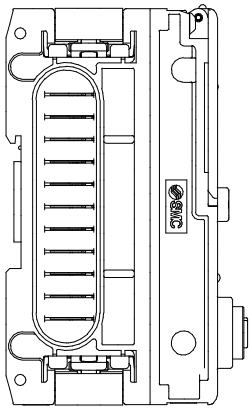
Specifications

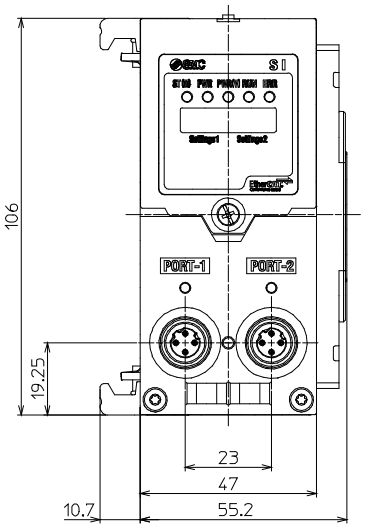
■Specifications

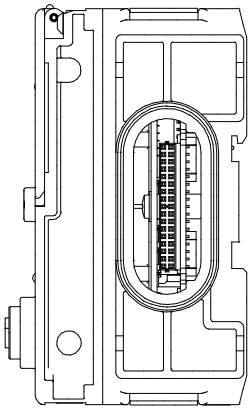
Model		EX600-SEC3	EX600-SEC4
Communication	Number of ports	2 ports	
	Protocol	EtherCAT (Conformance Test Record V.2.3.0)	
	Transmission speed	100 Mbps	
	Configuration file	ESI file	
	Occupying area (Number of input/output)	(1212 bytes/1210 bytes) Max.	
	Applicable function	Web server	
Internal current 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 °C	
	Storage temperature range	-20 to 60 °C	
	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	

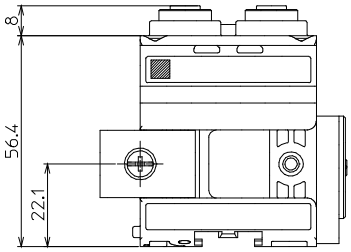
*1: All unused connectors must have a seal cap fitted to maintain IP67 rating.

■Dimensions









End plate

Model Indication and How to Order

•End plate (D side)

EX600-ED□-□

End plate at D side

Connector

Mounting method

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)

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

*: Refer to Connector Pin No. (page 29) for details of the PIN layout 1 and 2.

•End plate (U side)

EX600-EU1-□

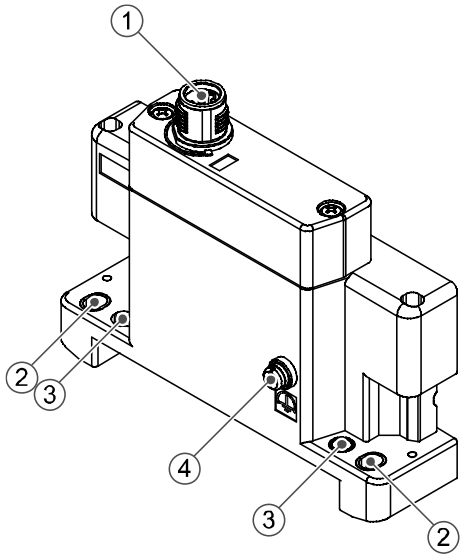
End plate at U side

Mounting method

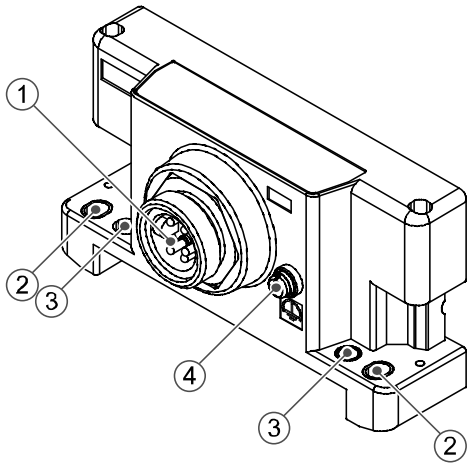
Symbol	Description
Nil	No DIN rail bracket
2	With DIN rail bracket (EX600-ED#-2)
3	With DIN rail bracket (EX600-ED#-3)

Summary of Product parts

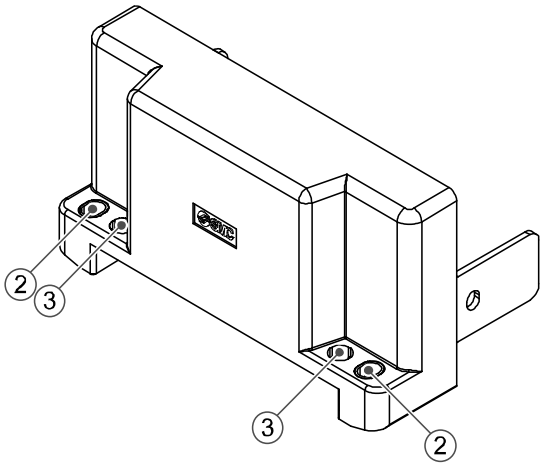
•EX600-ED2-#



•EX600-ED3-#



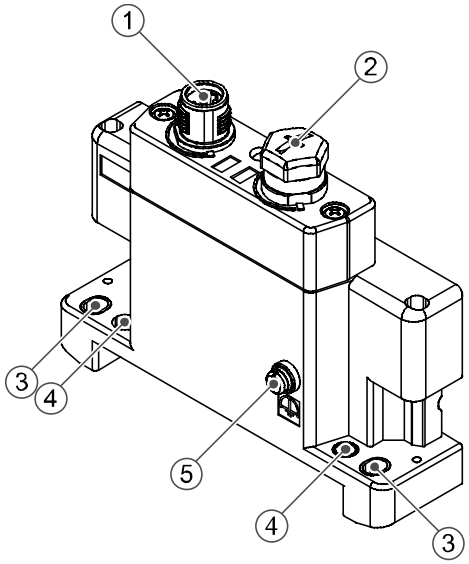
•EX600-EU1-#



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 (M3) *	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. termina (M3)l *	Functional Earth terminal - must be connected directly to system earth (ground).

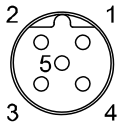
*: Individual grounding should be provided close to the product with a short cable.

■Wiring

○Connector pin assignment

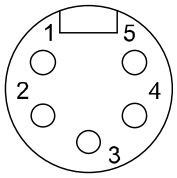
(1) EX600-ED2-#

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.

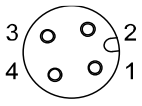
(2) EX600-ED3-#

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

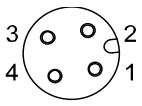
Configuration	Pin No.	Signal name
	1	24 V (Control and input)
	2	24 V (Output)
	3	0 V (Control and input)
	4	0 V (Output)

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

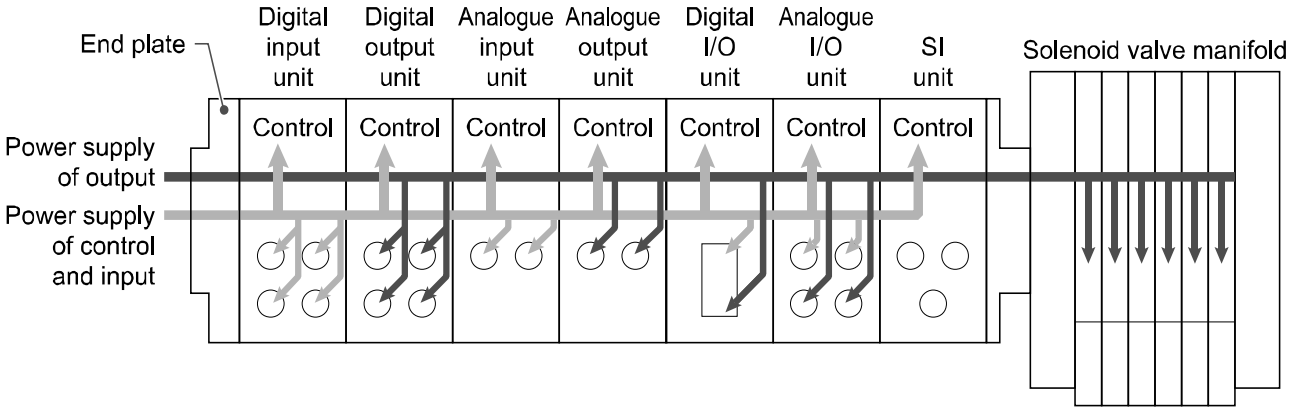
Configuration	Pin No.	Signal name
	1	24 V (Output)
	2	0 V (Output)
	3	24 V (Control and input)
	4	0 V (Control and input)
	5	Not used

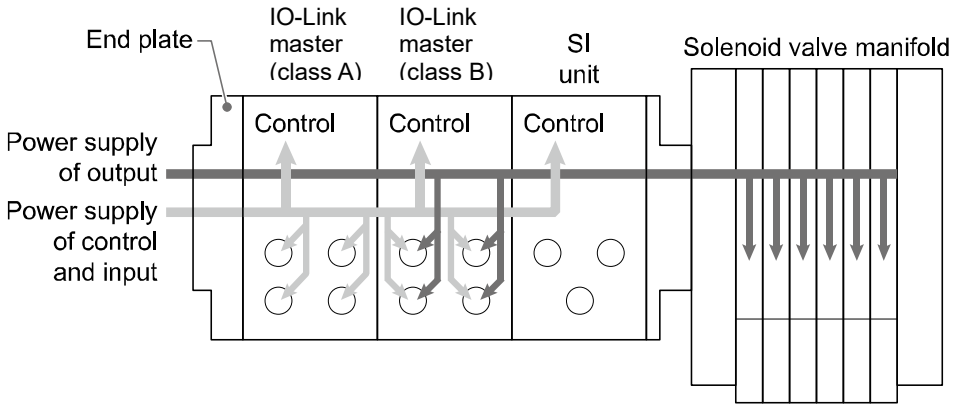
○Regarding the 2 types of power supply

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

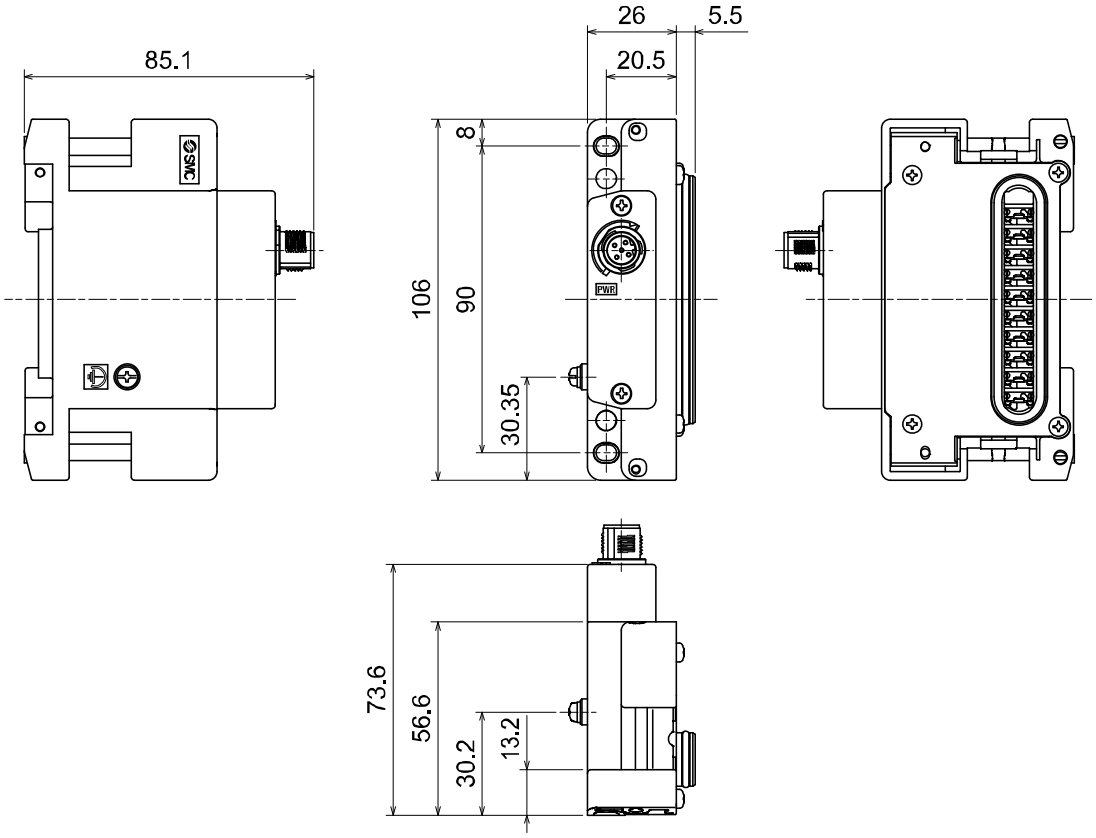
■Specifications

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/UKCA marked, UL (CSA)		CE/UKCA marked	
Weight			170 g	175 g	170 g	

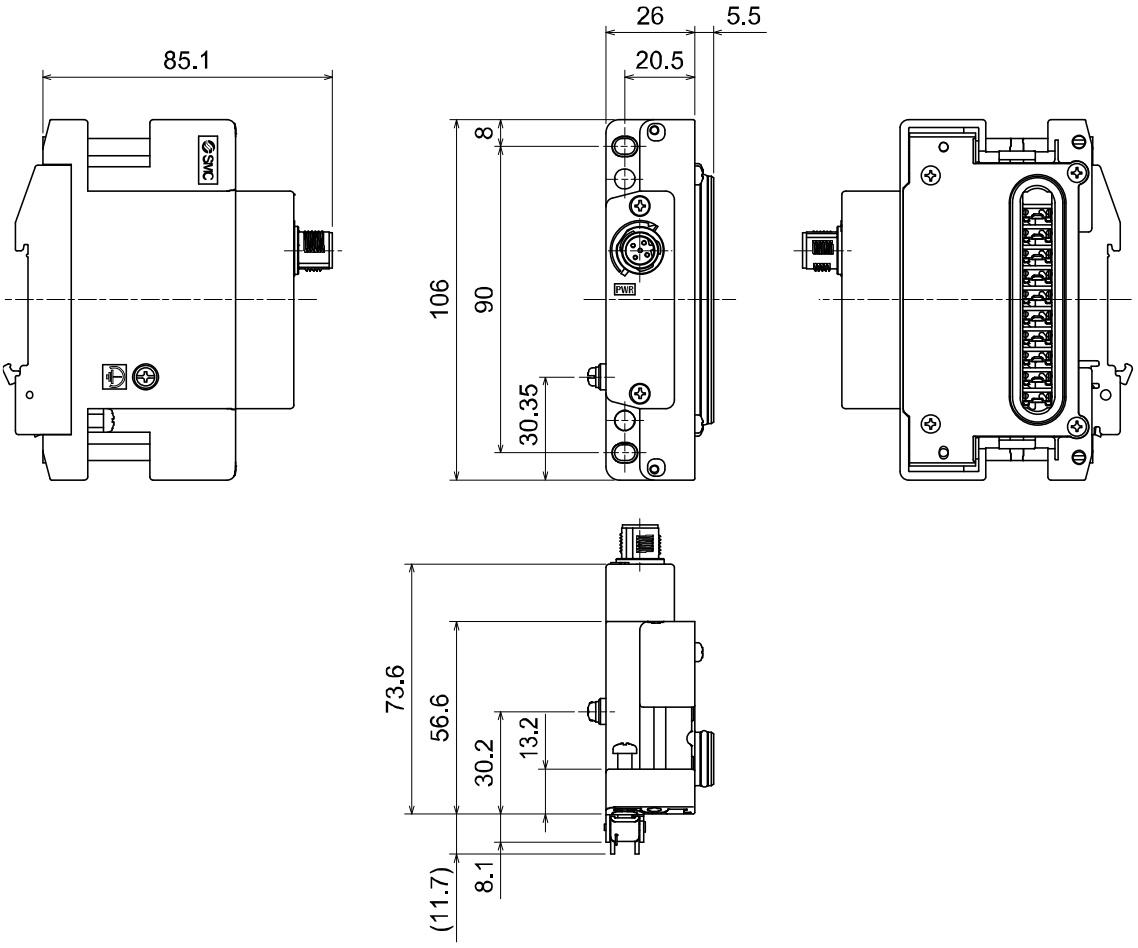
*1: All unused connectors must have a seal cap fitted.

