No.EX※※-OMS0014-B

Operation Manual

PRODUCT NAME

EtherNet/IP™ Compatible Fieldbus System

MODEL / Series / Product Number

EX500-GEN2
EX500-S103
EX500-DXP#

SMC Corporation

Table of Contents

Input unit

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 and safety requirements for systems and their components
ISO 4413: Hydraulic fluid power - General rules and safety requirements for systems and their components
IEC 60204-1: Safety of machinery - Electrical equipment of machines - Part 1: General requirements
ISO 10218-1: Robots and robotic devices - Safety requirements for industrial robots - Part 1:Robots
etc.

Danger	**Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
Warning	**Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
Caution	**Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate 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. Our products cannot be used beyond their specifications. Our products are not developed, designed, and manufactured to be used under the following conditions or environments. Use under such conditions or environments is not covered.

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Use for nuclear power, railways, aviation, space equipment, ships, vehicles, military application, equipment affecting human life, body, and property, fuel equipment, entertainment equipment, emergency shut-off circuits, press clutches, brake circuits, safety equipment, etc., and use for applications that do not conform to standard specifications such as catalogs and operation manuals.
3. Use for interlock circuits, except for use with double interlock such as installing a mechanical protection function in case of failure. Please periodically inspect the product to confirm that the product is operating properly.

Safety Instructions

⚠ Caution

We develop, design, and manufacture our products to be used for automatic control equipment, and provide them for peaceful use in manufacturing industries.
Use in non-manufacturing industries is not covered.
Products we manufacture and sell cannot be used for the purpose of transactions or certification specified in the Measurement Act.
The new Measurement Act prohibits use of any unit other than SI units in Japan.

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 regulations 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 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

■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 safety and noise resistance of the Serial 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.
- The product is a UL approved product only if they have a c UL us mark on the body.
- 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.

•Product handling

∗Installation

•Do not drop, hit or apply excessive shock to the fieldbus system.
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.
IP65/67 protection cannot be guaranteed if the screws are not tightened to the specified torque.

•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 fieldbus system and/or I/O device can result, causing malfunction.

•Do not route wires and cables together with power or high voltage cables.
Otherwise the fieldbus system and/or I/O 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 fieldbus system and/or I/O 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.

•Separate the power line for output devices from the power line for control.
Otherwise noise or induced surge voltage can cause malfunction.

∗Environment

•Select the proper type of protection according to the environment of operation.
IP65/67 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.
If using in an environment that is exposed to water splashes, please take measures such as using a cover.
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 which generates a large amount of surge (solenoid type lifter, high frequency induction furnace, motor, etc.) close to the fieldbus system, this may cause deterioration or breakage of the internal circuit of the fieldbus system. Avoid sources of surge generation and crossed lines.

•When a surge-generating load such as a relay or solenoid is driven directly, use an fieldbus system with a built-in surge absorbing element.
Direct drive of a load generating surge voltage can damage the fieldbus system.

•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 remnant of wires from entering the fieldbus system to avoid failure and malfunction.

- 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

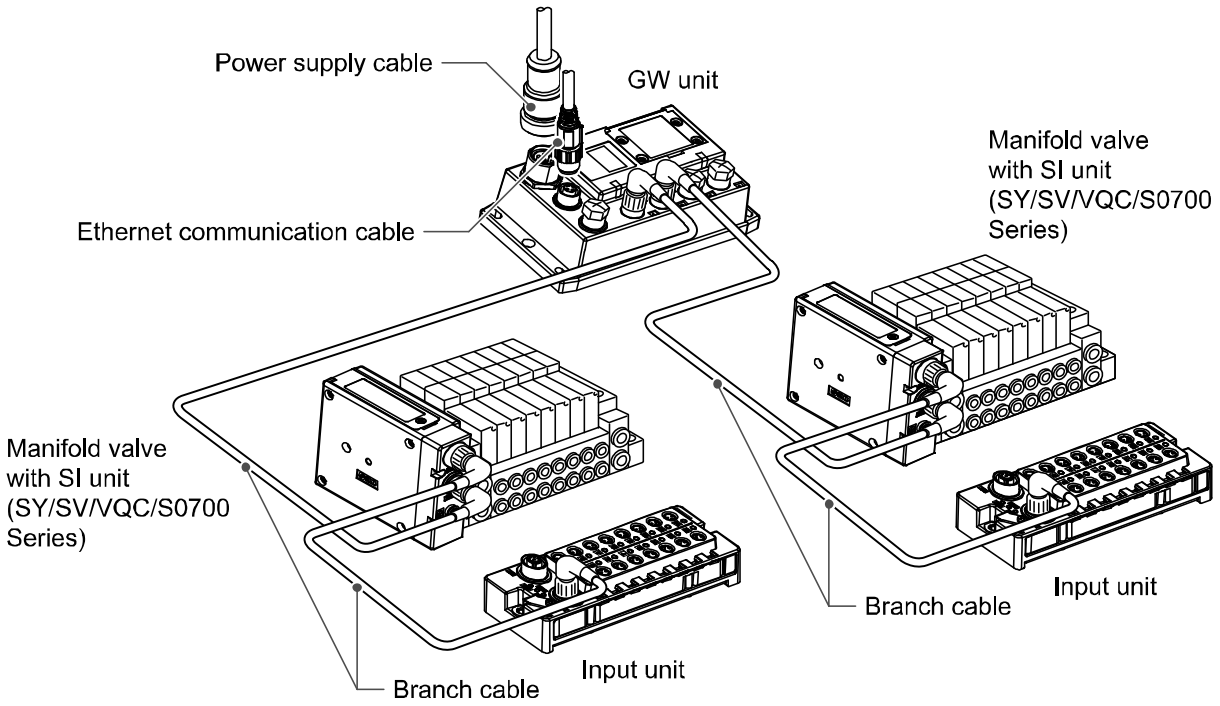
- Perform settings suitable for the operating conditions.
  Incorrect setting can cause operation failure.
- Please refer to the PLC manufacturer's manual etc. for details of programming and addresses.
  For the PLC protocol and programming refer to the relevant manufacturer's documentation.