■Dimensions

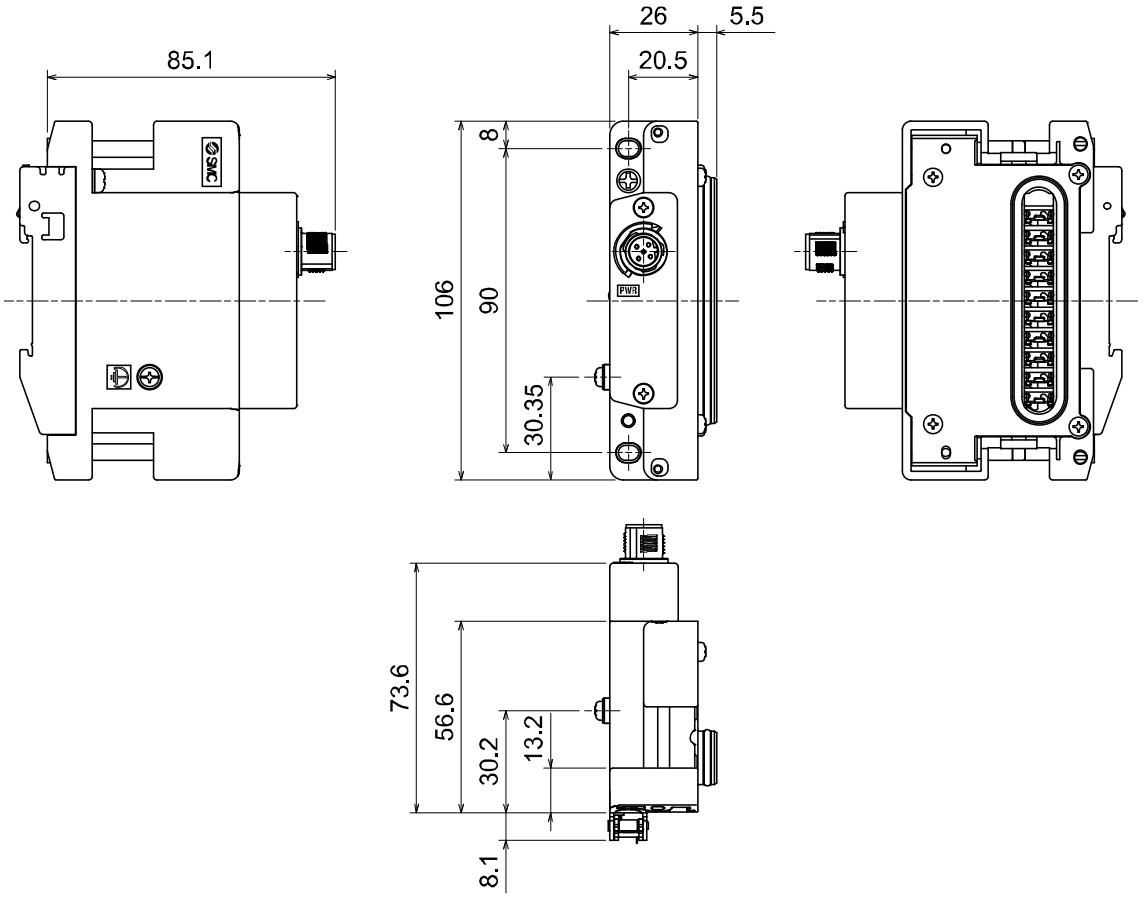
•EX600-ED2



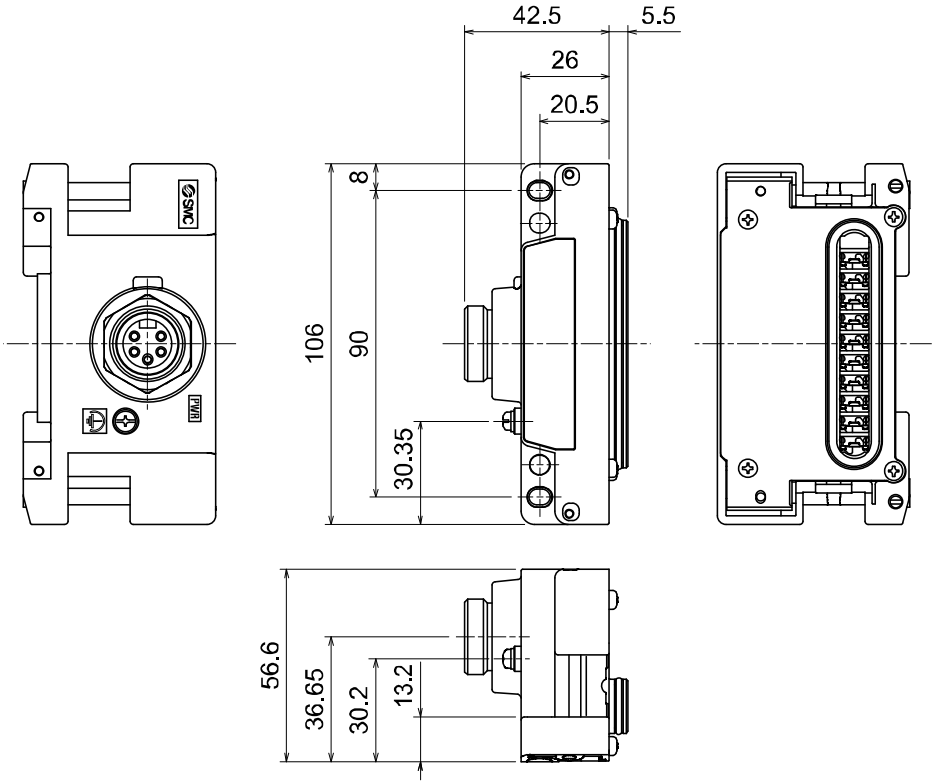
•EX600-ED2-2



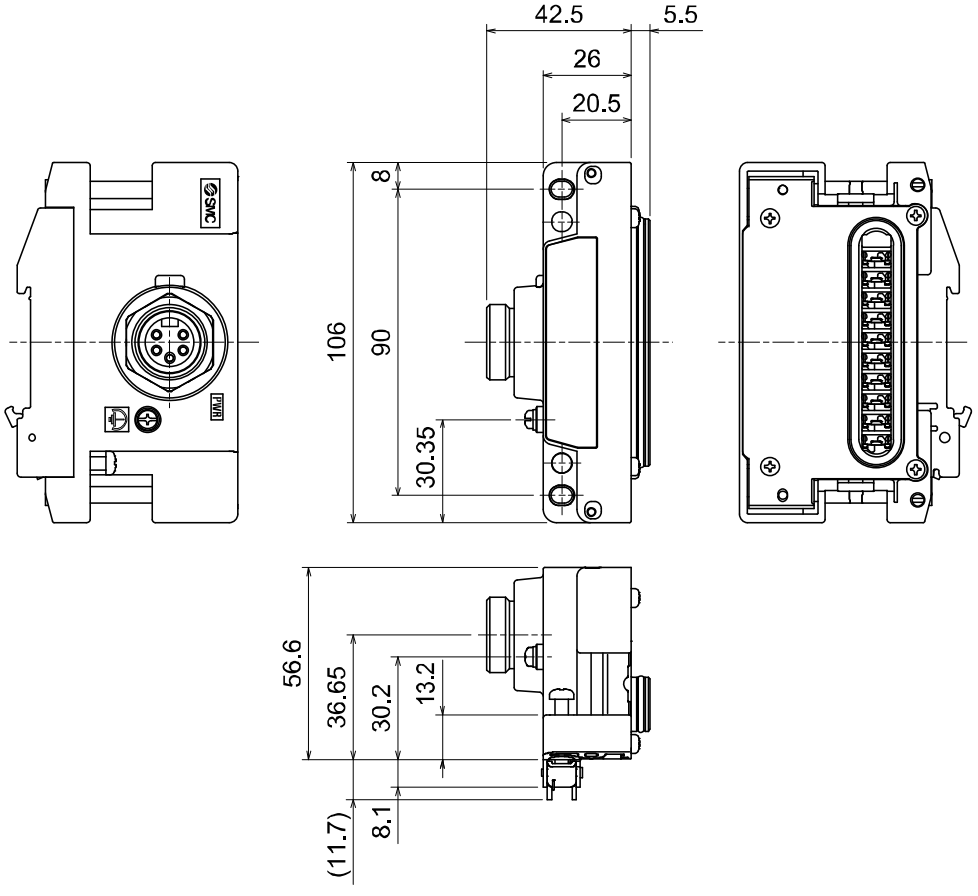
•EX600-ED2-3



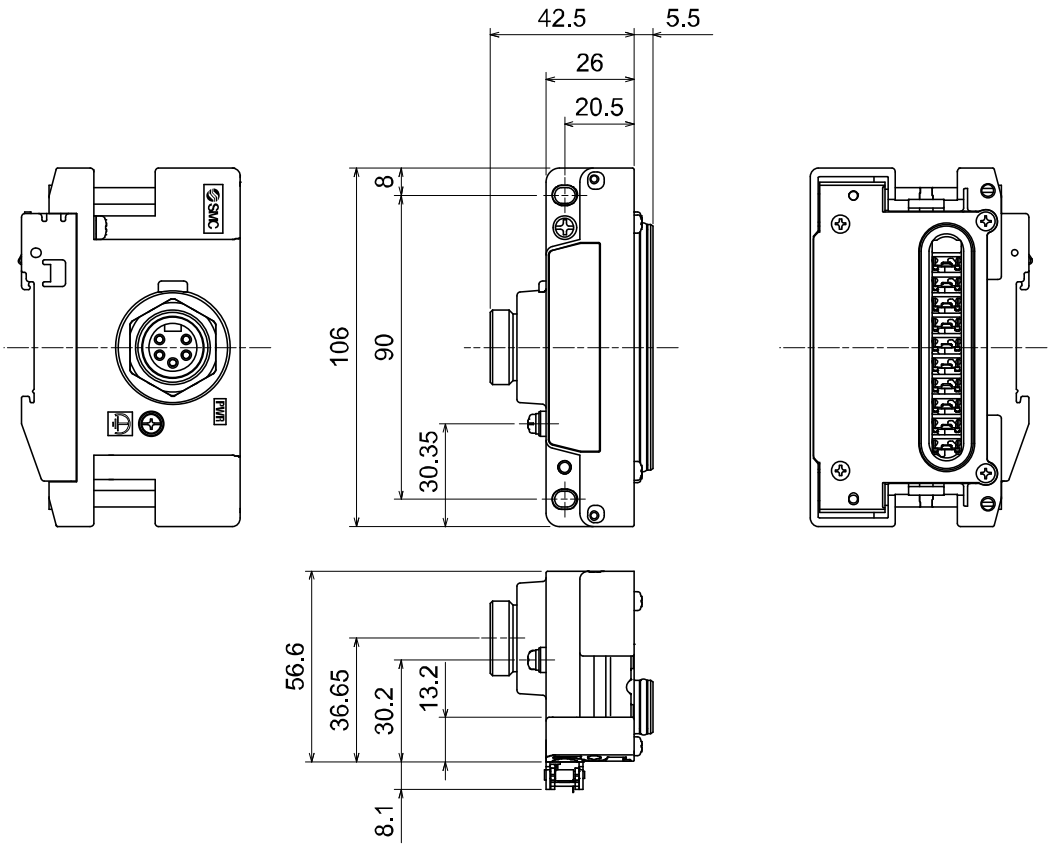
•EX600-ED3



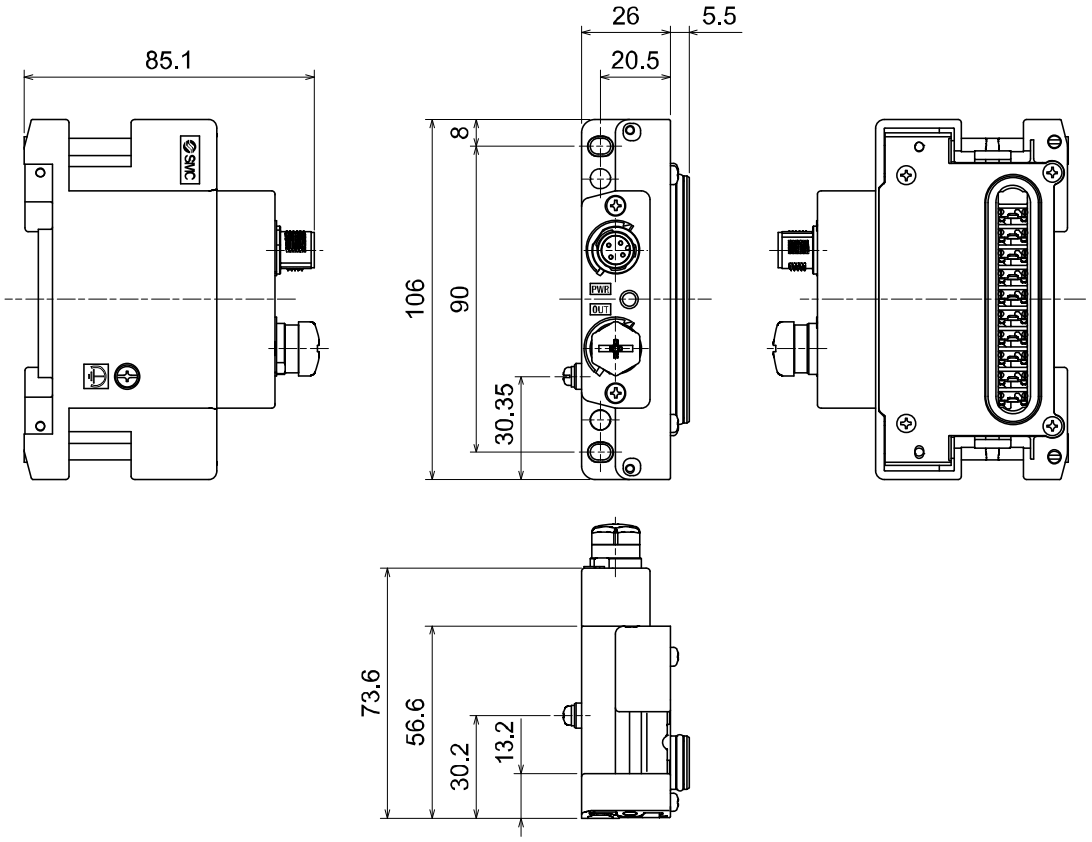
•EX600-ED3-2



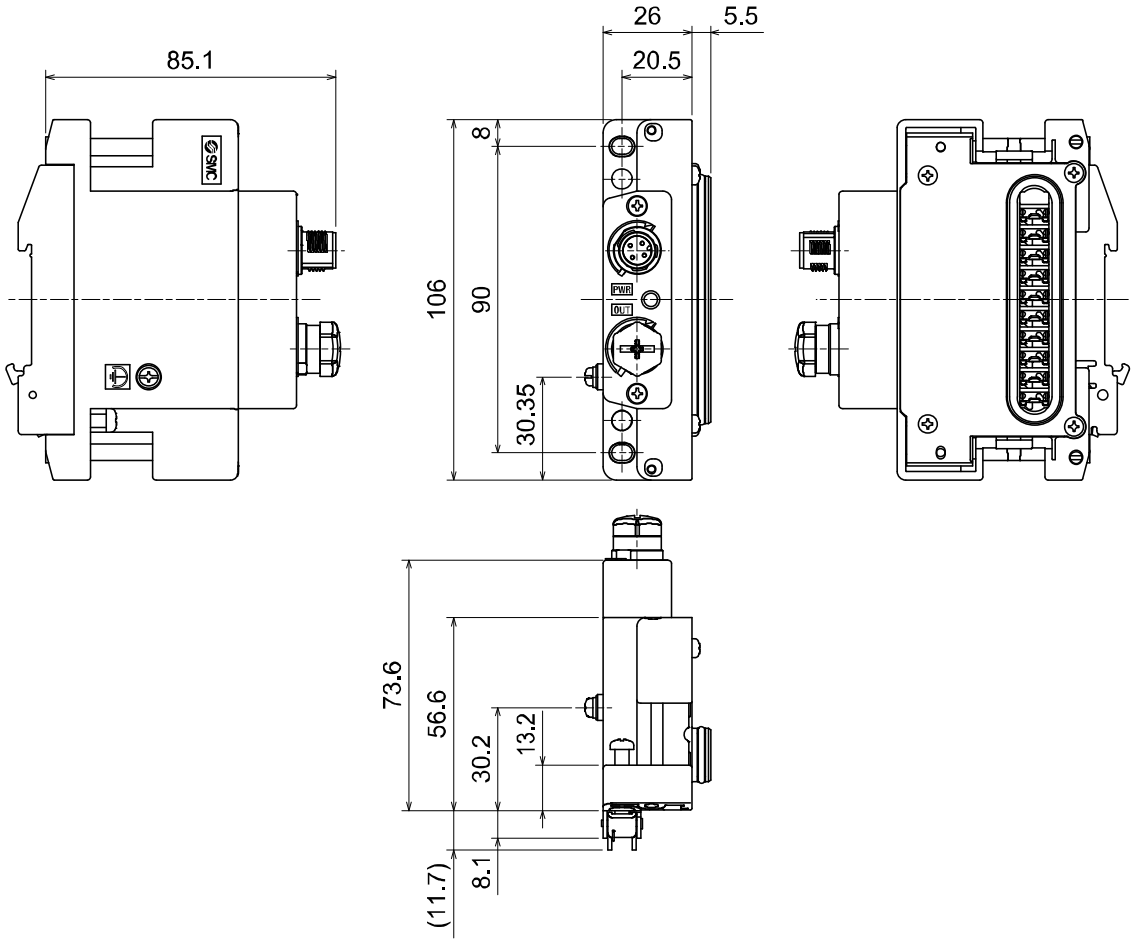
•EX600-ED3-3



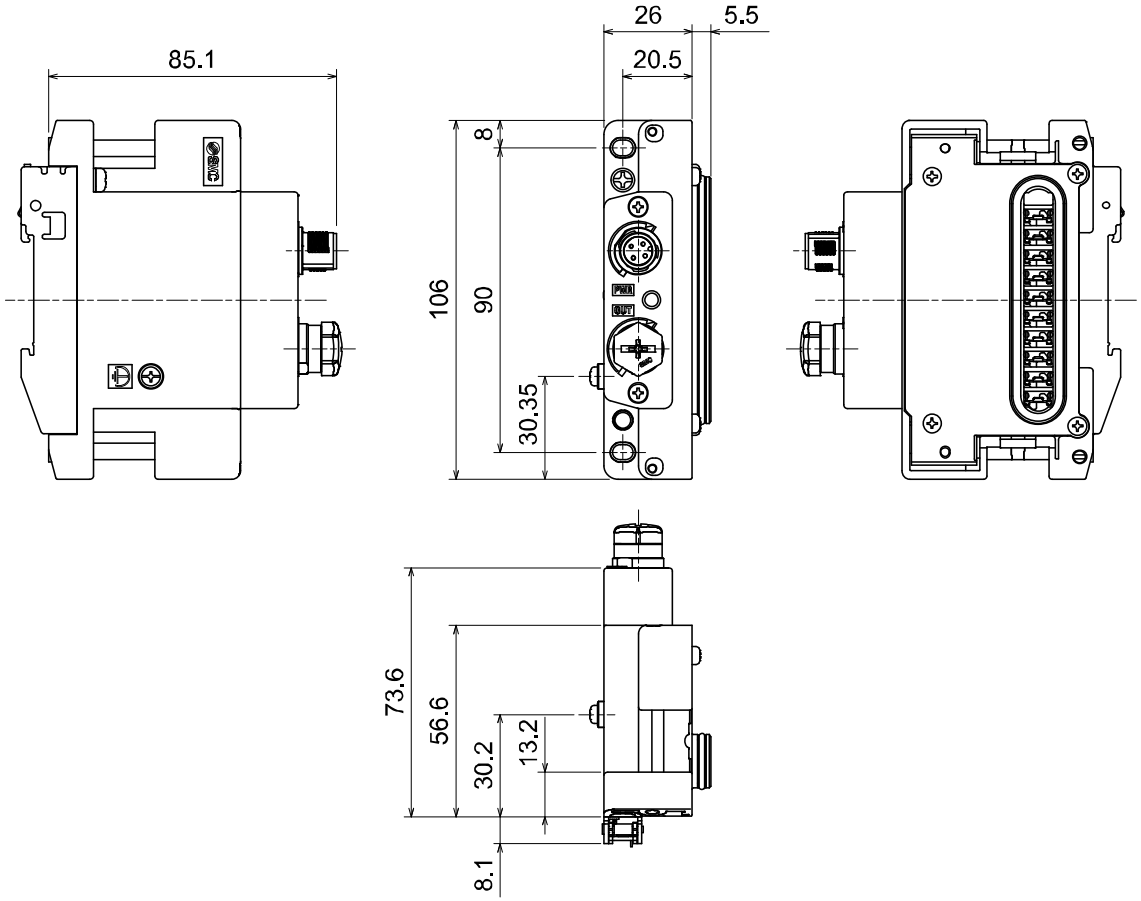
•EX600-ED4/ED5



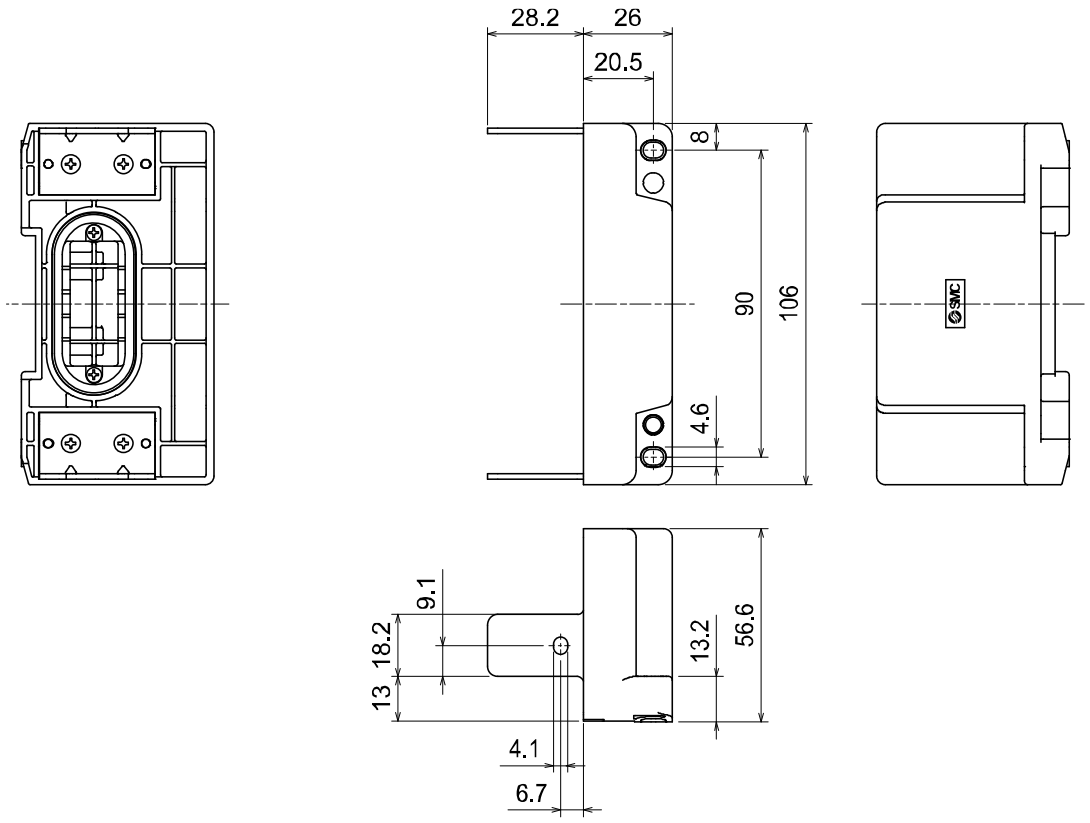
•EX600-ED4/ED5-2



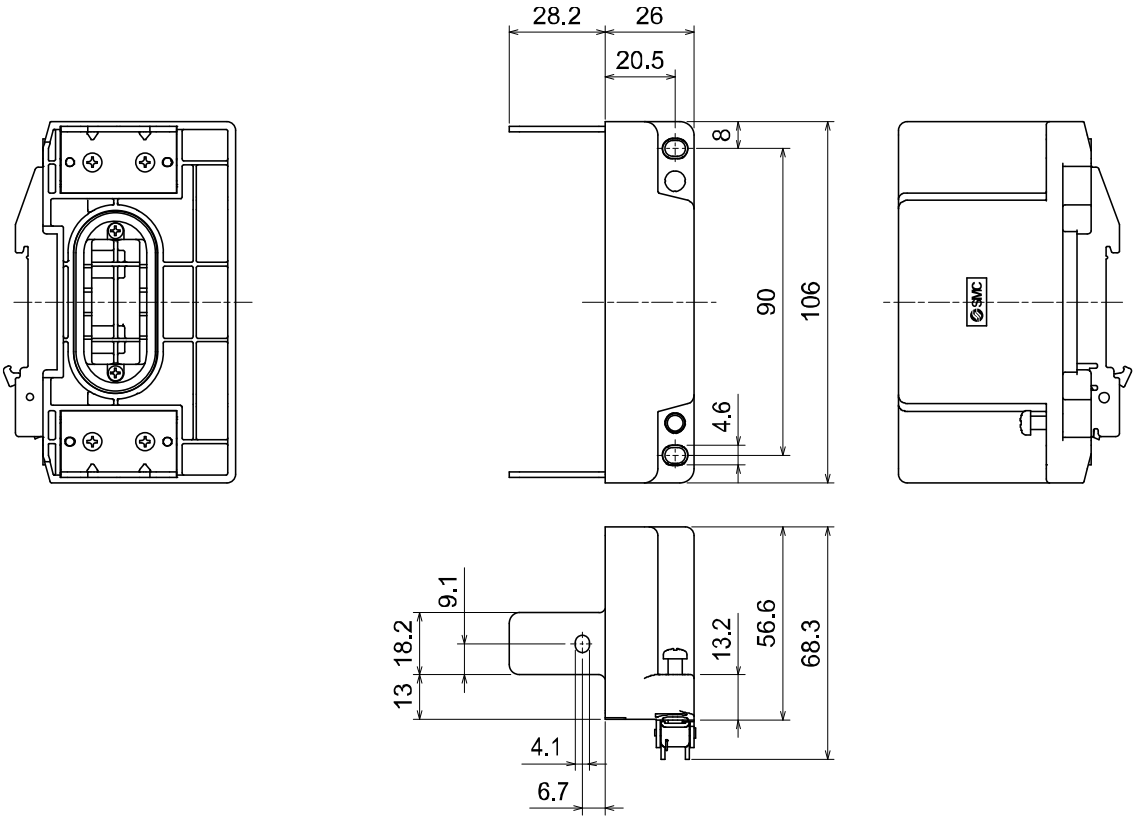
•EX600-ED4/ED5-3



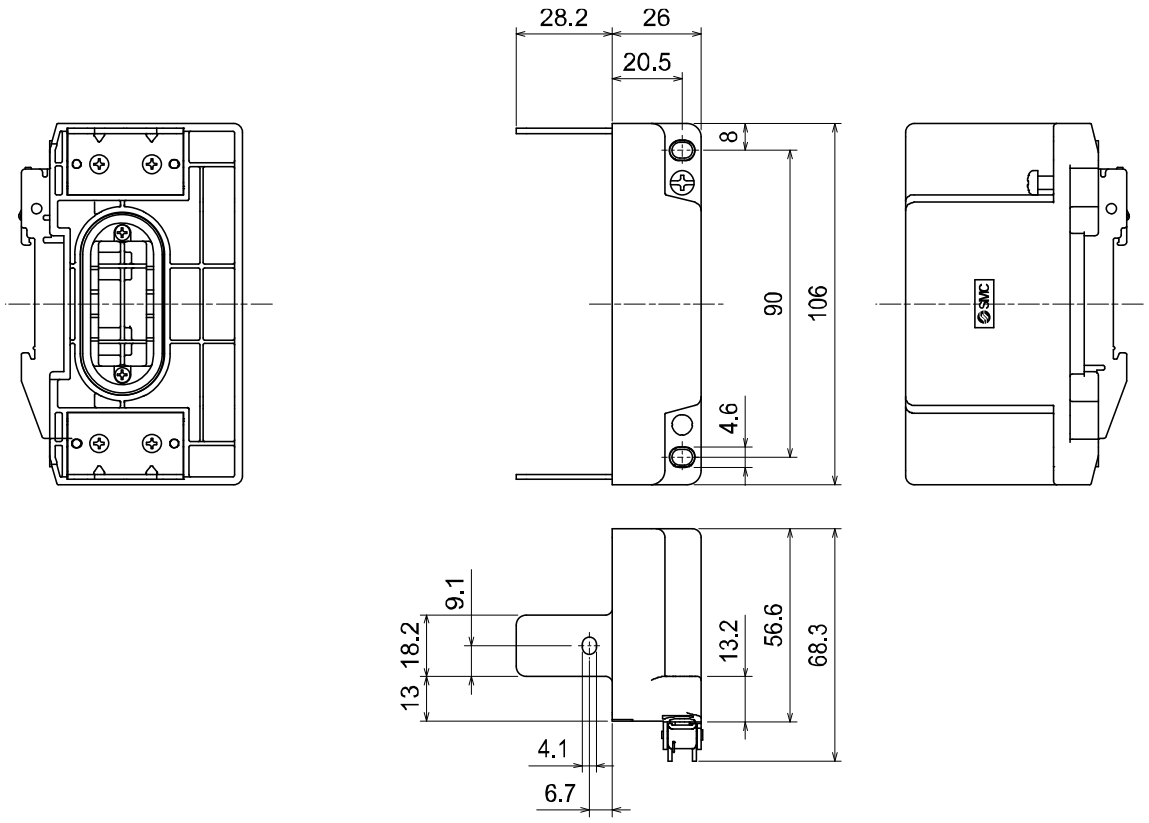
•EX600-EU1



•EX600-EU1-2



•EX600-EU1-3



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.

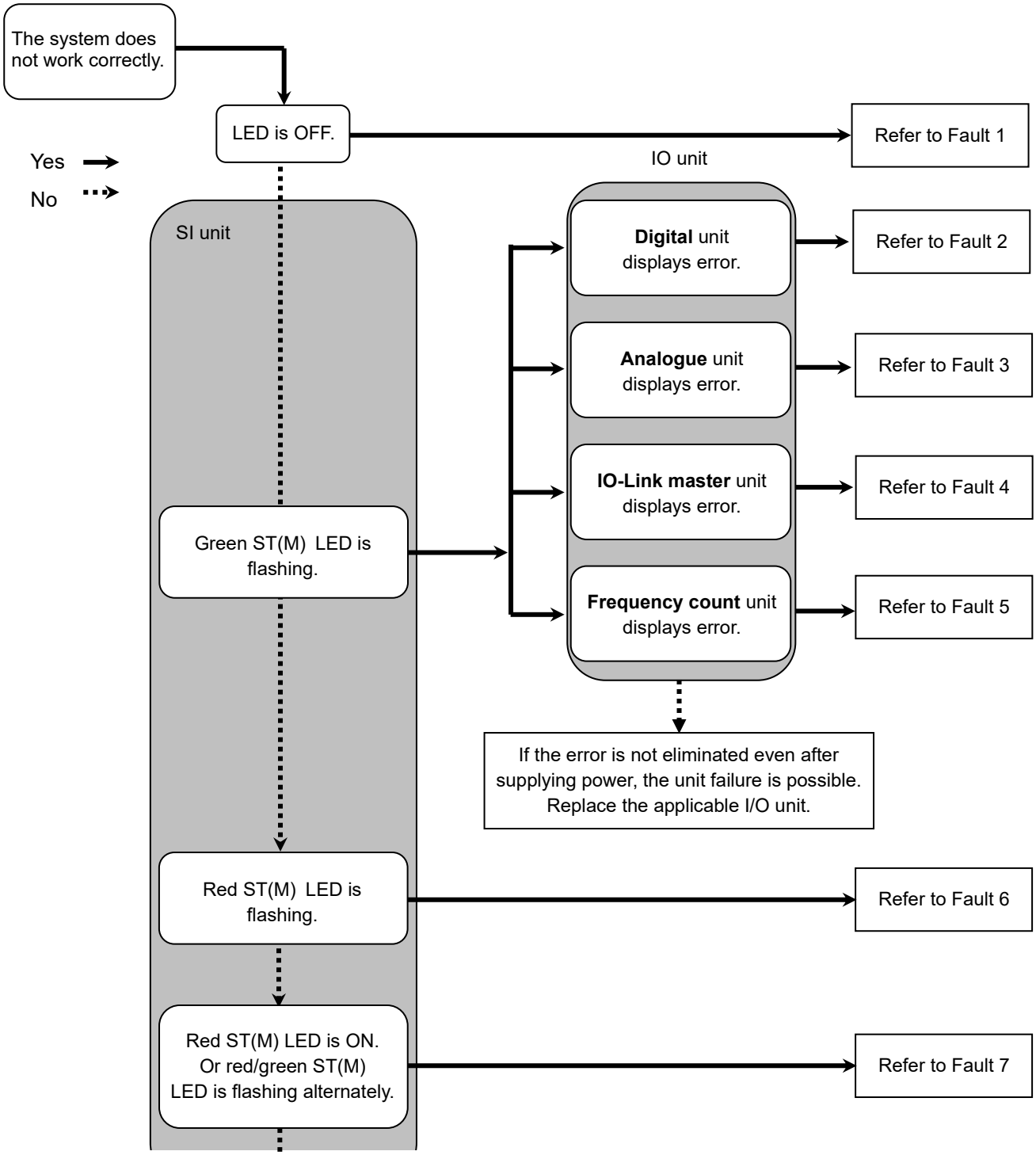
How to reset the product for power cut or forcible de-energizing

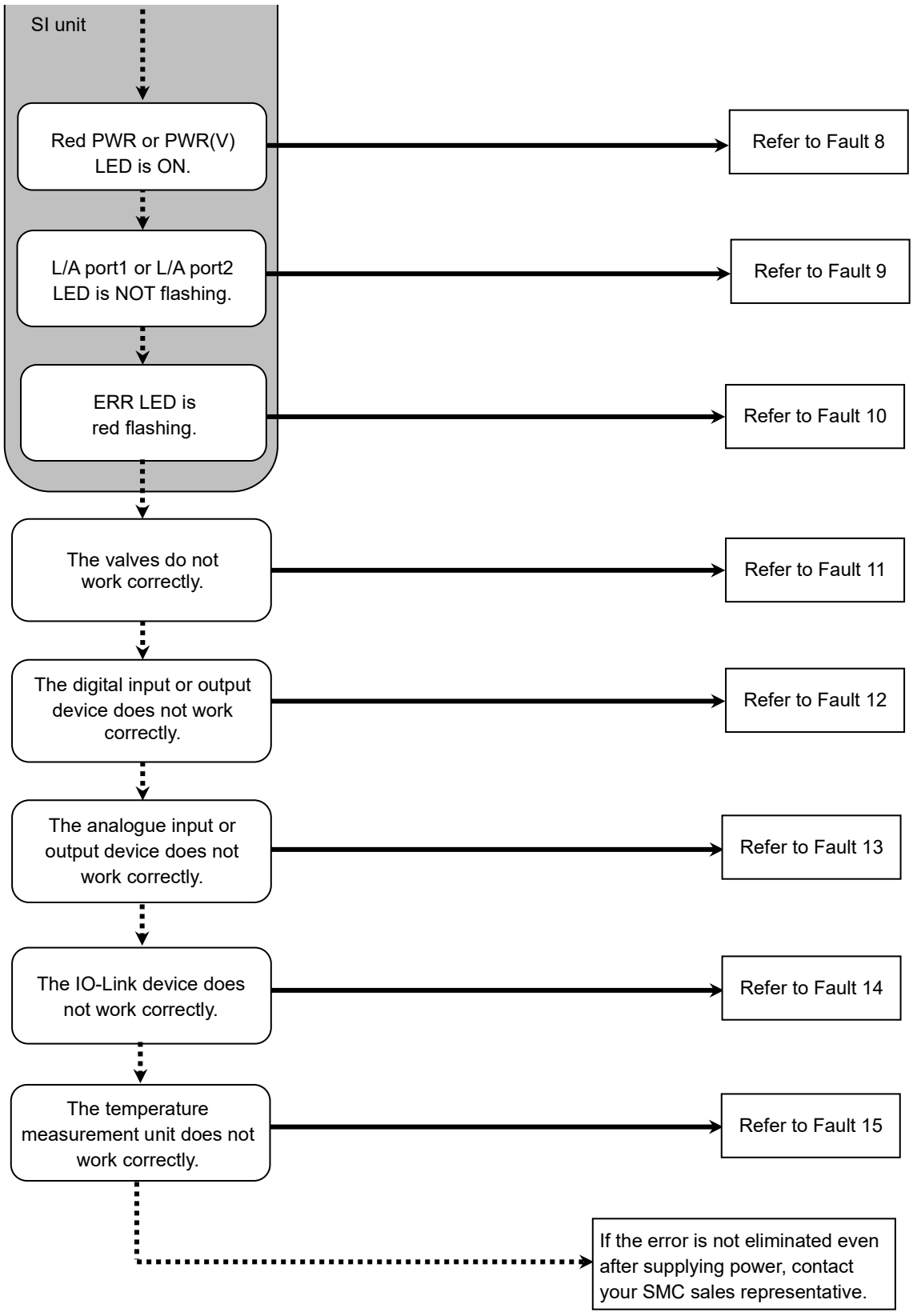
Supply power to the product.
The output status just before the power failure is not maintained when power supply is recovered.
Start operation after confirming safety of the entire equipment.

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.




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

•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.

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 Web server. 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.

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) (Diagnosis is activated)	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 unit, or IO-Link device are normal.
		Red and green LEDs are ON alternately.	An internal memory error has occurred in the IO-Link 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.

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 limit value.	Check the parts with error by using the LED display or unit diagnostic data or Web server. (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 limit value. Or invalidate diagnosis.
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.
	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 below 19 VDC.	Supply 24 VDC ±10% for control and input power source.
	Red PWR(V) LED is ON. (Diagnosis is activated)	Power supply voltage for output is below 19 VDC.	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 EtherCAT 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.
	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 PLC condition and run the PLC. (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	ERR: RED LED is flashing (Blinking)	Invalid configuration.	Check the PLC configuration and the system structure.
	ERR: RED LED is flashing (Single flashing)	Synchronization error, communication data error	Check the PLC configuration and the system structure.
	ERR: Red LED is flashing (Double flashing).	Sync Manager watchdog timeout.	Check the following and restart. (1) Check the PLC condition and run the PLC. (2) Check if the power is supplied to the EtherCAT device. (3) Check that the communication connector is not loose and there are no broken wires.
11	The valve dose not work correctly.	Program etc. is defective.	Check if the ladder program of PLC, 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-SEC3 (PNP output) ⇒ Negative common type valve •EX600-SEC4 (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 PLC, 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 PLC, 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 PWR 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 +10/-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 “Details of I/O map of the IO-Link master unit” (page 81) •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 PLC, etc. is correct.