∗Maintenance

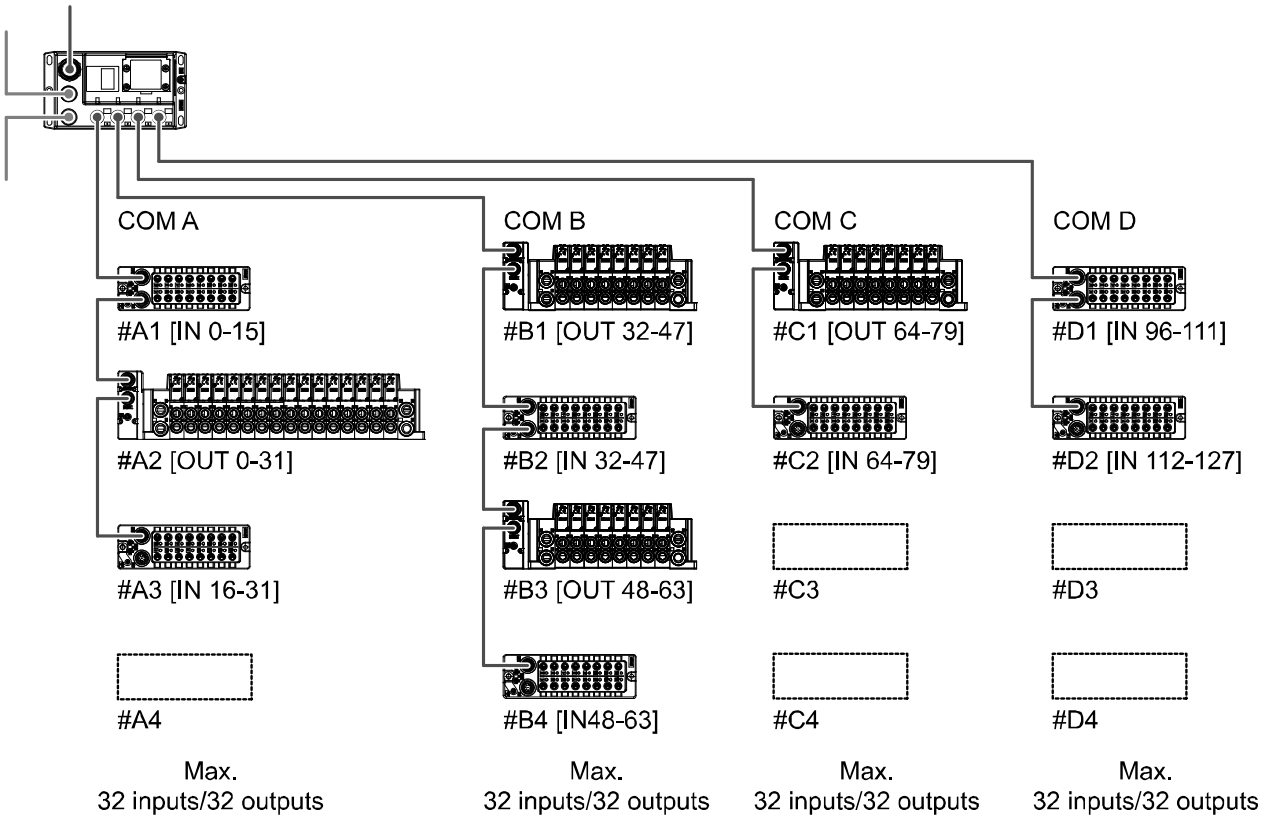
- Turn off the power supply, stop the supplied air, exhaust the residual pressure and verify the release of air before performing maintenance.
  There is a risk of unexpected malfunction.
- Perform regular maintenance and inspections.
  There is a risk of unexpected malfunction.
- After maintenance is 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 the 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.

Product Overview

■System construction



The EX500 range of units can be connected to open fieldbus (EtherNet/IP™) to realize the reduction of input or output device wiring and the distributed control system.
One branch of manifold valves/input unit can be connected to 32 outputs/32 inputs. Up to 4 branches can be connected (total 128 outputs/128 inputs).



EX500 GW unit

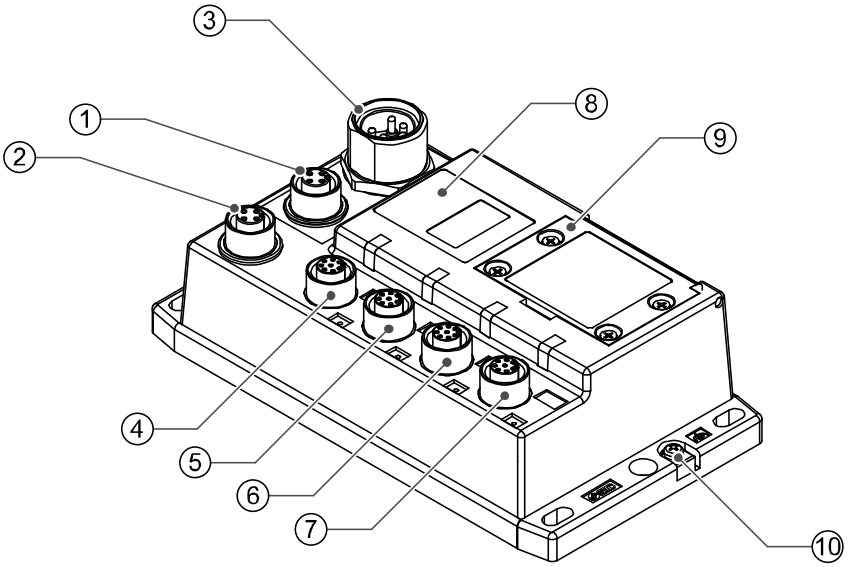
Model Indication and How to Order

EX500-G EN2

Fieldbus

EN2	EtherNet/IP™

Summary of Product parts



No.	Name	Application
1	Communication connector (Port1/IN)	Connect to EtherNet/IP™ line. *1
2	Communication connector (Port2/OUT)	
3	Power supply connector	Connector to supply power to the output devices such as solenoid valves and input and control equipment such as sensors. *1
4	Branch port A(COM A)	Connect the SI unit (with manifold valves) or input unit using a branch cable. *1
5	Branch port B(COM B)	
6	Branch port C(COM C)	
7	Branch port D(COM D)	
8	Display window	Displays the status of the power supply and the communication with the PLC. *2
9	Switch cover	Sets the address, etc. with the switch inside. *2
10	Grounding terminal (FE)	Used for functional grounding. (It is recommended to ground with resistance of 100 ohms or less)

Accessories

Seal cap: 5 pcs. (for M12 connector socket)	Used for unused communication connector and branch ports.

*1: Refer to page 12 for wiring.

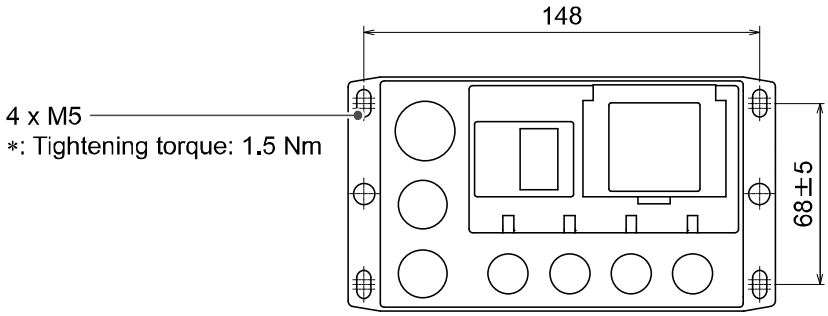
*2: Refer to page 17 for display and setting.

Mounting and Installation

■Installation

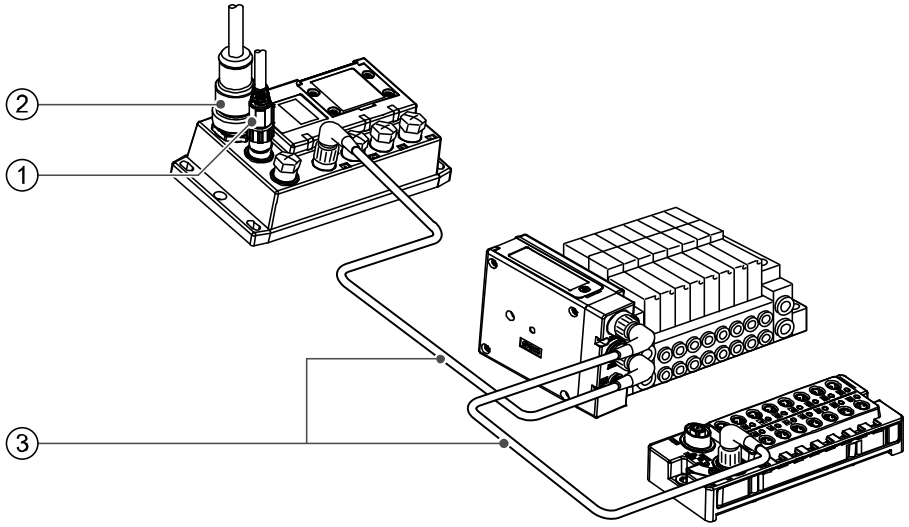
•Direct mounting

Install the product using 4 M5 screws x 15 mm or longer with a head ø5.2 minimum.