Parameter Setting

The EX600 parameters can be configured for the system, each unit, and each channel.
Parameters can be changed by Web server, CoE Object.

■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 IO 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 CoE 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 PLC	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 Monitor 24V_C	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 Monitor 24V_D	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.	-	-	-	-

∗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 1.0 ms 10 ms 20 ms	Selects the time for filtering.	1.0 ms	Unit
5	Input extension time	Sets the time to hold the input signal.	1.0ms 15 ms 100 ms 200 ms	Selects the time to hold the input signal.	15 ms	Unit
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.

•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 (e.g., 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		

•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 (e.g., 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 the following ranges. -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.	Enable (AXA)	Unit
			Disable	Does not generate an error.	Disable (AXB)	
6	Under range detection	Generates error when the input value falls below 0.5% of full span.	Enable	Generates an error.	Enable (AXA)	Unit
			Disable	Does not generate an error.	Disable (AXB)	
7	User setting value upper limit error *1	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 *1	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 next table.
When the analogue input range is changed, check the set value and change it to an appropriate value.

Settable range for user set upper or lower limit

Range	Settable value range			
	EX600-AXA		EX600-AXB	
	Lower limit	Upper limit	Lower limit	Upper limit
-10..+10 V	-10.50 to +10.45 V	-10.45 to +10.50 V	N/A	N/A
-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	+0.00 to +10.19 V	+0.05 to +10.24 V
0..5 V	0.00 to +5.22 V	+0.03 to +5.25 V	+0.00 to +5.09 V	+0.03 to +5.12 V
1..5 V	+0.75 to +5.22 V	+0.78 to +5.25 V	+0.75 to +5.09 V	+0.78 to +5.12 V
0..20 mA	0.00 to +20.90 mA	+0.10 to +21.00 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	+3.00 to +20.90 mA	+3.10 to +21.00 mA

Correspondence table for user set upper or lower limit (CoE object /Web server)
(Data format: Offset Binary /Signed Magnitude /2's Complement)

Range	EX600-AXA			EX600-AXB	
	Set value		Expected value	Set value	Expected value
-10..+10 V	CoE/Web	0 to 1050	+0.00 to +10.50 V	N/A	N/A
	CoE	32768 to 33818	-0.00 to -10.50 V		
	Web	-0 to -1050			
-5..+5 V	CoE/Web	0 to 525	+0.00 to +5.25 V		
	CoE	32768 to 33293	-0.00 to -5.25 V		
	Web	-0 to -525			
-20..+20 mA	CoE/Web	0 to 2100	+0.00 to +21.00 mA		
	CoE	32768 to 34868	-0.00 to -21.00 mA		
	Web	-0 to -2100			
0..10 V	CoE/Web	0 to 1050	+0.00 to +10.50 V	0～1024	+0.00 to +10.24 V
0..5 V	CoE/Web	0 to 525	+0.00 to +5.25 V	0～509	+0.00 to +5.09 V
1..5 V	CoE/Web	75 to 525	+0.75 to +5.25 V	75～509	+0.75 to +5.09 V
0..20 mA	CoE/Web	0 to 2100	+0.00 to +21.00 mA	0～2100	+0.00 to +21.00 mA
4..20 mA	CoE/Web	300 to 2100	+3.00 to +21.00 mA	300～2100	+3.00 to +21.00 mA

∗2: Follow the methods below when assigning the user set upper and lower limit by CoE object.

•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 CoE object.

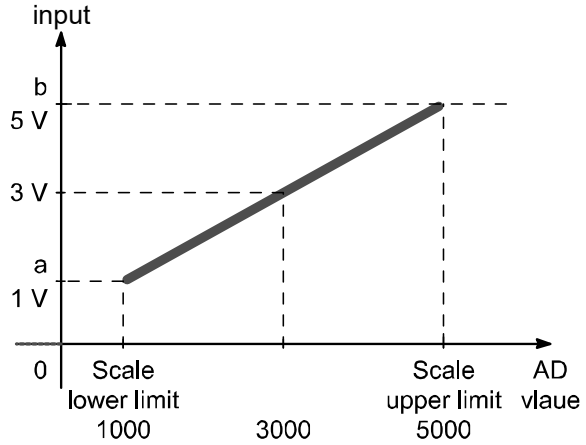
•Assigning negative value: Convert the absolute value x 100 to be assigned in 16bit binary. Then, change the most significant bit to "1" before inputting.

Example: -10.50 V is assigned --- Assign 10.50 x 100 = 1050 → 10000011010b → 1000010000011010b → 33818 by CoE object.

Scale conversion format (Only for EX600-AXB)
Function to set any value between "-32767 to 32767" as the AD value for input 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 input



(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 input
2000･･･2 V input
3000･･･3 V input
4000･･･4 V input
5000･･･5 V input
(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 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 scale conversion format, set the scale upper and lower limit value as follows, regardless of the range setting.

Correspondence table for scale upper or lower limit (CoE object /Web server)
(Data format: scale conversion format)

Set value		Expected value
CoE/Web	0～32767	+0～+32767
CoE	32768～65535	-0～-32767
Web	-0～-32767	

•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.	○	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 for receiving PLC output data.	Offset binary	Offset binary.	○	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.	○	
	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	○ 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.	○	
	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	○ 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.	○	

•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 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
(CoE object /Web server)
(Data format: Offset Binary /Signed Magnitude /2's Complement)

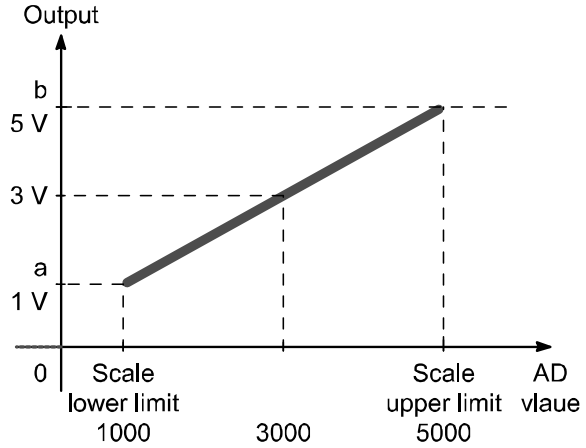
Range	Set value		Expected value
0..10 V	CoE/Web	0 to 1050	0.00 to +10.50 V
0..5 V	CoE/Web	0 to 525	0.00 to +5.25 V
1..5 V	CoE/Web	75 to 525	+0.75 to +5.25 V
0..20 mA	CoE/Web	0 to 2100	0.00 to +21.00 mA
4..20 mA	CoE/Web	300 to 2100	+3.00 to +21.00 mA

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

Scale conversion 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 scale conversion format, set the scale upper and lower limit value as follows, regardless of the range setting.

Correspondence table for scale upper or lower limit and output value at communication error and idling
(CoE object /Web server)
(Data format: scale conversion format)

Set value		Expected value
CoE/Web	0 to 32767	+0 to +32767
CoE	32768 to 65535	-0 to -32767
Web	-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 input and 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 input or output range within settable range in the next table.
When the analogue input or 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
(CoE object /Web server)
(Data format: Offset Binary /Signed Magnitude /2's Complement)

Range	Set value		Expected value
0..10 V	CoE/Web	0 to 1050	0.00 to +10.50 V
0..5 V	CoE/Web	0 to 525	0.00 to +5.25 V
1..5 V	CoE/Web	75 to 525	+0.75 to +5.25 V
0..20 mA	CoE/Web	0 to 2100	0.00 to +21.00 mA
4..20 mA	CoE/Web	300 to 2100	+3.00 to +21.00 mA

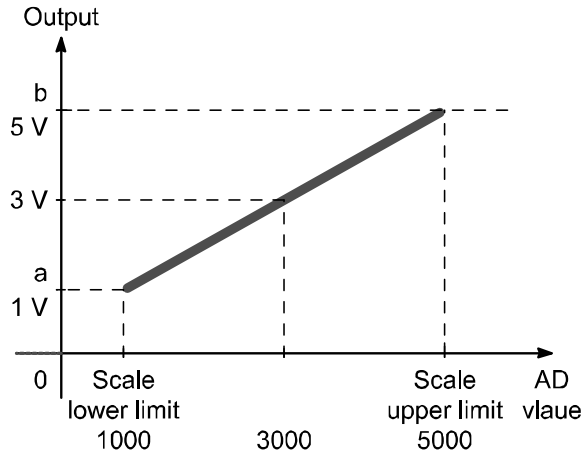
∗: When the data format is a type other than scale conversion, input the required voltage or current x 100 in decimal system.

Scale conversion 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 scale conversion format, set the scale upper and lower limit value as follows, regardless of the range setting.

Correspondence table for scale upper or lower limit and output value at communication error and idling
(CoE object /Web server)
(Data format: scale conversion format)

Set value		Expected value
CoE/Web	0 to 32767	+0 to +32767
CoE	32768 to 65535	-0 to -32767
Web	-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 *1	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 *1	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 *1	Channel

*1: 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		

•IO-Link master unit parameters (1)

No.	Parameter	Definition	Item	Content	Default setting	Parameter setting range
1	Byte Swap *1	Swap the byte order of the process data, which is sent and received between EtherCAT communication and IO-Link communication.	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.		
2	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.		
3	Output setting during Communication Fault (IO-Link) *2	Set the IO-Link communication process data output when the EtherCAT communication error is occurred.	Clear, PD Out valid	・All outputs are turned OFF ・The process data status is valid.		Unit
			Hold	・All outputs hold the values of the last received process data. ・The process data status is valid.		
			Clear, PD Out invalid	・All outputs are turned OFF ・The process data status is invalid. (Outputs operation of an IO-Link device depends on the parameter set for itself.)	○	
4	Output setting during Communication Fault (DO_C/Q) *2	Set the digital output signal when an EtherCAT 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.		

•IO-Link master unit parameters (2)

No.	Parameter	Definition	Item	Content	Default setting	Parameter setting range
5	Output setting during Communication Idle (IO-Link) *2*3	Set the IO-Link communication process data output when the EtherCAT communication is idling.	Clear, PD Out valid	・All outputs are turned OFF ・The process data status is valid.		Unit
			Hold	・All outputs hold the values of the last received process data. ・The process data status is valid.		
			Clear, PD Out invalid	・All outputs are turned OFF ・The process data status is invalid. (Outputs operation of an IO-Link device depends on the parameter set for itself.)	○	
6	Output setting during Communication Idle (DO_C/Q) *2*3	Set the digital output signal when EtherCAT 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.		
7	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	Set as digital input.		
			DO_C/Q	Set as digital output		

•IO-Link master unit parameters (3)

No.	Parameter	Definition	Item	Content	Default setting	Parameter setting range
8	Validation & Backup *4	Set the comparison function (comparison of vendor ID and device ID) of the connected device and data storage (DS) function.	No Device Check	Comparison function: Disable DS function: Disable	○	Channel
			Type compatible Device V1.0	Connected device: V1.0 Comparison function: Enable DS function: Disable		
			Type compatible Device V1.1	Connected device: V1.1 Comparison function: Enable DS function: Disable		
			Type compatible Device V1.1, Backup + Restore	Connected device: V1.1 Comparison function: Enable DS function: Enable (Backup & restore)		
			Type compatible Device V1.1, Restore	Connected device: V1.1 Comparison function: Enable DS function: Enable (for restore only)		
9	PortCycle Time	Set the IO-Link 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
10	VendorID	Set the vendor ID which is compared when the IO-Link device comparison function is enabled.	0x0001 to 0xFFFF	Set the vendor ID of the device to be connected.	0x0001	Channel
11	DeviceID	Set the device ID which is compared when the IO-Link device comparison function is enabled.	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 76) for details.

∗2: The Hold/Clear setting switch is not reflected. Output state at communication error/idle should be set by parameter. Refer to Output setting / IO-Link communication mode when the EtherCAT communication error is generated or idling (page 76) for difference in operation of the connected device due to difference in setting.

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

∗4: Valid when the IO-Link port operation mode is in "IOL_Manual".

Output setting / IO-Link communication mode when the EtherCAT communication error is generated or idling

When the EtherCAT communication is interrupted state 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 IO-Link 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 IO-Link device ‘s output setting function during communication faul.

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 IO-Link master communication process data.

When the process data size of the connected device and mapping size of the IO-Link 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-bytes, even if the Byte Swap parameter is set to “swap 32 bit”, the bytes will not be swapped.

When the process data size of the connected device and mapping size of the IO-Link master communication process data are different
(e.g., connected device process data size: 10-bytes, mapping size: 16-bytes)

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 Byte Swap parameter is set to “swap 32 bit”, the bytes will not be swapped.

∗: When the mapping size of the IO-Link 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 "IOL_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

Note

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

∗: When the IO-Link port operation mode is changed to a setting other than "IOL_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 bytes

Unit	Unit part number	Allocated bytes	
		Input	Output
SI unit	EX600-SEC3/4 (32 outputs)	0	4
	EX600-SEC3/4 (24 outputs)	0	3
	EX600-SEC3/4 (16 outputs)	0	2
	EX600-SEC3/4 (8 outputs)	0	1
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

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# *1 (4 channels)	8 (2 bytes per channel)	0
Frequency count Unit	EX600-DFB *1 (4 channels)	8 (2 bytes per channel)	0
IO-Link master Class A	EX600-LAB1 *1 (4 ports)	22, 38, 70 or 134*2	22, 38, 70 or 134*2
IO-Link master Class B	EX600-LBB1 *1 (4 ports)	22, 38, 70 or 134*2	22, 38, 70 or 134*2

∗1: Not available for EX600-SEC1/2 compatibility mode.

∗2: The allocated bytes of the IO-Link master can be changed by the IO-Link master size setting switch.

■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 22	Size 38	Size 70	Size 134	Bit 7 ... Bit 0	Bit 7 ... Bit 0
0				X2 X4 X2 X4 X2 X4 X2 X4 Port 4 Port 3 Port 2 Port 1	- Y4 - Y4 - Y4 - Y4 Port 4 Port 3 Port 2 Port 1
1				Reserved (fixed value: 0)	Reserved (fixed value: 0)
2 to 39	2 to 33	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	66	130	Port 1 status (PQI)	Reserved (fixed value: 0)
41	67	67	131	Port 2 status (PQI)	Reserved (fixed value: 0)
42	68	68	132	Port 3 status (PQI)	Reserved (fixed value: 0)
43	69	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 size 22/38/70/134 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 (IO-Link Device or IO-Link 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).

I/O map example

EX600 I/O data is mapped from unit 0 in order.
The I/O map is shown with the following unit configuration as an example.

<Example 1>

	Unit 0	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	
End plate	AXA Analogue input 4 bytes 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 bytes Input	SEC3 SI unit 4 bytes 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-SEC3): 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 (Unit 0)	**Lo byte**	Byte 0	DY#B (Unit 1)	Output 0 to 7
Byte 1		**Hi byte**	Byte 1	DY#B (Unit 2)	Output 0 to 7
Byte 2	AXA channel 1 (Unit 0)	**Lo byte**	Byte 2	SEC3 (Unit 5)	Output 0 to 7
Byte 3		**Hi byte**	Byte 3		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		
Total	7 bytes		Total	6 bytes	

*1: Refer to "Parameter Setting" (page 54) for setting the byte order of analogue value.

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

Input data			Output data		
Byte 0	AXA channel 0 (Unit 0)	**Hi byte**	Byte 0	DY#B (Unit 1)	Output 0 to 7
Byte 1		**Lo byte**	Byte 1	DY#B (Unit 2)	Output 0 to 7
Byte 2	AXA channel 1 (Unit 0)	**Hi byte**	Byte 2	SEC3 (Unit 5)	Output 0 to 7
Byte 3		**Lo byte**	Byte 3		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		
Total	7 bytes		Total	6 bytes	

*1: Refer to "Parameter Setting" (page 54) for setting the byte order of analogue value.

<Example 2>
When the IO-Link master size setting is set to 38 bytes (The process data of each port of the IO-Link master: 8/8/8/8 bytes).

	Unit 0	Unit 1	Unit 2	Unit 3	Unit 4	
End plate	DX#B Digital input 1 byte Input	DY#B Digital output 1 byte Output	LAB1 IO-Link Class A 38 bytes Input 38 bytes Output	LBB1 IO-Link Class B 38 bytes Input 38 bytes Output	SEC3 SI unit 4 bytes Output	Valve

Input date: (Unit 0) Digital input unit (EX600-DX#B): 1 byte occupied
(Unit 2) IO-Link master unit (EX600-LAB1): 38 bytes occupied
(Unit 3) IO-Link master unit (EX600-LBB1): 38 bytes occupied

Output date: (Unit 1) Digital output unit (EX600-DY#B): 1 byte occupied
(Unit 2) IO-Link master unit (EX600-LAB1): 38 bytes occupied
(Unit 3) IO-Link master unit (EX600-LBB1): 38 bytes occupied
(Unit 4) SI unit (EX600-SEC3): 4 bytes 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	LAB1 (Unit 2)	Process data	Byte 1	LAB1 (Unit 2)	Process data
:			:		
Byte 38			Byte 38		
Byte 39	LBB1 (Unit 3)	Process data	Byte 39	LBB1 (Unit 3)	Process data
:			:		
Byte 76			Byte 76		
Byte 77			Byte 77	SEC3 (Unit4)	Output 0 to 7
Byte 78			Byte 78		Output 8 to 15
Byte 79			Byte 79		Output 16 to 23
Byte 80			Byte 80		Output 24 to 31
Total	77 bytes		Total	81 bytes	

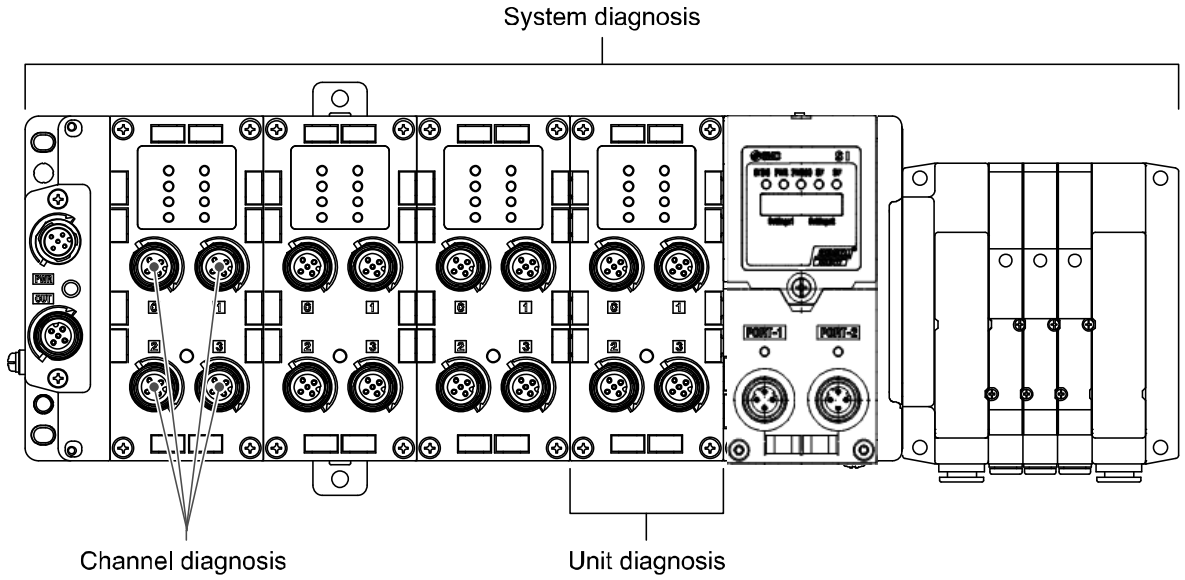
Diagnostics

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

Diagnostic mode	Diagnostic data	Diagnostic size
0	No diagnostic data.	0 byte
1	System diagnosis	4 bytes
2	System diagnosis + Unit diagnosis	6 bytes

∗1: When set to normal mode, the diagnostic data is assigned to the end of input data.

∗2: When set to EX600-SEC1/2 compatibility mode, the diagnostic data is assigned to the head of input data.



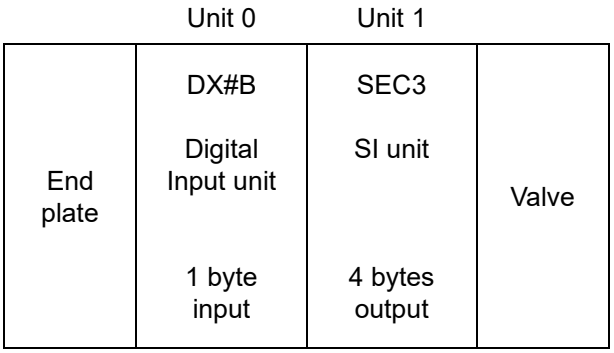
■Details of diagnostic data

Byte	Bit No.	Diagnostic content	Type
0	0	1: The analogue input or output value has fallen below the user-set limit value.	System
	1	1: The analogue input or outpurt value has exceeded the user-set limit 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 value has exceeded the user-set limit 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	Reserved	
	3	1: There is a disconnection 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. (Memory error detected when the power supply is applied)	
	7	1: Hardware error occurred. (Parameter read/write has failed)	
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.

I/O map example (with diagnostic data)

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



Input data: (Unit 0) Digital input unit (EX600-DX#B): 1 byte occupied
Output data: (Unit 1) SI unit (EX600-SEC3): 4 bytes occupied

•When Diagnostic mode 1 is selected (Normal mode)

Input data			Output data		
Byte 0	DX#B(Unit 0)	Input 0 to 7	Byte 0	SEC3 (Unit 1)	Output 0 to 7
Byte 1	Diagnostic data byte0		Byte 1		Output 8 to 15
Byte 2	Diagnostic data byte1		Byte 2		Output 16 to 23
Byte 3	Diagnostic data byte2		Byte 3		Output 24 to 31
Byte 4	Diagnostic data byte3		Byte 4		
Total	5 bytes		Total	4 bytes	

•When Diagnostic mode 1 is selected (EX600-SEC1/2 compatibility mode)

Input data			Output data		
Byte 0	Diagnostic data byte0		Byte 0	SEC3 (Unit 1)	Output 0 to 7
Byte 1	Diagnostic data byte1		Byte 1		Output 8 to 15
Byte 2	Diagnostic data byte2		Byte 2		Output 16 to 23
Byte 3	Diagnostic data byte3		Byte 3		Output 24 to 31
Byte 4	DX#B(Unit 0)	Input 0 to 7	Byte 4		
Total	5 bytes		Total	4 bytes	

■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-SEC1/2 compatibility mode, refer to the operation manual for the EX600-SEC1/2 (EX※※-OMO0027).