Holes for mounting

■Wiring



Described as follows:-

①Communication wiring: Connection with EtherNet/IP™

↓

②Power supply wiring: Connection of the power supply for the solenoid valve and the power supply for input and control.

↓

③Branch wiring: Connection from GW unit to SI unit or input unit.

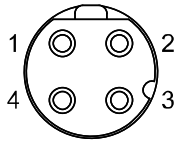
1. Wiring for communication

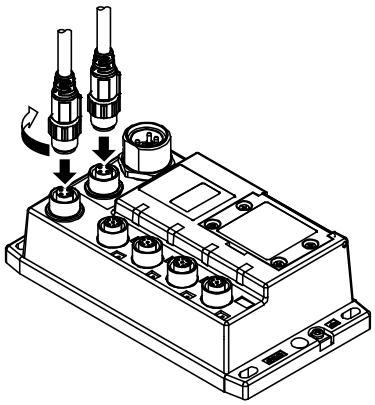
Connect the Ethernet communication cable to the communication connector.

Communication connector pin layout (Port1/Port2)

M12, 4 pin, socket, D code.

No.	Description
1	TX+
2	RX+
3	TX-
4	RX-





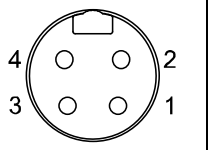
2. Power supply wiring

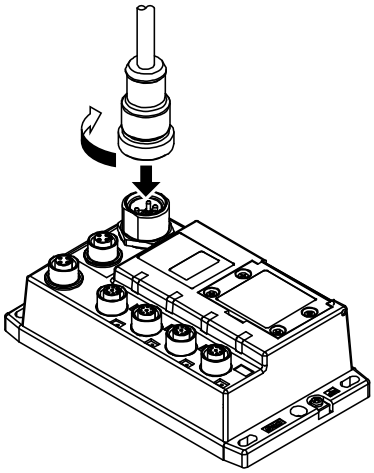
Connect a power supply cable to the power supply connector on the GW unit.
Refer to page 6 for the selection of the power supply.

Connector pin layout

7/8 inch, 4 pin, plug

No.	Description
1	24 VDC (For solenoid valves)
2	24 VDC (For input and control)
3	0 V (For input and control)
4	0 V (For solenoid valves)

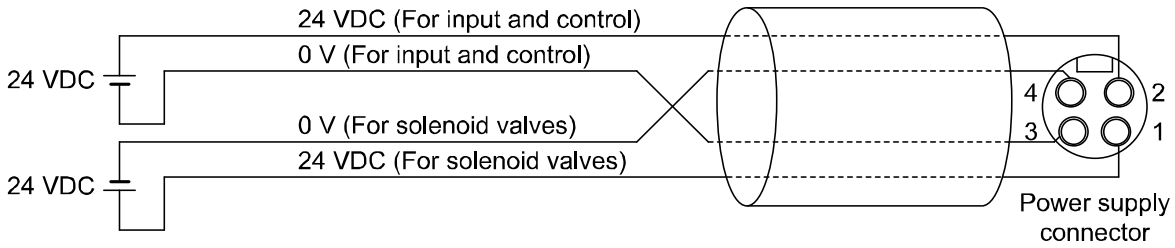




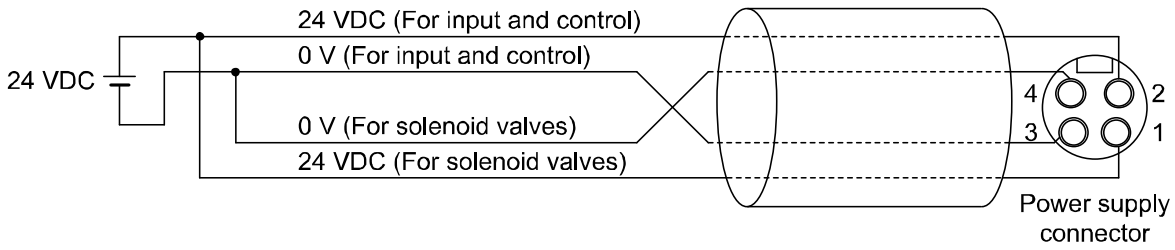
Power supply

Either single or dual power supply can be used. Separate wiring for the solenoid valves and input / control is necessary.

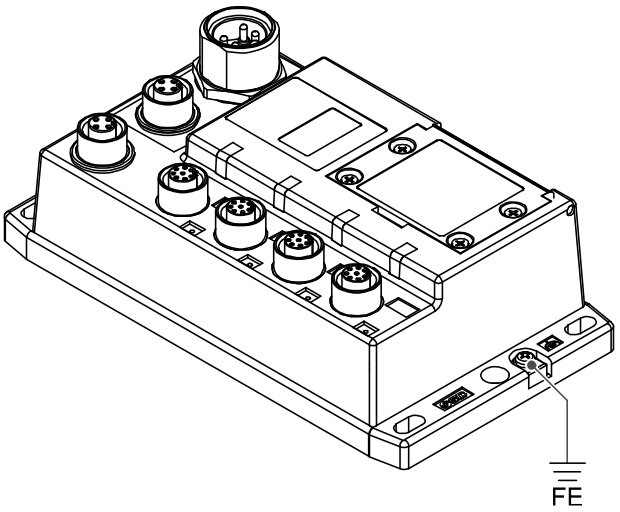
A. With separate power supplies



B. With one power supply



○Ground connection

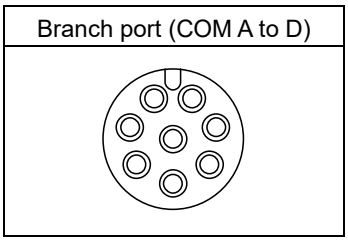


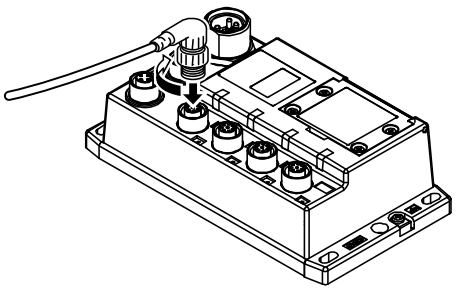
Note
Connect the FE terminal to ground.

3. Branch wiring

Connect the valve manifold with SI unit or an input unit to a branch port (COM A to D) using a branch cable (cable with M12 connector).

One branch port can be connected with up to 32 inputs and 32 outputs (Max. 4 units).