■ESI file

The ESI file is required to configure the EX600.
The file can be downloaded from the SMC website.
URL:https://www.smcworld.com/en-jp/

ESI file: SMC_EX600-SEC3_4_V1.2.xml

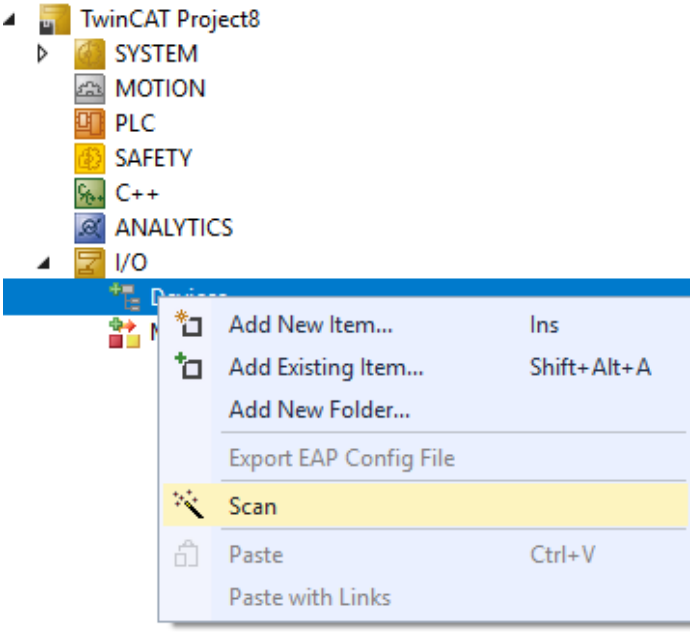
■Example of setting using TwinCAT3 XAE

Refer to the manual of TwinCAT3 XAE for details of the operating method.

1. ESI file installation
   Copy the ESI file for the EX600 to the following folder.

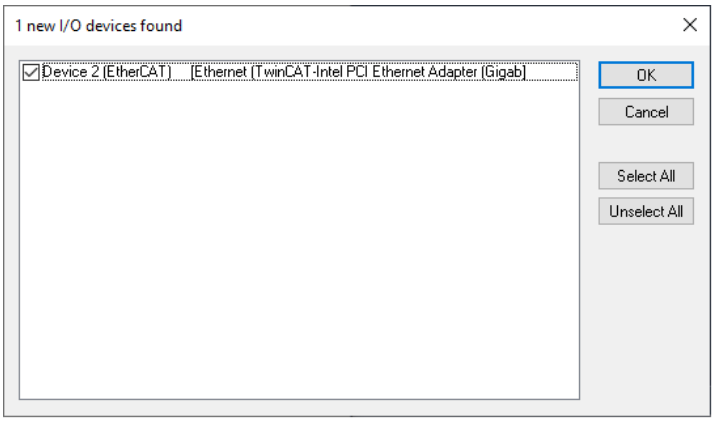
   C:¥TwinCAT¥3.1¥Config¥Io¥EtherCAT

2. Right click the [Devices] file, and then left click the [Scan].

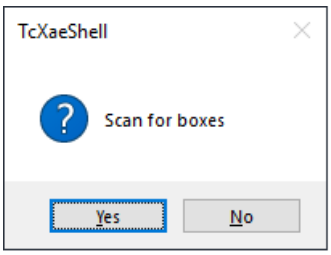


3. Click [OK] in the screen below.

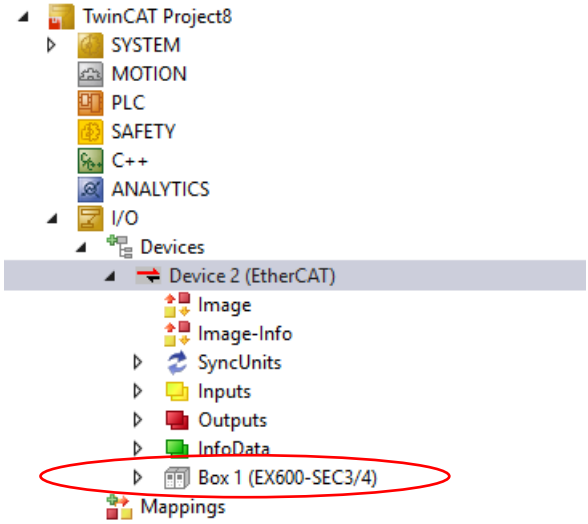
4. Select the checkbox and click [OK] in the screen below.



5. When the comment “Scan for boxes” appears, left click the [YES] button.



6. Once the scan is successfully completed, “Box 1(EX600-SEC3/4)” is displayed as shown in the screen below.

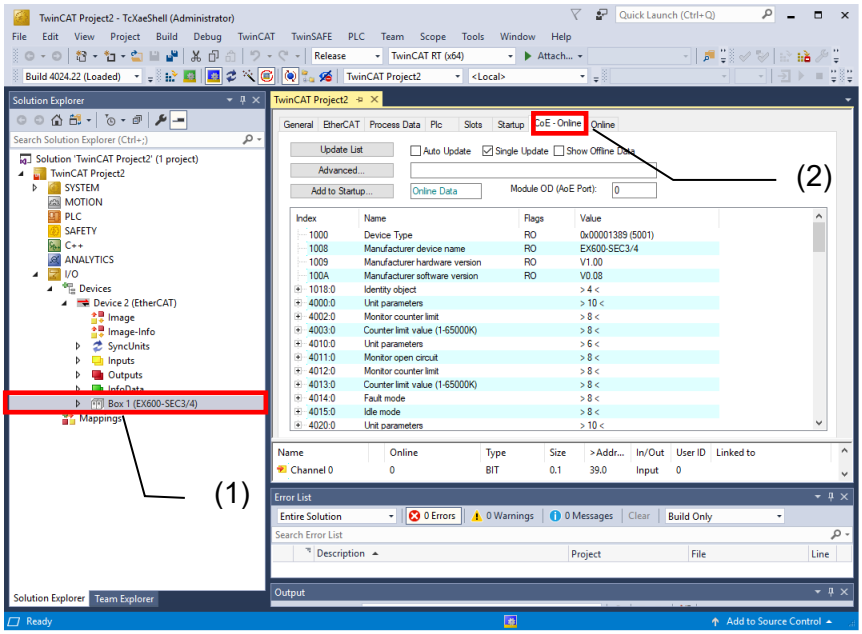


CoE Object Dictionary

You can use the CoE Object Dictionary to check diagnostic data and read and write various parameters. The data format is as follows. For the parameter setting in EX600-SEC1/2 compatibility mode, refer to the operation manual for the EX600-SEC1/2 (EX※※-OMO0027).

■How to display CoE object

After selecting [Box1(EX600-SEC3/4)], select the [CoE-Online] tab to display the CoE object.



•Standard object

Index	Name	Fixed value
1000	Device type	0x00001389(5001dec)
1008	Device name	EX600-SEC3/4
1009	Hardware version	V1.00
100A	Software version	V1.00
1018:0	Identity	0x04(4dec)
1018:01	Vendor ID	0x00000114(276dec)
1018:02	Product code	0x0100004B(16777291dec)
1018:03	Revision	0x00010002(65538dec)
1018:04	Serial Number	0x########

∗: Standard object conforms to the EtherCAT specifications.

•Device specific object

Index	Name	Meaning
4000 - 40A0	Parameter Data	Parameter setting data
5000 – 50A0	Diagnostic Data	Diagnostic data
F030	Configured Module Ident List	EX600 unit ID information
F050	Detected Module Ident List	

■Device specific object example

Parameter Data and Diagnostic Data are shown with the following unit configuration as an example.

<Example>

DX#B Unit 0	DY#B Unit 1	DM#E Unit 2	AXA Unit 3	AYA Unit 4	LBB1 Unit 5	SEC3 Valve 32 Unit 6	System Diag. Diag.

•Parameter Data

Index	Name / Meaning	Unit No.
4000:0	Unit parameters	Unit 0
4002:0	Monitor counter limit	
4003:0	Counter limit value (1-65000k)	
4010:0	Unit parameters	Unit 1
4011:0	Monitor open circuit	
4012:0	Monitor counter limit	
4013:0	Counter limit value (1-65000k)	
4014:0	Fault mode	
4015:0	Idle mode	
4020:0	Unit parameters	Unit 2
4021:0	Monitor open circuit	
4022:0	Monitor counter limit	
4023:0	Counter limit value (1-65000k)	
4024:0	Fault mode	
4025:0	Idle mode	
4030:0	Unit parameters	Unit 3
4035:0	Monitor upper limit	
4036:0	Upper limit value	
4037:0	Monitor lower limit	
4038:0	Lower limit value	
4039:0	Filter	
403A:0	Range	

•Parameter Data (continued)

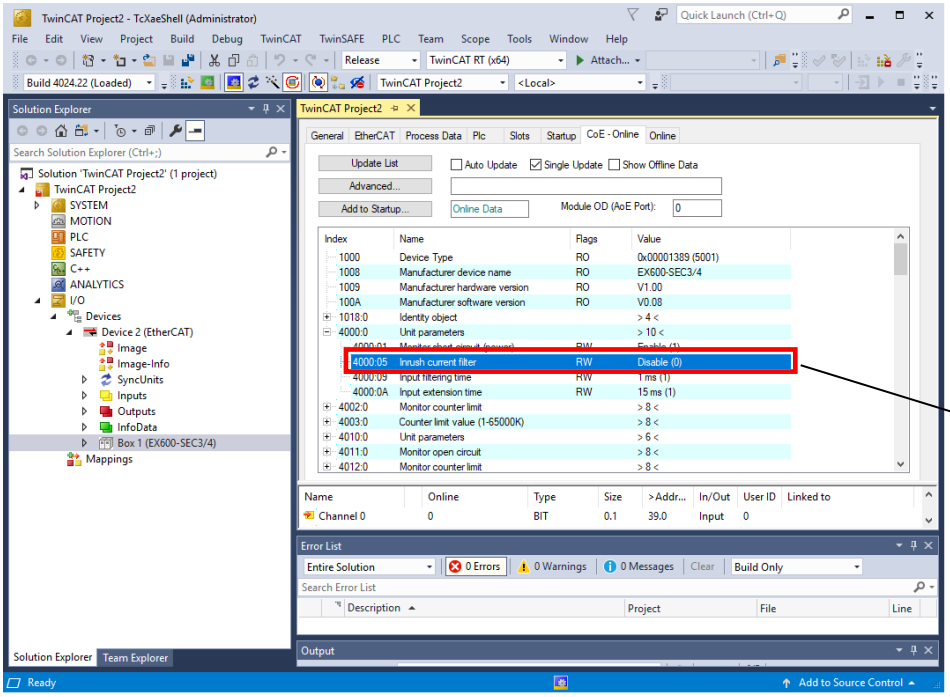
Index	Name / Meaning	Unit No.
4040:0	Unit parameters	Unit 4
4041:0	Fault mode	
4042:0	Fault value	
4043:0	Idle mode	
4044:0	Idle value	
4045:0	Monitor upper limit	
4046:0	Upper limit value	
4047:0	Monitor lower limit	
4048:0	Lower limit value	
404A:0	Range	
4050:0	Unit parameters	Unit 5
4051:0	Port1-Port configuration	
4052:0	Port2-Port configuration	
4053:0	Port3-Port configuration	
4054:0	Port4-Port configuration	
4059:0	Device read / write	
405A:0	L+ control	
4060:0	Unit parameters	Unit 6
4061:0	Monitor open circuit	
4062:0	Monitor counter limit	
4063:0	Counter limit value (1-65000k)	
4064:0	Fault mode	
4065:0	Idle mode	
406E:0	System parameter	

•Diagnostic Data

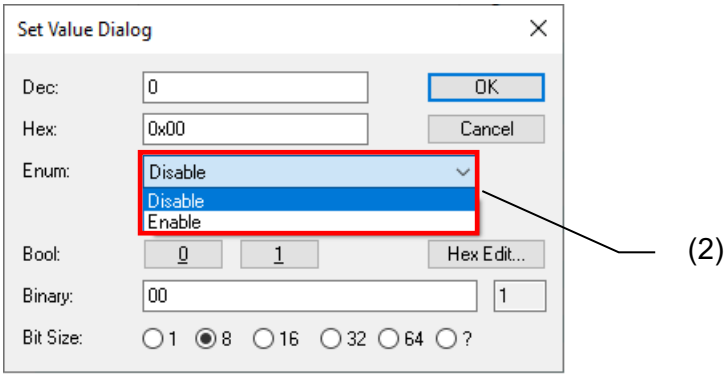
Index	Name / Meaning	Unit No.
5000:0	Short circuit error	Unit 0
5001:0	Over counter limit error	
5003:0	Counter value	
5010:0	Short circuit error	Unit 1
5011:0	Over counter limit error	
5012:0	Open circuit error	
5013:0	Counter value	
5020:0	Short circuit error	Unit 2
5021:0	Over counter limit error	
5022:0	Open circuit error	
5023:0	Counter value	
5030:0	Short circuit error	Unit 3
5031:0	Over range error	
5032:0	Under range error	
5033:0	Over upper limit error	
5034:0	Under lower limit error	
5040:0	Short circuit error	Unit 4
5043:0	Over upper limit error	
5044:0	Under lower limit error	
5050:0	Short circuit error	Unit 5
5051:0	Port1-Port status	
5052:0	Port2-Port status	
5053:0	Port3-Port status	
5054:0	Port4-Port status	
5060:0	Short circuit error	Unit 6
5061:0	Over counter limit error	
5062:0	Open circuit error	
5063:0	Counter value	
506E:0	System error	
506F:0	Error log	

■Example of how to set parameters

1. Select the parameter to change, and double click.



2. The parameter can be changed in Set Value Dialog view.



■Enumeration data (Enum)

• Enumeration data definion

Index	Value	Text
0800	0	Disable
	1	Enable
0801	0	Manual
	1	Auto
0802	0	Via switch
	1	Via software
0803	0	LSB-MSB
	1	MSB-LSB
0804	0	Clear
	1	Hold
	2	ForceON
0805	0	Clear,PDOut valid
	1	Hold
	2	Clear,PDOut invalid
0806	0	0.1 ms
	1	1 ms
	2	10 ms
	3	20 ms
0807	0	1 ms
	1	15 ms
	2	100 ms
	3	200 ms
0808	0	Offset binary
	1	Sign & magnitude
	2	2's complement
0809	0	Offset binary
	1	Sign & magnitude
	2	2's complement
	3	Scaled
080A	1	Sign & magnitude
	2	2's complement
080B	0	None
	1	2 value average
	2	4 value average
	3	8 value average

• Enumeration data definion (continued)

Index	Value	Text
080D	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
080E	3	0…10 V
	4	0…5 V
	5	1…5 V
	6	0…20 mA
	7	4…20 mA
080F	0	C(Celsius)
	1	F(Fahrenheit)
0810	4	2 wires
	5	3 wires
	6	4 wires
0811	0	Direct(No Swap)
	1	Swap 16bit
	2	Swap 32bit
	3	Swap all
0812	0	Deactivated
	1	IOL_Manual
	2	IOL_Autostart
	3	DI_C/Q
	4	DO_C/Q
0813	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

• Enumeration data definion (continued)

Index	Value	Text
0814	1	Digital Input
	5	Power2 (Port classB)
0815	0	One time switch off (PowerOffTime)
	1	Switch PortPowerOff (permanent)
	2	Switch PortPowerOn (permanent)
0816	0	NO_DEVICE
	1	DEACTIVATED
	2	PORT_DIAG
	3	PREOPERATE
	4	OPERATE
	5	DI_C/Q
	6	DO_C/Q
	254	PORT_POWER_OFF
	255	NOT_AVAILABLE
0817	0	VALID/PDOUTVALID
	1	INVALID/ PDOUTVALID
	2	VALID/ PDOUTINVALID
	3	INVALID/ PDOUTINVALID
0818	0	NOT_DETECTED
	1	COM1
	2	COM2
	3	COM3
0819	0	Read
	1	Write
081A	0	Port1
	1	Port2
	2	Port3
	3	Port4
081B	0	On
	1	Off
081C	0	No error
	1	Error
081D	0	Clear

■Details of the Parameter Data

• SI unit (EX600-SEC3/4)

Index	Name (Meaning)	Type	Value
40x0:0	Unit parameters	UNSIGNED8	8
40x0:02	Monitor short circuit (out)	Enum0800	0=Disable 1=Enable
40x0:06	Restart after short circuit	Enum0801	0=Manual 1=Auto
40x0:07	Monitor 24V_C (Monitoring the power supply voltage for control and input)	Enum0800	0=Disable 1=Enable
40x0:08	Monitor 24V_D (Monitoring the power supply voltage for output)	Enum0800	0=Disable 1=Enable
40x1:0	Monitor open circuit	UNSIGNED8	Number of Channels
40x1:01 … 40x1:20	Channel 0 … Channel 31 (Open circuit detection)	Enum0800	0=Disable 1=Enable
40x2:0	Monitor counter limit	UNSIGNED8	Number of Channels
40x2:01 … 40x2:20	Channel 0 … Channel 31 (ON/OFF count upper limit detection)	Enum0800	0=Disable 1=Enable
40x3:0	Counter limit value (1-65000k)	UNSIGNED8	Number of Channels
40x3:01 … 40x3:20	Channel 0 … Channel 31 (ON/OFF count upper limit value)	UNSIGNED16	1 to 65000 (k)
40x4:0	Fault mode	UNSIGNED8	Number of Channels
40x4:01 … 40x4:20	Channel 0 … Channel 31 (Output setting value during communication fault)	Enum0804	0=Hold 1=Clear 2=Force ON
40x5:0	Idle mode	UNSIGNED8	Number of Channels
40x5:01 … 40x5:20	Channel 0 … Channel 31 (Output setting value during communication idling)	Enum0804	0=Hold 1=Clear 2=Force ON
40xE:0	System parameters	UNSIGNED8	8
40xE:01	Hold/Clear setting	Enum0802	0= Via switch 1= Via software
40xE:02	Byte order of analogue values	Enum0803	0=LSB-MSB 1=MSB-LSB

∗1: x = Unit No.

• Digital input unit (EX600-DX###)

Index	Name (Meaning)	Type	Value
40x0:0	Unit parameters	UNSIGNED8	10
40x0:01	Monitor short circuit(power)	Enum0800	0=Disable 1=Enable
40x0:05	Inrush current filter	Enum0800	0=Disable 1=Enable
40x0:09	Input filtering time	Enum0806	0=0.1 ms 1=1 ms 2=10 ms 3=20 ms
40x0:0A	Input extension time	Enum0807	0=1 ms 1=15 ms 2=100 ms 3=200 ms
40x1:0 *2	Monitor open circuit	UNSIGNED8	Number of Channels
40x1:01 *2 … 40x1:08	Channel 0 … Channel 7 (Open circuit detection)	Enum0800	0=Disable 1=Enable
40x2:0	Monitor counter limit	UNSIGNED8	Number of Channels
40x2:01 … 40x2:10	Channel 0 … Channel 15 (ON/OFF count upper limit detection)	Enum0800	0=Disable 1=Enable
40x3:0	Counter limit value (1-65000k)	UNSIGNED8	Number of Channels
40x3:01 … 40x3:10	Channel 0 … Channel 15 (ON/OFF count upper limit value)	UNSIGNED16	1 to 65000 (k)

∗1: x = Unit No.
∗2: Applicable to the open detecting digital input unit (EX600-DX#C1)

∗

• Digital output unit (EX600-DY##)

Index	Name (Meaning)	Type	Value
40x0:0	Unit parameters	UNSIGNED8	6
40x0:02	Monitor short circuit (out)	Enum0800	0=Disable 1=Enable
40x0:06	Restart after short circuit	Enum0801	0=Manual 1=Auto
40x1:0	Monitor open circuit	UNSIGNED8	Number of Channels
40x1:01 … 40x1:10	Channel 0 … Channel 15 (Open circuit detection)	Enum0800	0=Disable 1=Enable
40x2:0	Monitor counter limit	UNSIGNED8	Number of Channels
40x2:01 … 40x2:10	Channel 0 … Channel 15 (ON/OFF count upper limit detection)	Enum0800	0=Disable 1=Enable
40x3:0	Counter limit value (1-65000k)	UNSIGNED8	Number of Channels
40x3:01 … 40x3:10	Channel 0 … Channel 15 (ON/OFF count upper limit value)	UNSIGNED16	1 to 65000 (k)
40x4:0	Fault mode	UNSIGNED8	Number of Channels
40x4:01 … 40x4:10	Channel 0 … Channel 15 (Output setting value during communication fault)	Enum0804	0=Hold 1=Clear 2=Force ON
40x5:0	Idle mode	UNSIGNED8	Number of Channels
40x5:01 … 40x5:10	Channel 0 … Channel 15 (Output setting value during communication idling)	Enum0804	0=Hold 1=Clear 2=Force ON

∗1: x = Unit No.

• Digital I/O unit (EX600-DM##)

Index	Name (Meaning)	Type	Value
40x0:0	Unit parameters	UNSIGNED8	10
40x0:01	Monitor short circuit(power)	Enum0800	0=Disable 1=Enable
40x0:02	Monitor short circuit (out)	Enum0800	0=Disable 1=Enable
40x0:05	Inrush current filter	Enum0800	0=Disable 1=Enable
40x0:06	Restart after short circuit	Enum0801	0=Manual 1=Auto
40x0:09	Input filtering time	Enum0806	0=0.1 ms 1=1 ms 2=10 ms 3=20 ms
40x0:0A	Input extension time	Enum0807	0=1 ms 1=15 ms 2=100 ms 3=200 ms
40x1:0	Monitor open circuit	UNSIGNED8	Number of Channels
40x1:09 … 40x1:10	Channel 8 … Channel 15 (Open circuit detection)	Enum0800	0=Disable 1=Enable
40x2:0	Monitor counter limit	UNSIGNED8	Number of Channels
40x2:01 … 40x2:10	Channel 0 … Channel 15 (ON/OFF count upper limit detection)	Enum0800	0=Disable 1=Enable
40x3:0	Counter limit value (1-65000k)	UNSIGNED8	Number of Channels
40x3:01 … 40x3:10	Channel 0 … Channel 15 (ON/OFF count upper limit value)	UNSIGNED16	1 to 65000 (k)
40x4:0	Fault mode	UNSIGNED8	Number of Channels
40x4:09 … 40x4:10	Channel 8 … Channel 15 (Output setting value during communication fault)	Enum0804	0=Hold 1=Clear 2=Force ON
40x5:0	Idle mode	UNSIGNED8	Number of Channels
40x5:09 … 40x5:10	Channel 8 … Channel 15 (Output setting value during communication idling)	Enum0804	0=Hold 1=Clear 2=Force ON

∗1: x = Unit No.

• Analogue input unit (EX600-AX#)

Index	Name (Meaning)	Type	Value
40x0:0	Unit parameters	UNSIGNED8	11
40x0:01	Monitor short circuit(power)	Enum0800	0=Disable 1=Enable
40x0:03	Monitor over range	Enum0800	0=Disable 1=Enable
40x0:04	Monitor under range	Enum0800	0=Disable 1=Enable
40x0:0B	Data format	Enum0808 (AXA)	0= Offset binary 1= Sign & magnitude 2=2's complement
		Enum0809 (AXB)	0= Offset binary 1= Sign & magnitude 2=2's complement 3= Scaled
40x5:0	Monitor upper limit	UNSIGNED8	Number of Channels
40x5:01 … 40x5:02	Channel 0 … Channel 1 (Analogue user setting value upper limit detection)	Enum0800	0=Disable 1=Enable
40x6:0	Upper limit value	UNSIGNED8	Number of Channels
40x6:01 … 40x6:02	Channel 0 … Channel 1 (Analogue user setting value of upper limit)	UNSIGNED16	0 to 0xFFFF
40x7:0	Monitor lower limit	UNSIGNED8	Number of Channels
40x7:01 … 40x7:02	Channel 0 … Channel 1 (Analogue user setting value lower limit detection)	Enum0800	0=Disable 1=Enable
40x8:0	Lower limit value	UNSIGNED8	Number of Channels
40x8:01 … 40x8:02	Channel 0 … Channel 1 (Analogue user setting value of lower limit)	UNSIGNED16	0 to 0xFFFF
40x9:0	Filter	UNSIGNED8	Number of Channels
40x9:01 … 40x9:02	Channel 0 … Channel 1 (Analogue average filter)	Enum080B	0=None 1=2 value average 2=4 value average 3=8 value average

• Analogue input unit (EX600-AX#) (continued)

Index	Name (Meaning)	Type	Value
40xA:0	Range	UNSIGNED8	Number of Channels
40xA:01 … 40xA:02	Channel 0 … Channel 1 (Analogue range)	Enum080D (AXA)	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
		Enum080E (AXB)	3= 0…10 V 4= 0…5 V 5= 1…5 V 6= 0…20 mA 7= 4…20 mA

∗1: x = Unit No.

• Analogue output unit (EX600-AYA)

Index	Name (Meaning)	Type	Value
40x0:0	Unit parameters	UNSIGNED8	11
40x0:01	Monitor short circuit(power)	Enum0800	0=Disable 1=Enable
40x0:0B	Data format	Enum0809	0= Offset binary 1= Sign & magnitude 2=2's complement 3= Scaled
40x1:0	Fault mode	UNSIGNED8	Number of Channels
40x1:01 … 40x1:02	Channel 0 … Channel 1 (Output setting during communication fault)	Enum0800	0=Disable (Hold) 1=Enable (Fault value)
40x2:0	Fault value	UNSIGNED8	Number of Channels
40x2:01 … 40x2:02	Channel 0 … Channel 1 (Output setting value during communication fault)	UNSIGNED16	0 to 0xFFFF

• Analogue output unit (EX600-AYA) (continued)

Index	Name (Meaning)	Type	Value
40x3:0	Idle mode	UNSIGNED8	Number of Channels
40x3:01 … 40x3:02	Channel 0 … Channel 1 (Output setting during communication idling)	Enum0800	0=Disable (Hold) 1=Enable (Fault value)
40x4:0	Idle value	UNSIGNED8	Number of Channels
40x4:01 … 40x4:02	Channel 0 … Channel 1 (Output setting value during communication idling)	UNSIGNED16	0 to 0xFFFF
40x5:0	Monitor upper limit	UNSIGNED8	Number of Channels
40x5:01 … 40x5:02	Channel 0 … Channel 1 (Analogue user setting value upper limit detection)	Enum0800	0=Disable 1=Enable
40x6:0	Upper limit value	UNSIGNED8	Number of Channels
40x6:01 … 40x6:02	Channel 0 … Channel 1 (Analogue user setting value of upper limit)	UNSIGNED16	0 to 0xFFFF
40x7:0	Monitor lower limit	UNSIGNED8	Number of Channels
40x7:01 … 40x7:02	Channel 0 … Channel 1 (Analogue user setting value lower limit detection)	Enum0800	0=Disable 1=Enable
40x8:0	Lower limit value	UNSIGNED8	Number of Channels
40x8:01 … 40x8:02	Channel 0 … Channel 1 (Analogue user setting value of lower limit)	UNSIGNED16	0 to 0xFFFF
40xA:0	Range	UNSIGNED8	Number of Channels
40xA:01 … 40xA:02	Channel 0 … Channel 1 (Analogue range)	Enum080E	3= 0…10 V 4= 0…5 V 5= 1…5 V 6= 0…20 mA 7= 4…20 mA

∗1: x = Unit No.

• Analogue I/O unit (EX600-AMB)

Index	Name (Meaning)	Type	Value
40x0:0	Unit parameters	UNSIGNED8	11
40x0:01	Monitor short circuit(power)	Enum0800	0=Disable 1=Enable
40x0:03	Monitor over range	Enum0800	0=Disable 1=Enable
40x0:04	Monitor under range	Enum0800	0=Disable 1=Enable
40x0:0B	Data format	Enum0809	0= Offset binary 1= Sign & magnitude 2= 2's complement 3= Scaled
40x1:0	Fault mode	UNSIGNED8	Number of Channels
40x1:03 … 40x1:04	Channel 2 … Channel 3 (Output setting during communication fault)	Enum0800	0=Disable (Hold) 1=Enable (Fault value)
40x2:0	Fault value	UNSIGNED8	Number of Channels
40x2:03 … 40x2:04	Channel 2 … Channel 3 (Output setting value during communication fault)	UNSIGNED16	0 to 0xFFFF
40x3:0	Idle mode	UNSIGNED8	Number of Channels
40x3:03 … 40x3:04	Channel 2 … Channel 3 (Output setting during communication idling)	Enum0800	0=Disable (Hold) 1=Enable (Fault value)
40x4:0	Idle value	UNSIGNED8	Number of Channels
40x4:03 … 40x4:04	Channel 2 … Channel 3 (Output setting value during communication idling)	UNSIGNED16	0 to 0xFFFF
40x5:0	Monitor upper limit	UNSIGNED8	Number of Channels
40x5:01 … 40x5:04	Channel 0 … Channel 3 (Analogue user setting value upper limit detection)	Enum0800	0=Disable 1=Enable
40x6:0	Upper limit value	UNSIGNED8	Number of Channels
40x6:01 … 40x6:04	Channel 0 … Channel 3 (Analogue user setting value of upper limit)	UNSIGNED16	0 to 0xFFFF

• Analogue I/O unit (EX600-AMB) (continued)

Index	Name (Meaning)	Type	Value
40x7:0	Monitor lower limit	UNSIGNED8	Number of Channels
40x7:01 … 40x7:04	Channel 0 … Channel 3 (Analogue user setting value lower limit detection)	Enum0800	0=Disable 1=Enable
40x8:0	Lower limit value	UNSIGNED8	Number of Channels
40x8:01 … 40x8:04	Channel 0 … Channel 3 (Analogue user setting value of lower limit)	UNSIGNED16	0 to 0xFFFF
40x9:0	Filter	UNSIGNED8	Number of Channels
40x9:01 … 40x9:02	Channel 0 … Channel 1 (Analogue average filter)	Enum080B	0=None 1=2 value average 2=4 value average 3=8 value average
40xA:0	Range	UNSIGNED8	Number of Channels
40xA:01 … 40xA:04	Channel 0 … Channel 3 (Analogue range)	Enum080E	3= 0…10 V 4= 0…5 V 5= 1…5 V 6= 0…20 mA 7= 4…20 mA

∗1: x = Unit No.

• Frequency count unit (EX600-DFB)

Index	Name (Meaning)	Type	Value
40x0:0	Unit parameters	UNSIGNED8	11
40x0:01	Monitor short circuit(power)	Enum0800	0=Disable 1=Enable
40x5:0	Monitor upper limit	UNSIGNED8	Number of Channels
40x5:01 … 40x5:04	Channel 0 … Channel 3 (User setting value upper limit detection)	Enum0800	0=Disable 1=Enable
40x6:0	Upper limit value	UNSIGNED8	Number of Channels
40x6:01 … 40x6:04	Channel 0 … Channel 3 (User setting value of upper limit)	UNSIGNED16	0 to 0xFFFF

• Frequency count unit (EX600-DFB) (continued)

Index	Name (Meaning)	Type	Value
40x7:0	Monitor lower limit	UNSIGNED8	Number of Channels
40x7:01 … 40x7:04	Channel 0 … Channel 3 (User setting value lower limit detection)	Enum0800	0=Disable 1=Enable
40x8:0	Lower limit value	UNSIGNED8	Number of Channels
40x8:01 … 40x8:04	Channel 0 … Channel 3 (User setting value of lower limit)	UNSIGNED16	0 to 0xFFFF
40x9:0	Filter	UNSIGNED8	Number of Channels
40x9:01 … 40x9:04	Channel 0 … Channel 3 (Average filter)	Enum080B	0=None 1=2 value average 2=4 value average 3=8 value average
40xC:0	Cut off frequency	UNSIGNED8	Number of Channels
40xC:01 … 40xC:04	Channel 0 … Channel 3 (Cut off frequency value)	UNSIGNED16	0 to 0xFFFF

∗1: x = Unit No.

• Temperature measurement count unit (EX600-AT#)

Index	Name (Meaning)	Type	Value
40x0:0	Unit parameters	UNSIGNED8	11
40x0:0B	Data format	Enum080A	1= Sign & magnitude 2=2's complement
40x0:13	Temperature	Enum080F	1=F(Fahrenheit) 2=C(Celsius)
40x9:0	Filter	UNSIGNED8	Number of Channels
40x9:01 … 40x9:04	Channel 0 … Channel 3 (Average filter)	Enum080B	0=None 1=2 value average 2=4 value average 3=8 value average
40xB:0	Number of wires	UNSIGNED8	Number of Channels
40xB:01 … 40xB:04	Channel 0 … Channel 3 (Number of wires)	Enum0810	4=2 wires 5=3 wires 6=4 wires

∗1: x = Unit No.

• IO-Link master unit (EX600-L#B1)

Index	Name (Meaning)	Type	Value
40x0:0	Unit parameters	UNSIGNED8	16
40x0:01	Monitor short circuit(power)	Enum0800	0=Disable 1=Enable
40x0:0C	Fault output (IO-Link) (Output setting during Communication Fault)	Enum0805	0=Clear,PDOut valid 1=Hold 2=Clear,PDOut invalid
40x0:0D	Fault output (DO_CQ) (Output setting during Communication Fault)	Enum0804	0=Clear 1=Hold 2=ForceON
40x0:0E	Idle output (IO-Link) (Output setting during Communication idling)	Enum0805	0=Clear,PDOut valid 1=Hold 2=Clear,PDOut invalid
40x0:0F	Idle output (DO_CQ) (Output setting during Communication idling)	Enum0804	0=Clear 1=Hold 2=ForceON
40x0:10	Byte swap (Swap the byte order of the process data)	Enum0811	0=Direct(No Swap) 1=Swap 16bit 2=wap 32bit 3=Swap all
40x1:0	Port1-Port configuration	UNSIGNED8	6
40x1:01	PortMode	Enum0812	0=Deactivated 1=IOL_Manual 2=IOL_Autostart 3=DI_C/Q 4=DO_C/Q
40x1:02	Validation & Backup	Enum0813	0=No Device check 1=V1.0 2=V1.1 3=V1.1 , Backup + Restore 4=V1.1 , Restore
40x1:03 *2	I/Q behavior (Pin2 at M12 Connector)	Enum0814	1=Digital Input 5=Power2 (Port classB)
40x1:04	PortCycle Time	UNSIGNED8	0 to 0xFF
40x1:05	Vendor ID (Vendor ID for device comparison function)	UNSIGNED16	0 to 0xFFFF
40x1:06	Device ID (Device ID for device comparison function)	UNSIGNED32	0 to 0xFFFFFF
40x2:0	Port2-Port configuration	See Port1-Port configuration	
40x3:0	Port3-Port configuration		
40x4:0	Port4-Port configuration		

• IO-Link master unit (EX600-L#B1) (continued)

Index	Name (Meaning)	Type	Value
40x5:0 *3	Port1-Port power off/on	UNSIGNED8	2
40x5:01 *3	Port Power Mode	Enum0815	0=One time switch off (Power Off Time) 1=Switch PortPowerOff 2=Switch PortPowerOn
40x5:02 *3	Power Off Time	UNSIGNED16	0x01F4 to 0xFFFF
40x6:0 *3	Port2-Port power off/on	See Port1-PortPower off/on	
40x7:0 *3	Port3-Port power off/on		
40x8:0 *3	Port4-Port power off/on		
40x9:0	Device read/write	UNSIGNED8	6
40x9:01	Request	Enum0819	0=Read 1=Write
40x9:02	Port	Enum081A	0=Port1 1=Port2 2=Port3 3=Port4
40x9:03	Index	UNSIGNED16	Default 0
40x9:04	Subindex	UNSIGNED8	Default 0
40x9:05	Length	UNSIGNED8	Default 0
40x9:06	Data	Octet string	232bytes
40xA:0 *4	L+ control	UNSIGNED8	4
40xA:01 *4	Port1	Enum081B	0=On 1=Off
40xA:02 *4	Port2	Enum081B	0=On 1=Off
40xA:03 *4	Port3	Enum081B	0=On 1=Off
40xA:04 *4	Port4	Enum081B	0=On 1=Off

∗1: x = Unit No.
∗2: Read only.
∗3: EX600-LAB1 only.
∗4: EX600-LBB1 only.

■Details of the Diagnostic Data

• SI unit (EX600-SEC3/4)

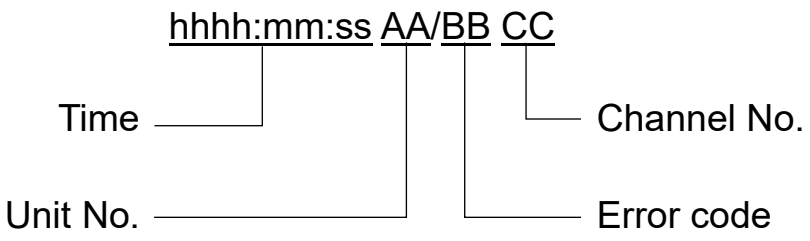
Index	Name (Meaning)	Type	Value
50x0:0	Short circuit error	UNSIGNED8	Number of Channels
50x0:01 … 50x0:20	Channel 0 … Channel 31	Enum081C	0=No error 1=Error
50x1:0	Over counter limit error	UNSIGNED8	Number of Channels
50x1:01 … 50x1:20	Channel 0 … Channel 31	Enum081C	0=No error 1=Error
50x2:0	Open circuit error	UNSIGNED8	Number of Channels
50x2:01 … 50x2:20	Channel 0 … Channel 31	Enum081C	0=No error 1=Error
50x3:0	Counter value	UNSIGNED8	Number of Channels
50x2:01 … 50x2:20	Channel 0 … Channel 31	UNSIGNED32	0 to 0xFFFFFFFF
50xE:0	System error	UNSIGNED8	6
50xE:01	Pwr output is out of range (The power supply voltage for output is below 19 VDC)	Enum081C	0=No error 1=Error
50xE:02	Pwr control is out of range (The power supply voltage for control and input is below 19 VDC)	Enum081C	0=No error 1=Error
50xE:03	Unit disconnection	Enum081C	0=No error 1=Error
50xE:04	Connection error	Enum081C	0=No error 1=Error
50xE:05	Memory error	Enum081C	0=No error 1=Error
50xE:06	Parameter read/write error	Enum081C	0=No error 1=Error
50xF:0	Error log	UNSIGNED8	31
50xF:01 … 50xF:1E	Log 0 … Log 29	Visible String	hhhh:mm:ss AA/BB CC *2
50xF:1F *3	Clear error log	Enum081D	0=Clear

∗1: x = Unit No.

∗2: Refer to " Detail of the Log Data "(page 112)

∗3: Write only

Details of the Log Data



Error code

Error code	Content
0	-
1	Short circuit has occurred.
2	Analogue input value has fallen below the setting range.
3	Analogue input value has exceeded the setting range.
4	-
5	-
6	Open circuit has been detected.
7	Analogue value has exceeded the user-set limit value.
8	Analogue value has fallen below the user-set limit value.
9	ON/OFF counter value has exceeded the user-set limit value.
10～15	-
16	Power supply voltage level for control and input is below 19 VDC.
17	Power supply voltage level for output is below 19 VDC.
18	-
19	Disconnection between the units. (During operation)
20	Connection failure between the units. (When the power supply is applied)
21	-
22	System error (Memory error detected when the power supply is applied)
23	Hardware error (Parameter read/write has failed)

• Digital input unit,Digital output unit,Digital I/O unit(EX600-DX###,DY##,DM##)

Index	Name (Meaning)	Type	Value
50x0:0	Short circuit error	UNSIGNED8	Number of Channels
50x0:01 … 50x0:10	Channel 0 … Channel 15	Enum081C	0=No error 1=Error
50x1:0	Over counter limit error	UNSIGNED8	Number of Channels
50x1:01 … 50x1:10	Channel 0 … Channel 15	Enum081C	0=No error 1=Error
50x2:0 *2	Open circuit error	UNSIGNED8	Number of Channels
50x2:01 *2 … 50x2:10	Channel 0 … Channel 15	Enum081C	0=No error 1=Error
50x3:0	Counter value	UNSIGNED8	Number of Channels
50x3:01 … 50x3:10	Channel 0 … Channel 15	UNSIGNED32	0 to 0xFFFFFFFF

∗1: x = Unit No.
∗2: Applicable to the open detecting digital input unit (EX600-DX#C1) and digital output.