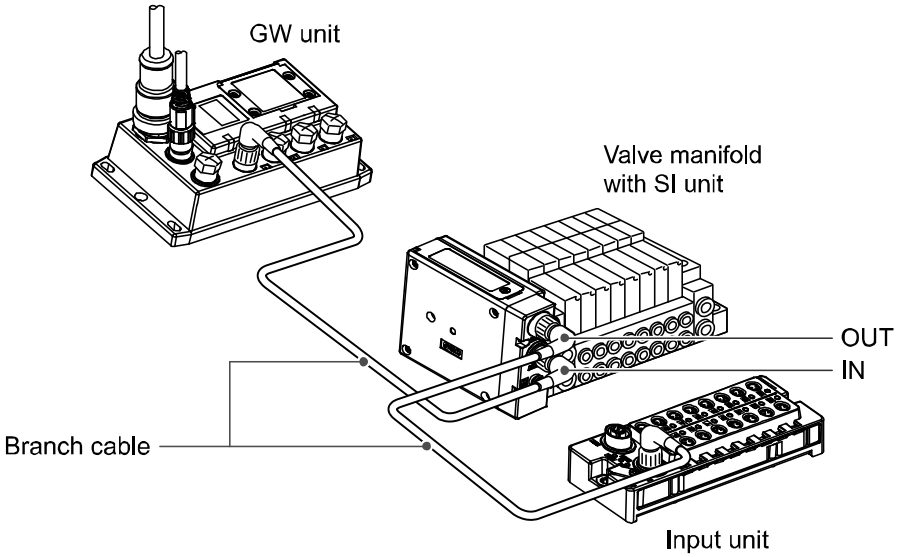
Note

Be sure to fit a seal cap on any unused connectors of the GW unit.
IP65 is maintained by using the seal cap.
(Tightening torque: 0.1 Nm)

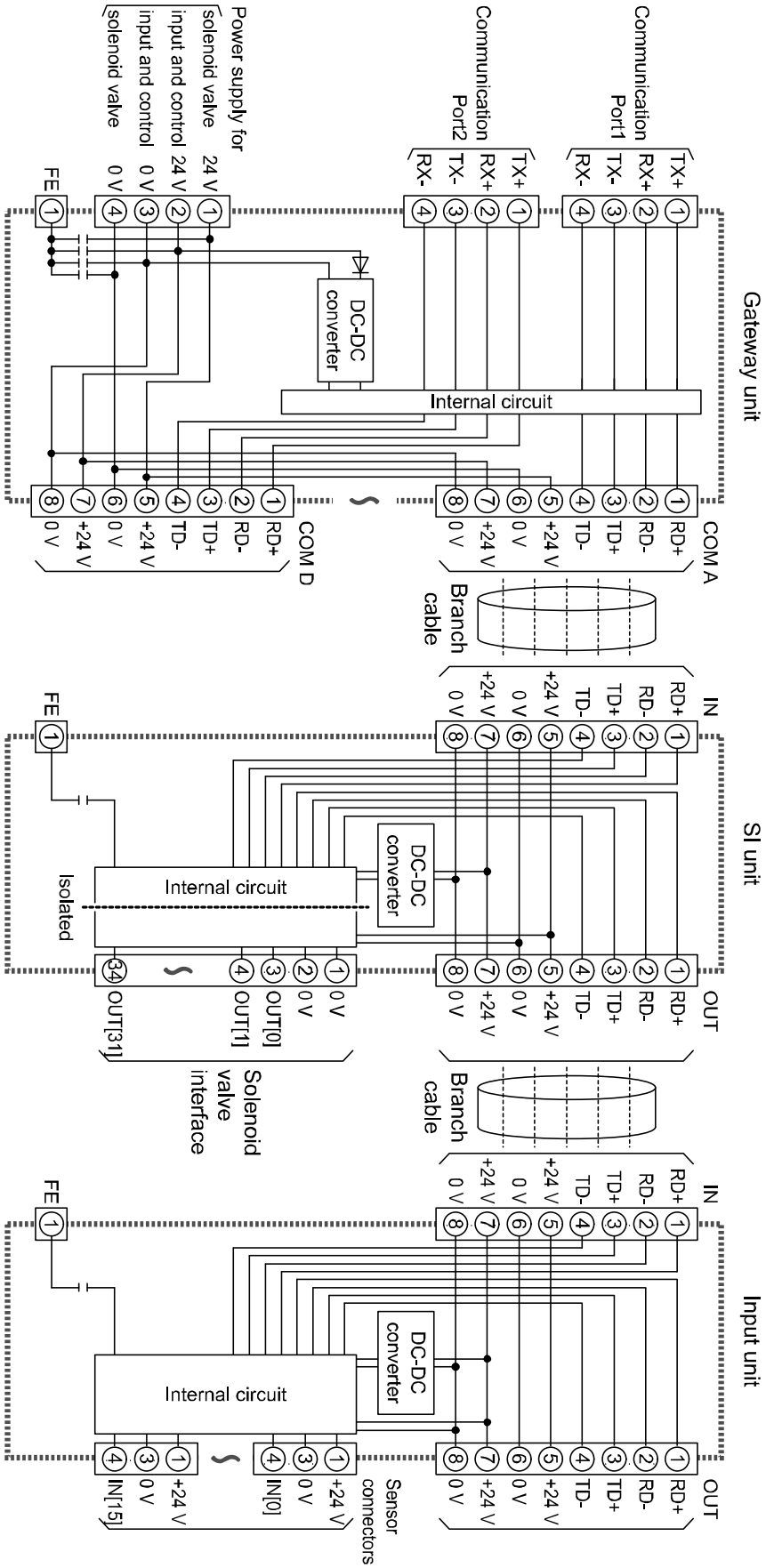
[Connection example]

Connecting a GW unit to a valve manifold with SI unit and to an input unit

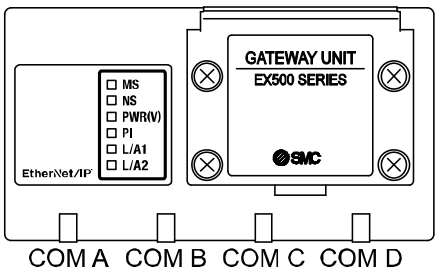
2 pcs. of the connector for wiring the branch cable are prepared for each SI unit and Input unit.
The branch cable from the GW unit is connected to the branch connector (IN).
The cable to the next SI unit or input unit is connected to the branch connector (OUT).



•Internal circuit



LED Display



Display	Meaning	
MS	LED is OFF	The power supply for input and control is OFF
	Green LED is ON	Normal operation
	Green LED is flashing	Parameter setting error
	Red LED is flashing	Diagnostics error
	Red LED is ON	Unrecoverable error
NS	LED is OFF	IP address not set
	Green LED is ON	EtherNet/IP™ communication established
	Green LED is flashing	EtherNet/IP™ communication not established
	Red LED is flashing	EtherNet/IP™ communications time out
	Red LED is ON	IP address has been duplicated
PWR(V)	LED is OFF	Power supply for Solenoid valve is OFF
	Green LED is ON	Power supply for Solenoid valve is ON
PI	LED is OFF	Forced output mode is disabled (Operating normally)
	Orange LED is flashing	Ethernet UCMP Echo request (Ping command) received.
	Orange LED is ON	Forced output mode is ON
L/A1	LED is OFF	No Link, No Activity (Port1)
	Green LED is ON	Link, No Activity (Port1, 100 Mbps)
	Green LED is flashing	Link, Activity (Port1, 100 Mbps)
	Orange LED is ON	Link, No Activity (Port1, 10 Mbps)
	Orange LED is flashing	Link, Activity (Port1, 10 Mbps)
L/A2	LED is OFF	No Link, No Activity (Port2)
	Green LED is ON	Link, No Activity (Port2, 100 Mbps)
	Green LED is flashing	Link, Activity (Port2, 100 Mbps)
	Orange LED is ON	Link, No Activity (Port2, 10 Mbps)
	Orange LED is flashing	Link, Activity (Port2, 10 Mbps)

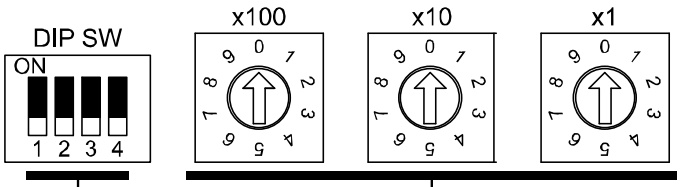
COM A	LED is OFF	Not connected
	Green LED is ON	Normal operation
	Green LED is flashing	Diagnostics error
COM B	LED is OFF	Not connected
	Green LED is ON	Normal operation
	Green LED is flashing	Diagnostics error
COM C	LED is OFF	Not connected
	Green LED is ON	Normal operation
	Green LED is flashing	Diagnostics error
COM D	LED is OFF	Not connected
	Green LED is ON	Normal operation
	Green LED is flashing	Diagnostics error

•Switch setting

Open the switch cover, and set the switches with a small flat blade screwdriver.