• Analogue input unit, Analogue output unit, Analogue I/O unit, Frequency count unit (EX600-AX#, AYA, AMB, DFB)

Index	Name (Meaning)	Type	Value
50x0:0	Short circuit error	UNSIGNED8	Number of Channels
50x0:01 … 50x0:04	Channel 0 … Channel 3	Enum081C	0=No error 1=Error
50x1:0 ※2	Over range error ※2	UNSIGNED8	Number of Channels
50x1:01 ※2 … 50x1:04	Channel 0 ※2 … Channel 3	Enum081C	0=No error 1=Error
50x2:0 ※2	Under range error ※2	UNSIGNED8	Number of Channels
50x2:01 ※2 … 50x2:04	Channel 0 ※2 … Channel 3	Enum081C	0=No error 1=Error
50x3:0	Over upper limit error	UNSIGNED8	Number of Channels
50x3:01 … 50x3:04	Channel 0 … Channel 3	Enum081C	0=No error 1=Error
50x4:0	Under lower limit error	UNSIGNED8	Number of Channels
50x4:01 … 50x4:04	Channel 0 … Channel 3	Enum081C	0=No error 1=Error

∗1: x = Unit No.
∗2: Applicable to the analogue input.

•IO-Link master unit (EX600-L#B1)

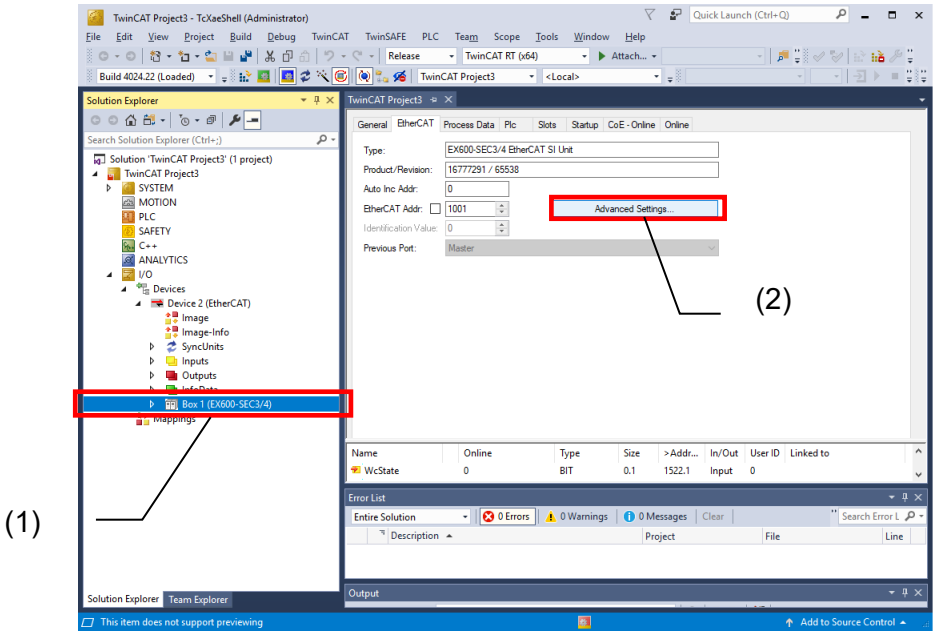
Index	Name (Meaning)	Type	Value
50x0:0	Short circuit error	UNSIGNED8	Number of Channels
50x0:01 … 50x0:04	Port 1 … Port 4	Enum081C	0=No error 1=Error
50x1:0	Port1-Port status	UNSIGNED8	9
50x1:01	PortStatusinfo	Enum0816	0=NO_DEVICE 1=DEACTIVATED 2=PORT_DIAG 3=PREOPERATE 4=OPERATE 5=DI_C/Q 6=DO_C/Q 254=PORT_POWER_OFF 255=NOT_AVAILABLE
50x1:02	PortQualityinfo	Enum0817	0=VALID/PDOUTVALID 1=INVALID/ PDOUTVALID 2=VALID/ PDOUTINVALID 3=INVALID/ PDOUTINVALID
50x1:03	RevisionID	UNSIGNED8	0 to 0xFF
50x1:04	TransmissionRate	Enum0818	0=NOT_DETECTED 1=COM1 2=COM2 3=COM3
50x1:05	MasterCycleTime	UNSIGNED8	0 to 0xFF
50x1:06	InputDataLength	UNSIGNED8	0 to 0x20
50x1:07	OutputDataLength	UNSIGNED8	0 to 0x20
50x1:08	VendorID	UNSIGNED16	1 to 0xFFFF
50x1:09	DeviceID	UNSIGNED32	1 to 0xFFFFFF
50x1:0	Port2-Port status	See1 Port1-Port status	
50x2:0	Port3-Port status		
50x3:0	Port4-Port status		

∗1: x = Unit No.

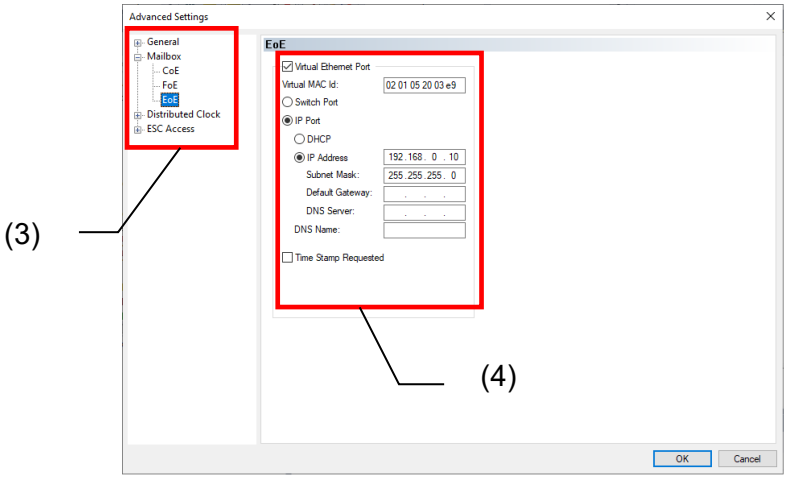
IP Address setting

When using the Web server or IO-Link Device Tool (IO-Link Device Tool V5.1 PE), IP address setting is required. EoE (Ethernet over EtherCAT) is used to set the IP address.

1. After selecting [Box1(EX600-SEC3/4)], click the [Advanced Settings...] of EtherCAT tab.



2. Select [Mailbox] ->[EoE], set the IP Address.



3. Click the [Restart TwinCAT (Config Mode)] button to activate the EoE setting.

Web Server

EX600 Web server functional overview

The Web server function is provided by the EX600-SEC3/SEC4.
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.

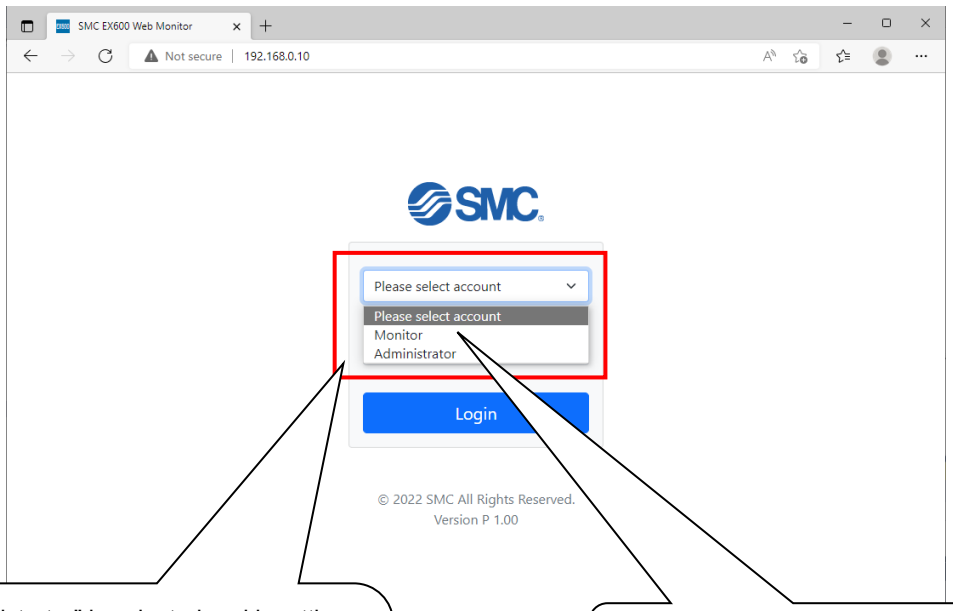
Web browser	Version
Google Chrome	Ver.85
Mozilla firefox	Ver.81
Microsoft Edge (Chromium)	Ver.85

∗: 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-SEC3 (The following is an example for IP address of EX600-SEC3 is 192.168.0.10.)
(1) Connect PC and EX600-SEC3 with a communication cable and open the web browser.
(2) Match the top 3 octets of the IP address between the PC and EX600.
e.g., PC IP address 192.168.0.250 (subnet mask 255.255.255.0)
(3) Type the IP address of EX600-SEC3 on the web browser. (e.g., http://192.168.0.10)
The EX600 webpage should load after several seconds.

NOTE
Use only one computer for connection.

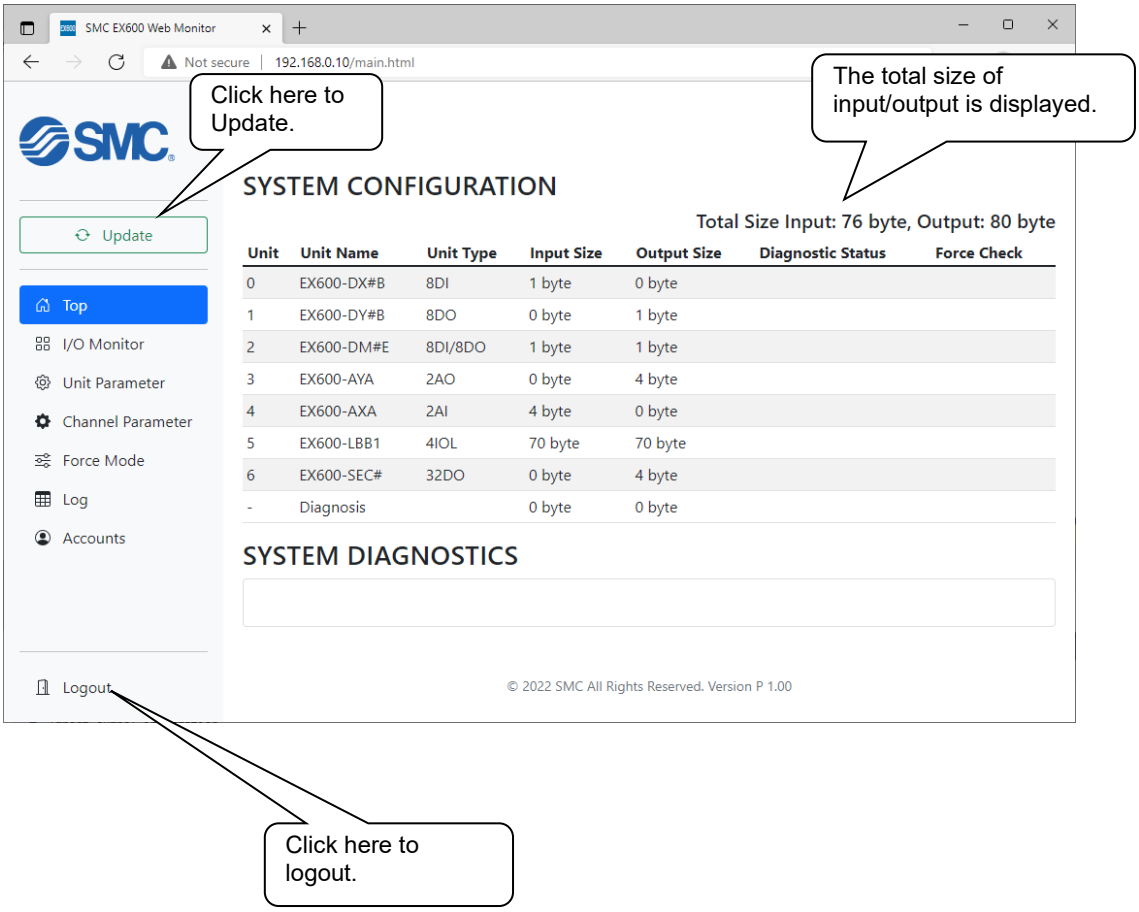


When "Administrator" is selected and inputting password, the screen is switched to "Admin mode".

Default setting Password is “admin”.

When "Monitor" is selected, the screen is switched to monitor only mode.
No Password is required.

(4) After pressing the "Login" button, the "SYSTEM CONFIGURATION" web page is displayed.
This page is the TOP web page of the EX600 Web server.

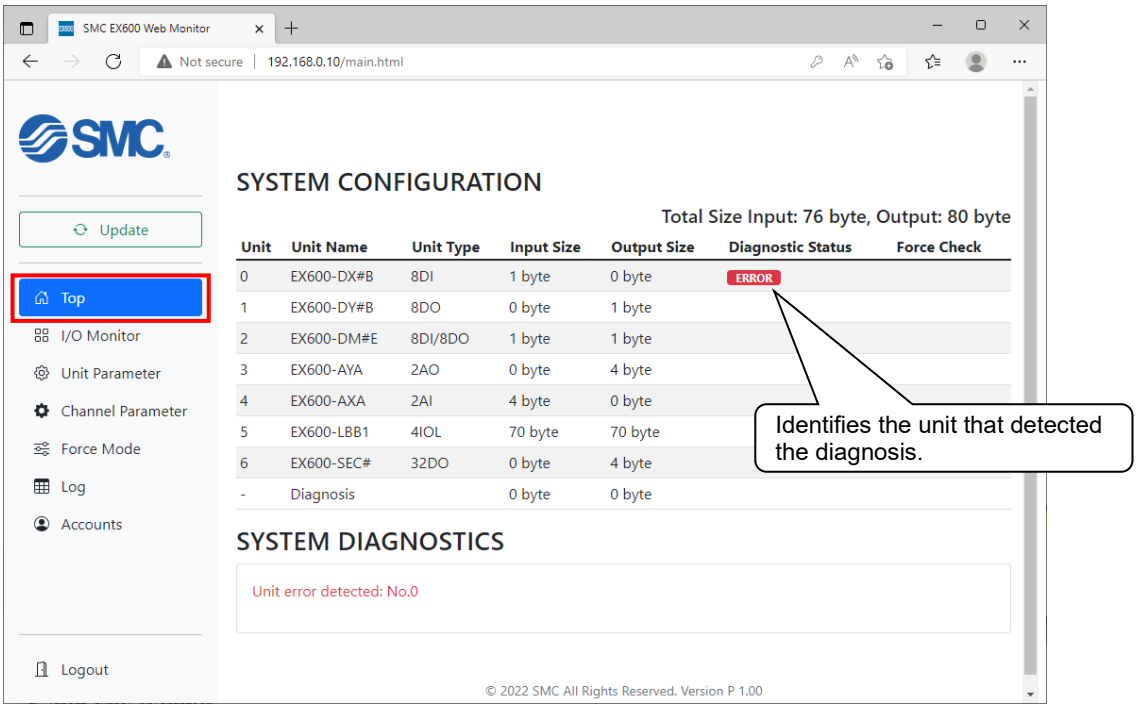


NOTE
The screen above shows the case when the manifold hardware configuration is as shown below.

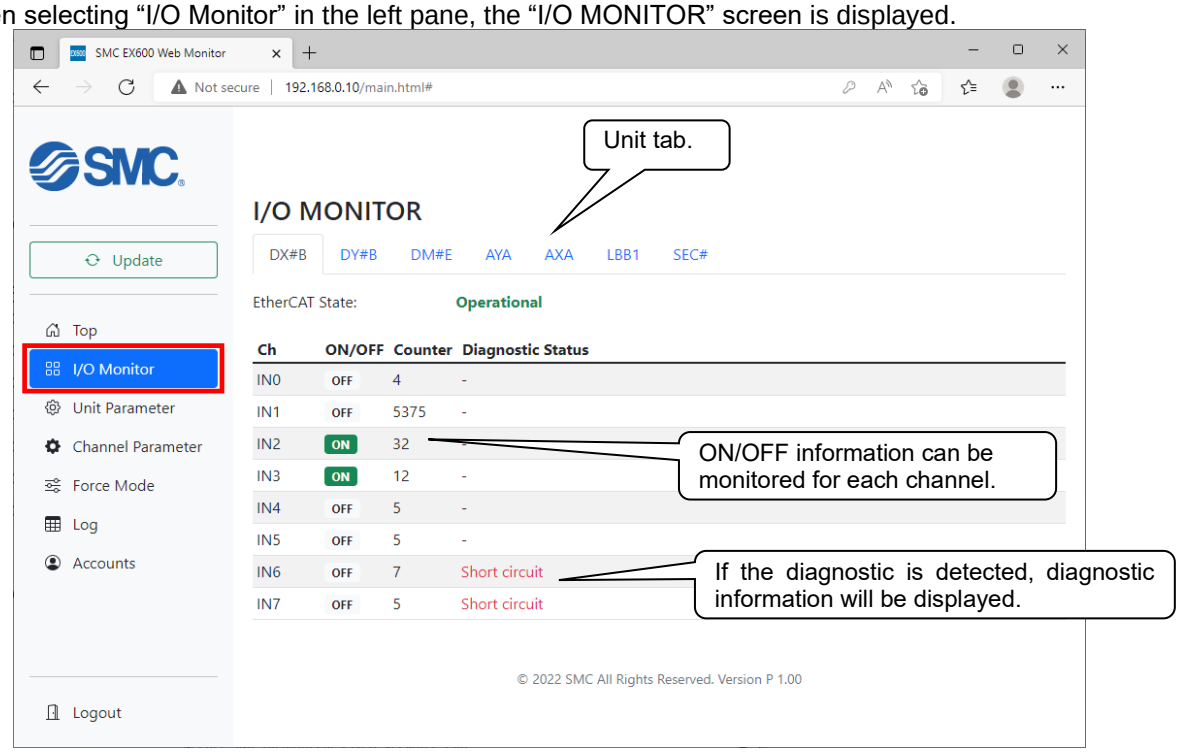
Configuration

	No.0	No.1	No.2	No.3	No.4	No.5	No.6	
End plate	EX600-DX#B	EX600-DY#B	EX600-DN#E	EX600-AXA	EX600-AYA	EX600-LBB1	EX600-SEC3	No diagnostic data.

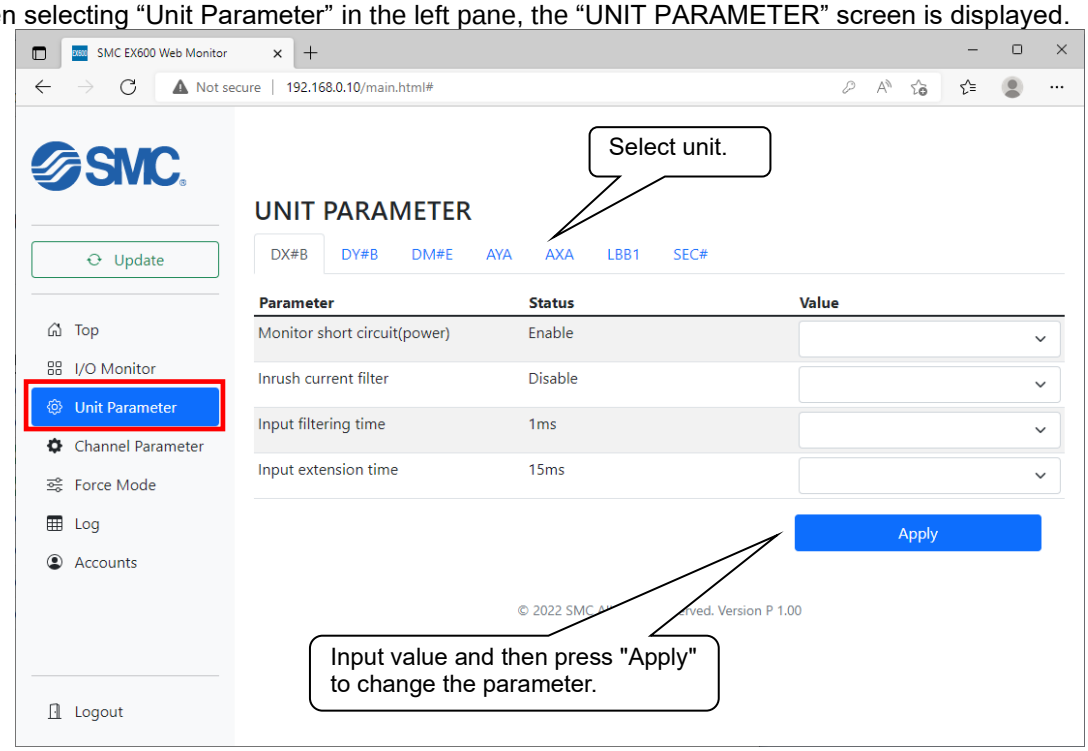
(5) When unit diagnosis is detected, the diagnostic information is displayed on the "SYSTEM CONFIGURATION" screen.



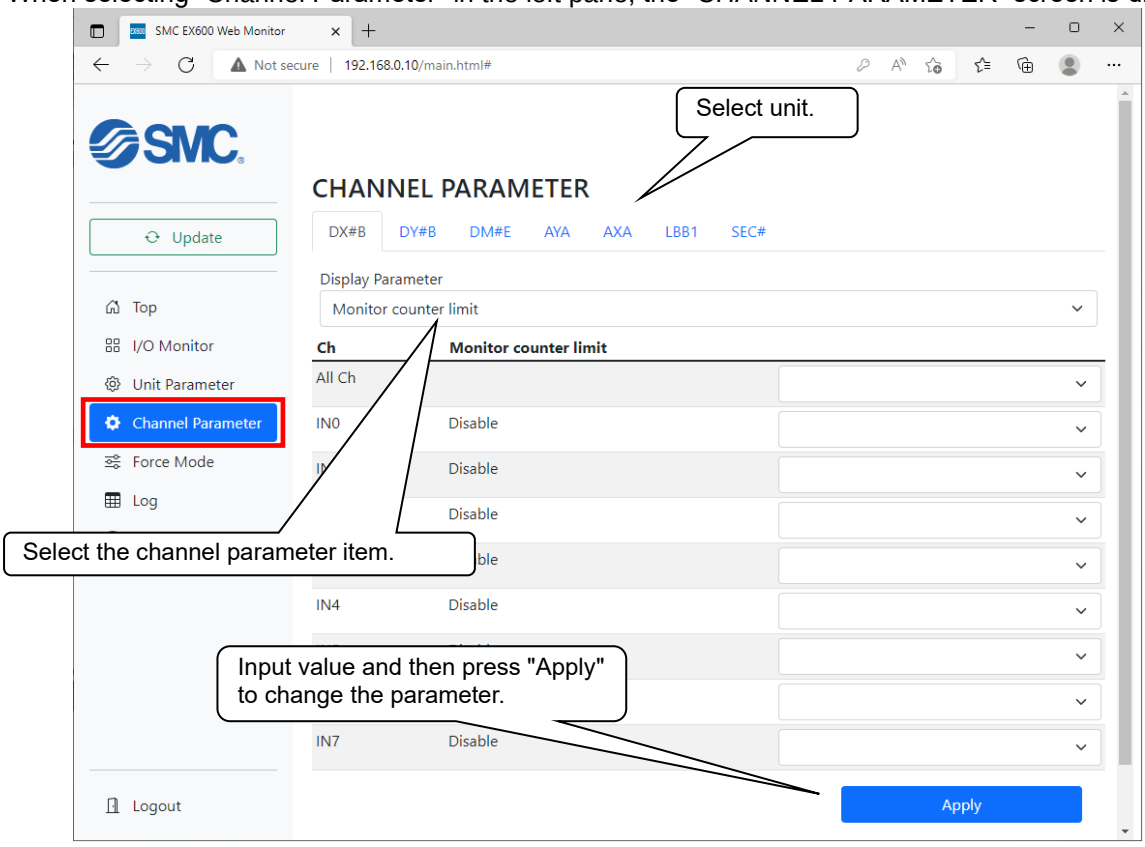
(6) When selecting “I/O Monitor” in the left pane, the “I/O MONITOR” screen is displayed.



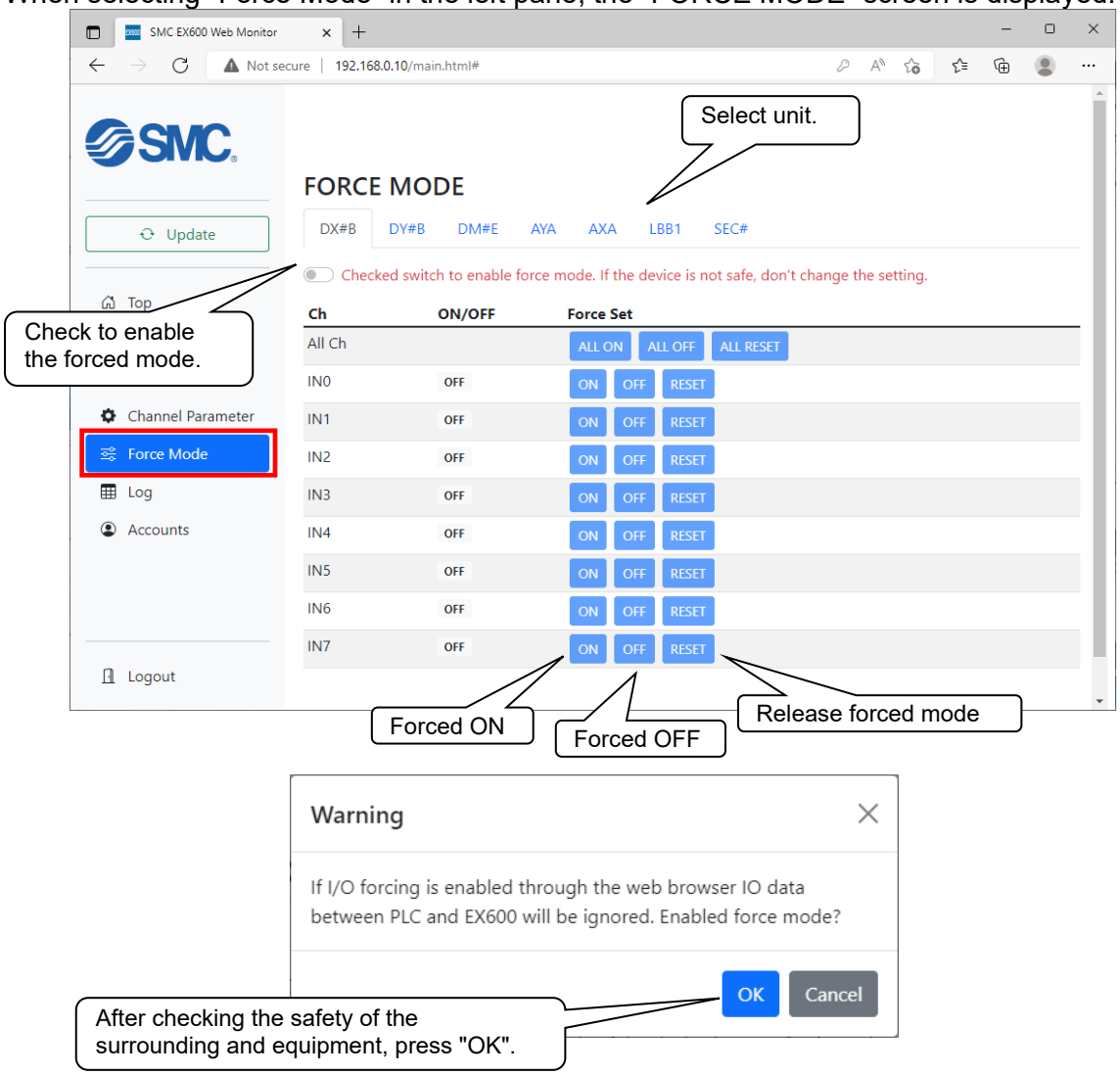
(7) When selecting “Unit Parameter” in the left pane, the “UNIT PARAMETER” screen is displayed.



(8) When selecting “Channel Parameter” in the left pane, the “CHANNEL PARAMETER” screen is displayed.



(9) When selecting “Force Mode” in the left pane, the “FORCE MODE” screen is displayed.

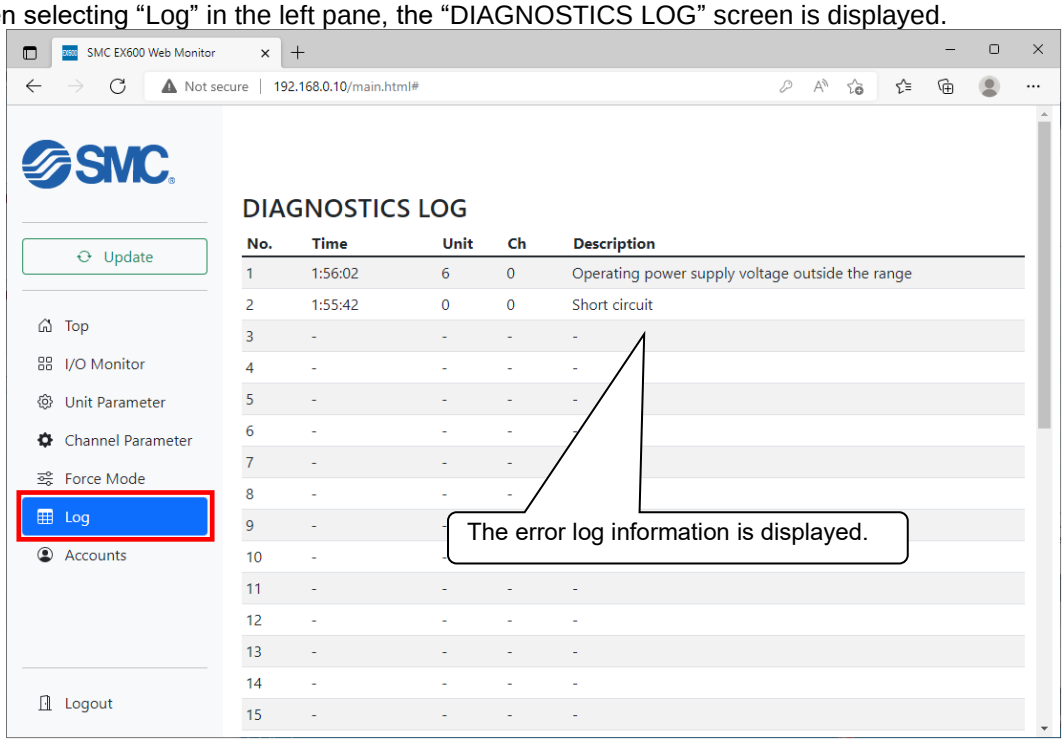


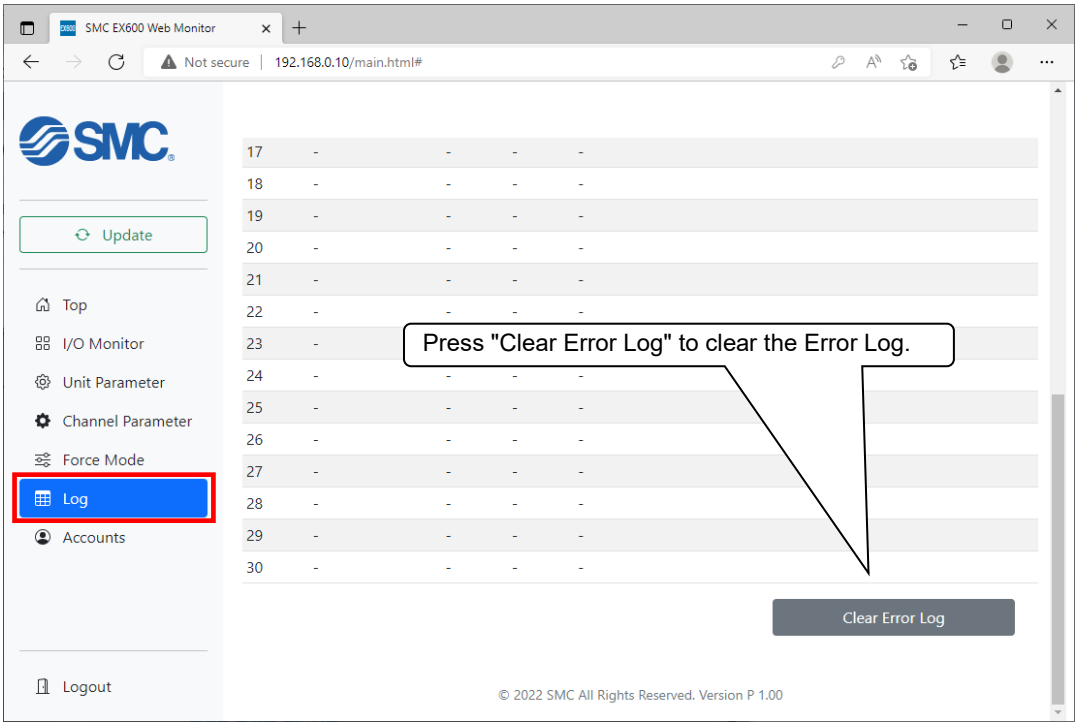
NOTE
Force Mode can be enabled when Pre-Operational or Safe-Operational is selected.
There are two ways to cancel the forced mode: "press the RESET button" or "LOG OUT from the Web server".

⚠Warning

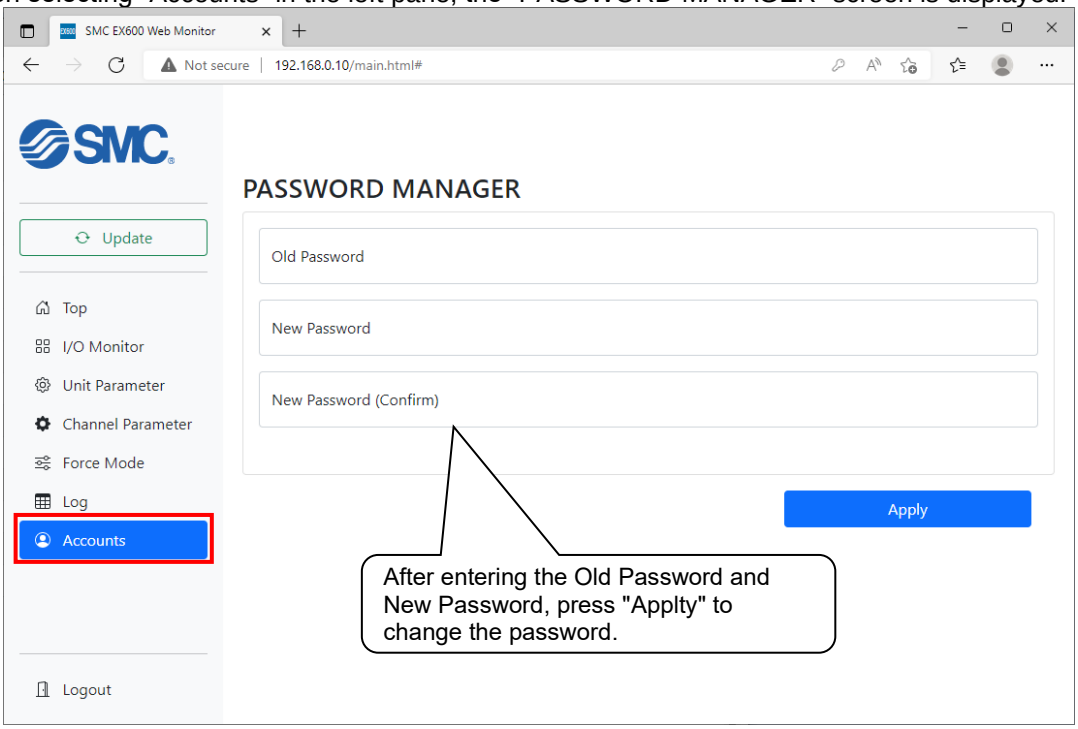
■The forced input/output function is used to change the signal status forcibly. When operating this function, be sure to check the safety of the surrounding and equipment.
Otherwise, injury or equipment damage could result.

(10) When selecting “Log” in the left pane, the “DIAGNOSTICS LOG” screen is displayed.





(11) When selecting “Accounts” in the left pane, the “PASSWORD MANAGER” screen is displayed.



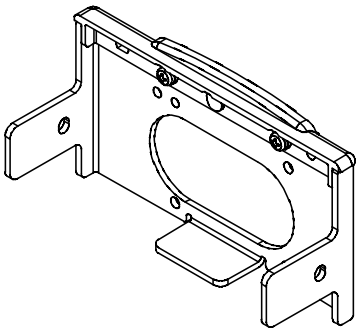
Accessories

For the selection of accessories, refer to the catalogue.

(1) Valve plate

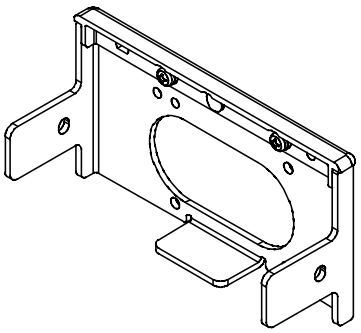
EX600-ZMV1

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.



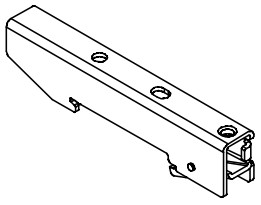
(2) End plate bracket

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)

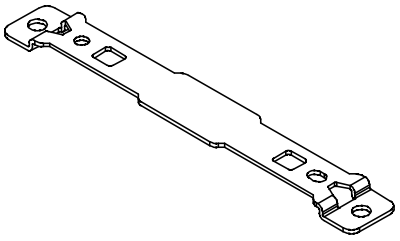
Enclosed parts: Round head screw (M4 x 20) with washer, 1 pc.
P tithe screw (4 x 14), 2 pcs.



(3) Intermediate support bracket

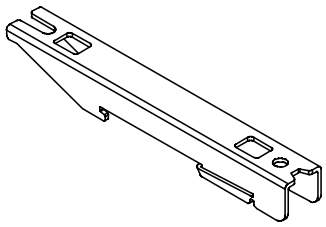
EX600-ZMB1…for direct mounting

Enclosed parts: Round head screw (M4 x 5), 2 pcs.



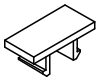
EX600-ZMB2…for DIN rail mounting

Enclosed parts: Round head screw (M4 x 6), 2 pcs.



(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 EtherCAT 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) EtherCAT 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

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