Note

1. The power supply should be off while setting the switches.
2. The default setting is OFF or 0.
3. Whenever the switch cover has been opened, close the switch cover and tighten the screw to the specified torque.
   (Tightening torque: 0.6 Nm)



IP address

Setting			Meaning
x100	x10	x1	
0	0	0	Remote control (DHCP) *1
0	0	1	Manual setting of IP address: 192.168.Y.**X** (X: 1-254) *2
0	0	2	
:	:	:	
2	5	4	
2	5	5	DHCP mode *3
2	5	6	Reserved
:	:	:	
9	9	9	

The default setting is 0.

DIP switch

No.	Meaning
1	Reserved (Fixed to OFF)
2	HOLD/CLEAR setting ON: If EtherNet/IP™ communication error occurs, the output will be retained. OFF: Set the output condition during EtherNet/IP™ communication error via network. Cleared when this is not set.
3	Mode setting ON: Gateway distribution system (64 point) OFF: Gateway distribution system 2 (128 point)
4	Manual setting of IP address: 192.168.**Y**.X (Y: OFF_0, ON_1)

The default setting is OFF.

*: Configuration
Please refer to the SMC website (URL http://www.smcworld.com) for applicable EDS file for the configuration of the network.

∗**1: Remoto control**

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

Enable DHCP

Information including IP address can be obtained from BOOTP/DHCP Server. If the power is supplied again in this state, EX500 tries to obtain the information including IP address again.

Disable BOOTP/DHCP

Information including IP address is not obtained from BOOTP/DHCP Server. Previous setting can be held if power is supplied under this condition.

∗**2: Manual setting of IP address**

IP address is set within the range of 192.168.0.1 to 192.168.0.254, 192.168.1.1 to 192.168.1.254.

∗**3: DHCP mode**

Obtain IP address from DHCP Server. Obtained IP address is lost when power supply is cut.

Default setting

"Enable DHCP" at "Remote control".

∗4: See page 62.

Note

Remote Control mode

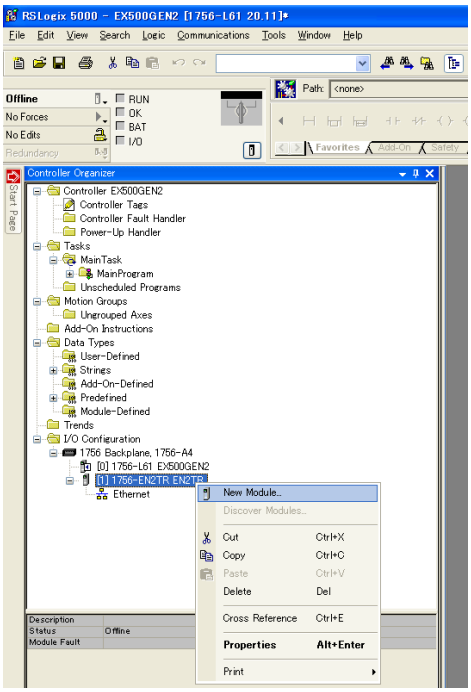
If IP address EX500 held is unknown, restart GW unit in DHCP mode temporarily and return to Remote control mode. Though the previous IP address is lost when GW unit is in DHCP mode, new IP address can be obtained from BOOTP/DHCP server.

Setting of EtherNet/IP™ using RSLogix5000™

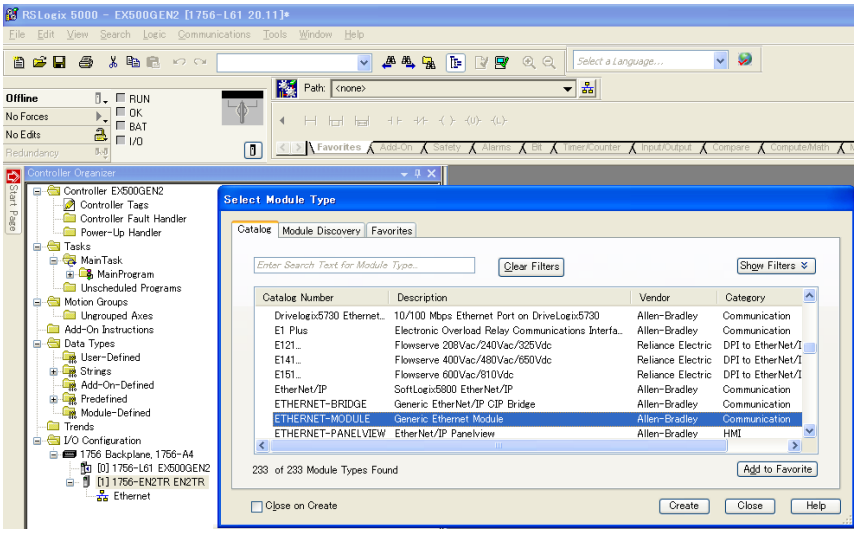
Method to connect a GW unit to the Rockwell Automation EtherNet/IP™ module (master) is shown below. Refer to the Operation Manual of the RSLogix5000™ for the detailed operation.

∗: This figure shows the display of Rockwell Automation software, RSLogix5000™.

●Select [EtherNet/IP™ module] in [I/O Configuration] folder, then select [New Module].



The [Select Module] screen is displayed. Select [ETHERNET-MODULE Generic Ethernet Module], then select [Create].



●The Module Properties screen is displayed. Perform each setting.

(1) Name: Enter the required unit name.

(2) Comm Format: Select the data format of Connection Parameters.

(3) IP Address: Enter the IP address setting for the GW unit.

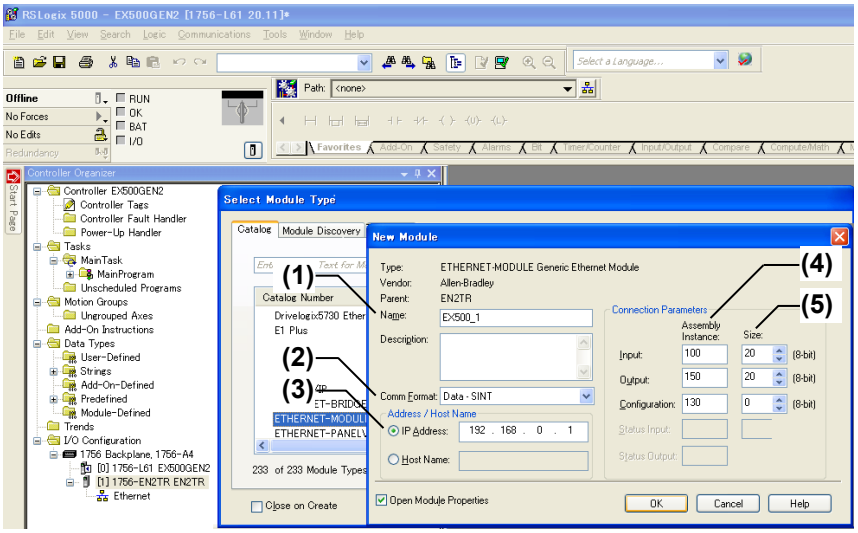
(4) Assembly Instance: Perform setting as shown below.

Item	Decimal	
Common Format	"Data-INT"	"Data-SINT"
Input	100	100
Output	150	150
Configuration	130	130

(5) Size: Perform setting as shown below.

Item	Decimal	
Common Format	"Data-INT"	"Data-SINT"
Input	10 (words)	20 (bytes)
Output	10 (words)	20 (bytes)
Configuration	0 or 34 (words)	0 or 68 (bytes)

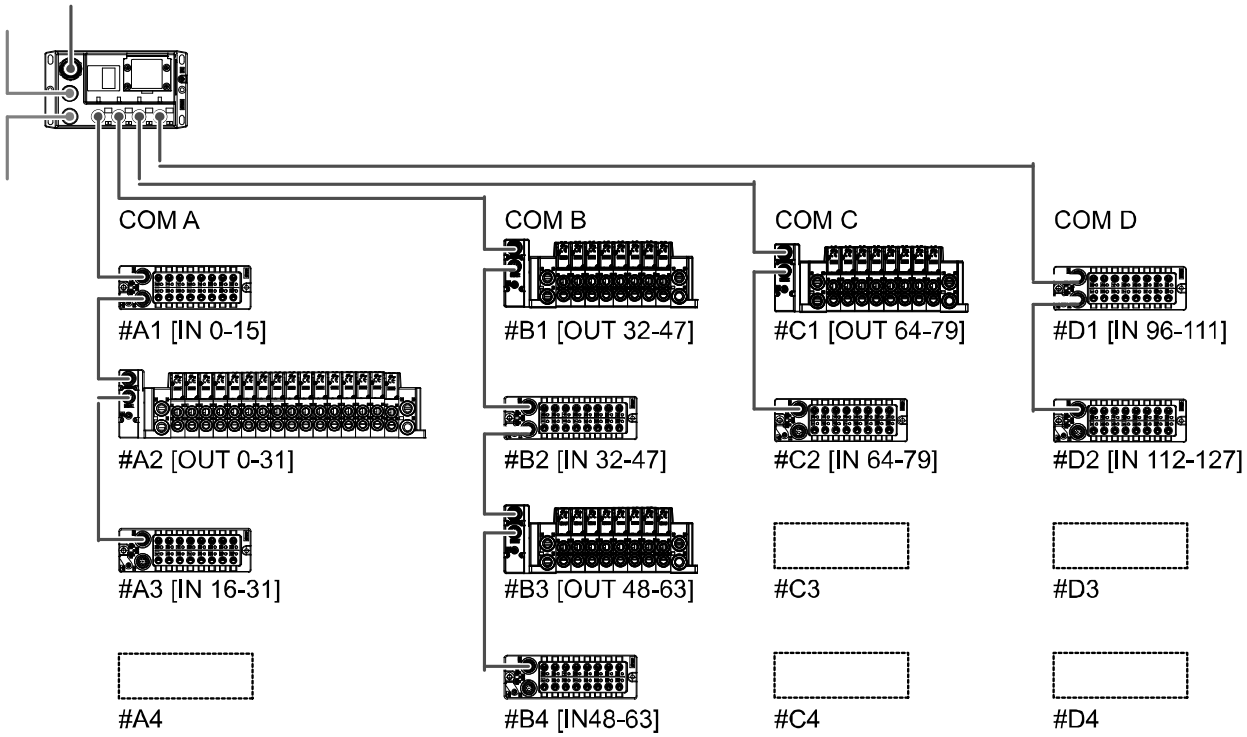
∗: Set 0 for Configuration Size when configuration data setting is not changed from the default value. Configuration data setting will be explained later. Configuration data setting can be changed by setting 34 (words) or 68 (bytes). Refer to page 28 for the configuration data map.



■I/O memory map

○I/O data

Connection example



Input data

Offset (INT)	Input data																Meaning	
	MSB							LSB	MSB							LSB		
	15							8	7							0		
0	IN15	IN14	IN13	IN12	IN11	IN10	IN9	IN8	IN7	IN6	IN5	IN4	IN3	IN2	IN1	IN0	COM A	Input data
1	IN31	IN30	IN29	IN28	IN27	IN26	IN25	IN24	IN23	IN22	IN21	IN20	IN19	IN18	IN17	IN16		
2	IN47	IN46	IN45	IN44	IN43	IN42	IN41	IN40	IN39	IN38	IN37	IN36	IN35	IN34	IN33	IN32	COM B	
3	IN63	IN62	IN61	IN60	IN59	IN58	IN57	IN56	IN55	IN54	IN53	IN52	IN51	IN50	IN49	IN48		
4	IN79	IN78	IN77	IN76	IN75	IN74	IN73	IN72	IN71	IN70	IN69	IN68	IN67	IN66	IN65	IN64	COM C	
5	IN95	IN94	IN93	IN92	IN91	IN90	IN89	IN88	IN87	IN86	IN85	IN84	IN83	IN82	IN81	IN80		
6	IN111	IN110	IN109	IN108	IN107	IN106	IN105	IN104	IN103	IN102	IN101	IN100	IN99	IN98	IN97	IN96	COM D	
7	IN127	IN126	IN125	IN124	IN123	IN122	IN121	IN120	IN119	IN118	IN117	IN116	IN115	IN114	IN113	IN112		
8	#D4	#D3	#D2	#D1	#C4	#C3	#C2	#C1	#B4	#B3	#B2	#B1	#A4	#A3	#A2	#A1	Slave condition	Diagnostic data
9	Error code												COM_D	COM_C	COM_B	COM_A	Port diagnosis/ Error code	

Output data

Offset (INT)	Output data																Meaning	
	MSB							LSB	MSB							LSB		
	15							8	7							0		
0	OUT15	OUT14	OUT13	OUT12	OUT11	OUT10	OUT9	OUT8	OUT7	OUT6	OUT5	OUT4	OUT3	OUT2	OUT1	OUT0	COM A	Output data
1	OUT31	OUT30	OUT29	OUT28	OUT27	OUT26	OUT25	OUT24	OUT23	OUT22	OUT21	OUT20	OUT19	OUT18	OUT17	OUT16		
2	OUT47	OUT46	OUT45	OUT44	OUT43	OUT42	OUT41	OUT40	OUT39	OUT38	OUT37	OUT36	OUT35	OUT34	OUT33	OUT32	COM B	
3	OUT63	OUT62	OUT61	OUT60	OUT59	OUT58	OUT57	OUT56	OUT55	OUT54	OUT53	OUT52	OUT51	OUT50	OUT49	OUT48		
4	OUT79	OUT78	OUT77	OUT76	OUT75	OUT74	OUT73	OUT72	OUT71	OUT70	OUT69	OUT68	OUT67	OUT66	OUT65	OUT64	COM C	
5	OUT95	OUT94	OUT93	OUT92	OUT91	OUT90	OUT89	OUT88	OUT87	OUT86	OUT85	OUT84	OUT83	OUT82	OUT81	OUT80		
6	OUT111	OUT110	OUT109	OUT108	OUT107	OUT106	OUT105	OUT104	OUT103	OUT102	OUT101	OUT100	OUT99	OUT98	OUT97	OUT96	COM D	
7	OUT127	OUT126	OUT125	OUT124	OUT123	OUT122	OUT121	OUT120	OUT119	OUT118	OUT117	OUT116	OUT115	OUT114	OUT113	OUT112		
8	#D4	#D3	#D2	#D1	#C4	#C3	#C2	#C1	#B4	#B3	#B2	#B1	#A4	#A3	#A2	#A1	Slave connection diagnosis	Diagnostic setting
9	-	-	-	-	-	-	-	-	-	-	-	-	COM_D	COM_C	COM_B	COM_A	32 point switch diagnosis	

-: Unused

○Diagnostic data

Diagnostic information

Offset (INT)	Input data																Meaning
	MSB							LSB	MSB							LSB	
	15							8	7							0	
8	#D4	#D3	#D2	#D1	#C4	#C3	#C2	#C1	#B4	#B3	#B2	#B1	#A4	#A3	#A2	#A1	Slave condition
9	Error code												COM_D	COM_C	COM_B	COM_A	Port diagnosis/ Error code

< Slave condition >

Value	Slave condition
0	Not connected
1	Connection port

< Port diagnosis >

Value	Status
0	OK
1	ERR

< Error code >

Message code showing the diagnostic error and position code showing error location are stored.
All 0 when no error has occurred.

Message code				Position code (Order #1 - #4, Port A - D)							
				#4	#3	#2	#1	D	C	B	A
0	0	1	0	0	0	0	1	0	0	0	1
Message code 0x2				Product No.1				A port			

Ex.: Short-circuit or over current error with the first slave of COM A port.

Message code and corrective action for diagnostic error are shown below.

Message Code	Name of Diagnostic error	Meaning of Diagnostic Error
0x0	(No error)	There is no error.
0x1	Short-circuit or over current (lost connection)	Short circuit or over current of GW unit branch port input and control power supply.
0x2	Short-circuit or over current	Short circuit or over current of input unit sensor connector.
0x3	More than 32 input	More than 32 inputs are connected to 1 port.
0x4	More than 32 output	More than 32 outputs are connected to 1 port.
0x5	More than 4 slaves	More than 4 slaves are connected to 1 port.
0x6	Lost connection or configuration error	Slave specified by the diagnostic setting "Slave connection diagnostic" is not connected.
0x7	Dip switch is not set to "32out."	SI unit which is not 32 output is connected to the port specified by diagnostic setting < 32 point switch diagnostic >
0x8-0xF	Reserve	-

Diagnostic setting

Offset (INT)	Output data																Meaning
	MSB							LSB	MSB							LSB	
	15							8	7							0	
8	#D4	#D3	#D2	#D1	#C4	#C3	#C2	#C1	#B4	#B3	#B2	#B1	#A4	#A3	#A2	#A1	Slave connection diagnostic
9	-	-	-	-	-	-	-	-	-	-	-	-	COM_D	COM_C	COM_B	COM_A	32 point switch diagnostic

-: Unused

< Slave connection diagnostic >

Value	Setting
0	Disabled
1	Enabled

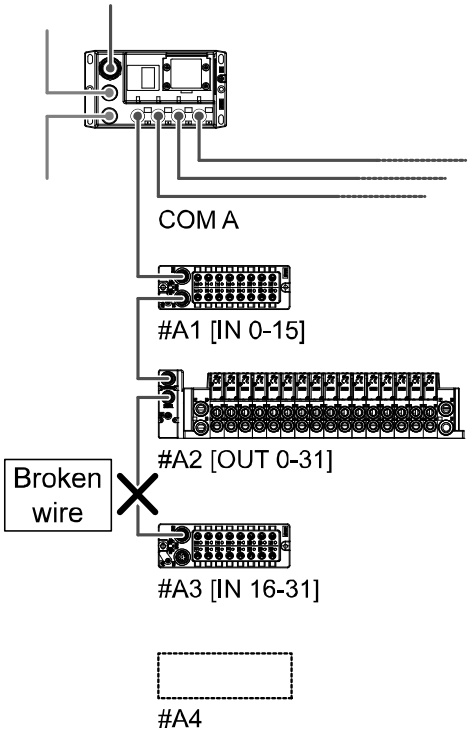
∗: See page 26.

< 32 point switch diagnostic >

Value	Setting
0	Disabled
1	Enabled

∗: See page 27.

< Slave connection diagnostic >
Diagnostic function to detect the branch cable broken wire or incorrect configuration of the slave connection.
Diagnostic error can be generated when the slave is not connected by setting "1" (enabled) for the diagnostic bit of the slave connection.
Refer to the figure below for the usage.

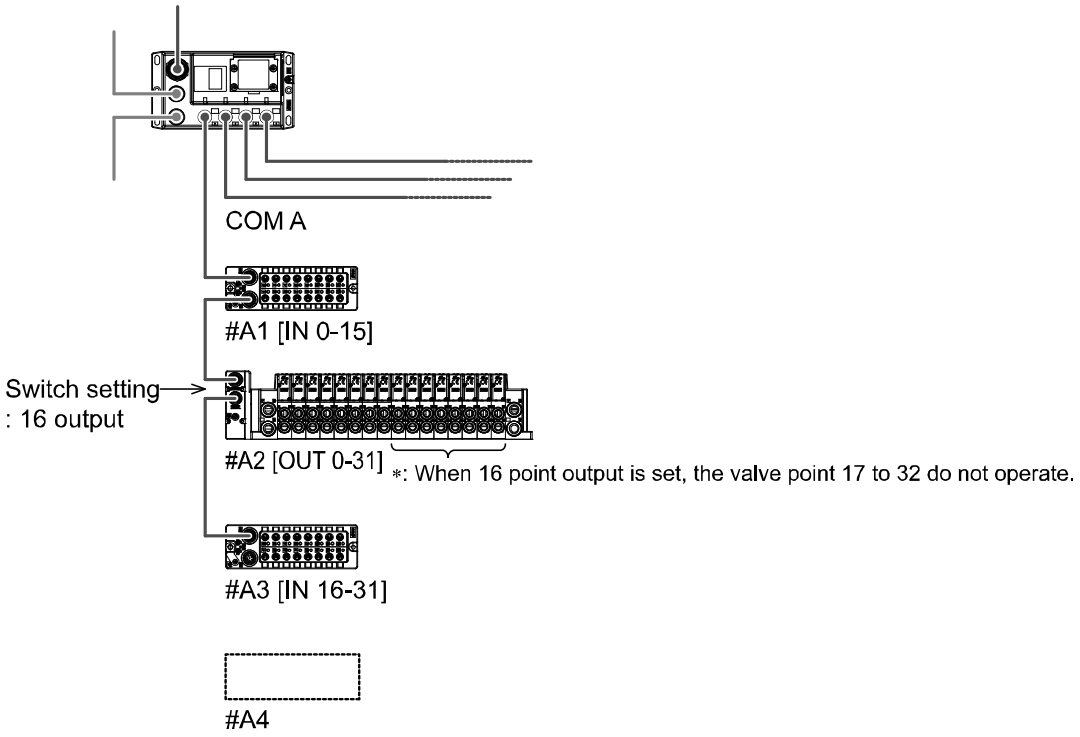


Offset (INT)	Output data																Meaning
	MSB							LSB	MSB							LSB	
	15							8	7							0	
8	#D4	#D3	#D2	#D1	#C4	#C3	#C2	#C1	#B4	#B3	#B2	#B1	#A4	#A3	#A2	#A1	Slave connection diagnosis
	0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**1**	

In the figure above, #A1 to #A3 are slaves for which the connection is diagnosed.
In this case, #A3 slave is not connected, and a diagnostic error is generated.
Here, the < Port diagnostic > of the input data is "1".

Offset (INT)	Input data																Meaning
	MSB							LSB	MSB							LSB	
	15							8	7							0	
8	#D4	#D3	#D2	#D1	#C4	#C3	#C2	#C1	#B4	#B3	#B2	#B1	#A4	#A3	#A2	#A1	Slave condition
	0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	
9	Error code												COM_D	COM_C	COM_B	COM_A	Port diagnostic/ Error code
	0	**1**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	

< 32 point switch diagnostic >
Detect the incorrect setting of the SI unit switch.
When a manifold with more than 17 valves is used, by setting "1" (enabled) to 32 point switch diagnostic bit, a diagnostic error can be generated when SI unit switch is set to 16 point output by mistake.
Refer to the figure below for the usage.



Offset (INT)	Output data																Meaning
	MSB							LSB	MSB							LSB	
	15							8	7							0	
9	Reserve												COM_D	COM_C	COM_B	COM_A	32 point switch diagnosis
	-	-	-	-	-	-	-	-	-	-	-	-	**0**	**0**	**0**	**1**	

In the figure above, COM A is the subject of 32 point switch diagnostic.
In this case, diagnostic error is generated as the SI unit of 16 point output setting is connected.
Here, the < Port diagnostic > of the input data is "1".

Offset (INT)	Input data																Meaning
	MSB							LSB	MSB							LSB	
	15							8	7							0	
8	#D4	#D3	#D2	#D1	#C4	#C3	#C2	#C1	#B4	#B3	#B2	#B1	#A4	#A3	#A2	#A1	Slave condition
	0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**1**	
9	Error code												COM_D	COM_C	COM_B	COM_A	Port diagnostic/ Error code
	0	**1**	**1**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	

●Configuration data map

Offset (INT)	Configuration data															
	MSB							LSB	MSB							LSB
	15							8	7							0
0	-	-	-	-	-	-	-	-	-	-	QC	Web forcing	COM_D diag	COM_C diag	COM_B diag	COM_A diag
1	FA_OUT7		FA_OUT6		FA_OUT5		FA_OUT4		FA_OUT3		FA_OUT2		FA_OUT1		FA_OUT0	
2	FA_OUT15		FA_OUT14		FA_OUT13		FA_OUT12		FA_OUT11		FA_OUT10		FA_OUT9		FA_OUT8	
3	FA_OUT23		FA_OUT22		FA_OUT21		FA_OUT20		FA_OUT19		FA_OUT18		FA_OUT17		FA_OUT16	
4	FA_OUT31		FA_OUT30		FA_OUT29		FA_OUT28		FA_OUT27		FA_OUT26		FA_OUT25		FA_OUT24	
5	FA_OUT39		FA_OUT38		FA_OUT37		FA_OUT36		FA_OUT35		FA_OUT34		FA_OUT33		FA_OUT32	
6	FA_OUT47		FA_OUT46		FA_OUT45		FA_OUT44		FA_OUT43		FA_OUT42		FA_OUT41		FA_OUT40	
7	FA_OUT55		FA_OUT54		FA_OUT53		FA_OUT52		FA_OUT51		FA_OUT50		FA_OUT49		FA_OUT48	
8	FA_OUT63		FA_OUT62		FA_OUT61		FA_OUT60		FA_OUT59		FA_OUT58		FA_OUT57		FA_OUT56	
9	FA_OUT71		FA_OUT70		FA_OUT69		FA_OUT68		FA_OUT67		FA_OUT66		FA_OUT65		FA_OUT64	
10	FA_OUT79		FA_OUT78		FA_OUT77		FA_OUT76		FA_OUT75		FA_OUT74		FA_OUT73		FA_OUT72	
11	FA_OUT87		FA_OUT86		FA_OUT85		FA_OUT84		FA_OUT83		FA_OUT82		FA_OUT81		FA_OUT80	
12	FA_OUT95		FA_OUT94		FA_OUT93		FA_OUT92		FA_OUT91		FA_OUT90		FA_OUT89		FA_OUT88	
13	FA_OUT103		FA_OUT102		FA_OUT101		FA_OUT100		FA_OUT99		FA_OUT98		FA_OUT97		FA_OUT96	
14	FA_OUT111		FA_OUT110		FA_OUT109		FA_OUT108		FA_OUT107		FA_OUT106		FA_OUT105		FA_OUT104	
15	FA_OUT119		FA_OUT118		FA_OUT117		FA_OUT116		FA_OUT115		FA_OUT114		FA_OUT113		FA_OUT112	
16	FA_OUT127		FA_OUT126		FA_OUT125		FA_OUT124		FA_OUT123		FA_OUT122		FA_OUT121		FA_OUT120	
17 - - - 33	Reserve															

-: Unused

< Configuration data >

●COM_A to COM_D diag: Select the output operation during a diagnostic error for each port.
0: Continue (Default)
1: Stop

●Web forcing: Limit the forced output function of Web server function.
0: Forced output is disabled while EtherNet/IP™ communication is established (default status).
1: Forced output is available while EtherNet/IP™ communication is established.

●QC: QuickConnect™ function can be selected. *1
0: Invalid (Default)
1: Enabled
*: When enabled, Auto-Negotiation (A-N) is disabled. The communication speed is 100 Mbps. Communication is fixed to full duplex. Make sure the value is set to "0" when the QuickConnect™ function is not used.

●FA_OUT0 to FA_OUT127: Hold or Clear of output can be set during EtherNet/IP™ communication error.
00: Clear (Default)
01: Forced output ON
1X: Hold
*: Make sure the switch No. 2 is OFF when this configuration data is used. See page 18.

∗1: EtherNet/IP™ QuickConnect™ function

This GW unit can be used as an EtherNet/IP™ compliant node for networks with the QuickConnect™ function.
To enable the QuickConnect™ function, it is necessary to perform the settings 1 to 2 to the GW unit as shown below.
After satisfying the conditions 1 to 2, setting of the QuickConnect™ function compliant EtherNet/IP™ module (master), according to the specified procedure, must be performed. Refer to the manual for the EtherNet/IP™ module (master) for the specified operation procedure.

1. IP address not set
   The IP address is set either by manual setting using switches, or by Remote control (with the IP address X "000").
   When setting the IP address by remote control, first obtain the IP address through the BOOTP/DHCP Server, then select the Disable DHCP button to hold the IP address.

2. Communication setting
   GW communication setting is changed by one of the followings methods.
   (1) Configuration data
   Set "1" to configuration data "QC" referring to the configuration data map on page 28.
   Make sure the value is set to "0" when the QuickConnect™ function is not used.

   (2) Changed by CIP™ Object.
   Change the EtherNet Link Object to the values shown below.

Setting of communication port 1

Class ID	Inst ID	Attr ID	Access Rule	Name	Semantics of Values	Quick Connect
F6h [EtherNet Link Object]	1 h	6 h	Get/Set	Interface Control	01000000 = A-N Enable(Default)	Not use
					02006400 = A-N Disable, Force 100 Mbps Full duplex	Use

Setting of communication port 2

Class ID	Inst ID	Attr ID	Access Rule	Name	Semantics of Values	Quick Connect
F6h [EtherNet Link Object]	2 h	6 h	Get/Set	Interface Control	01000000 = A-N Enable(Default)	Not use
					02006400 = A-N Disable, Force 100 Mbps Full duplex	Use

∗: Make sure the value is set to "01000000" when the QuickConnect™ function is not used.

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

Class ID	Inst ID	Attr ID	Access Rule	Name	Semantics of Values	Quick Connect
F5h [TCP/IP Object]	1 h	Ch	Get/Set	EtherNet/IP QuickConnect	0 = Disable(Default)	Not use
					1 = Enable	Use

∗: Make sure the value is set to "0" when the QuickConnect™ function is not used.

■Web server function

The GW unit has a Web server function which allows checking the information of the slave configuration from a PC Web browser during maintenance, or checking of I/O monitor or forced output of ON/OFF of the valve.

●Connection of GW unit and PC

Connect GW unit and PC to the same Ethernet network, then start the Web browser on the PC.
The GW unit can be connected to the Web server by inputting GW unit IP address to the Web browser address bar.

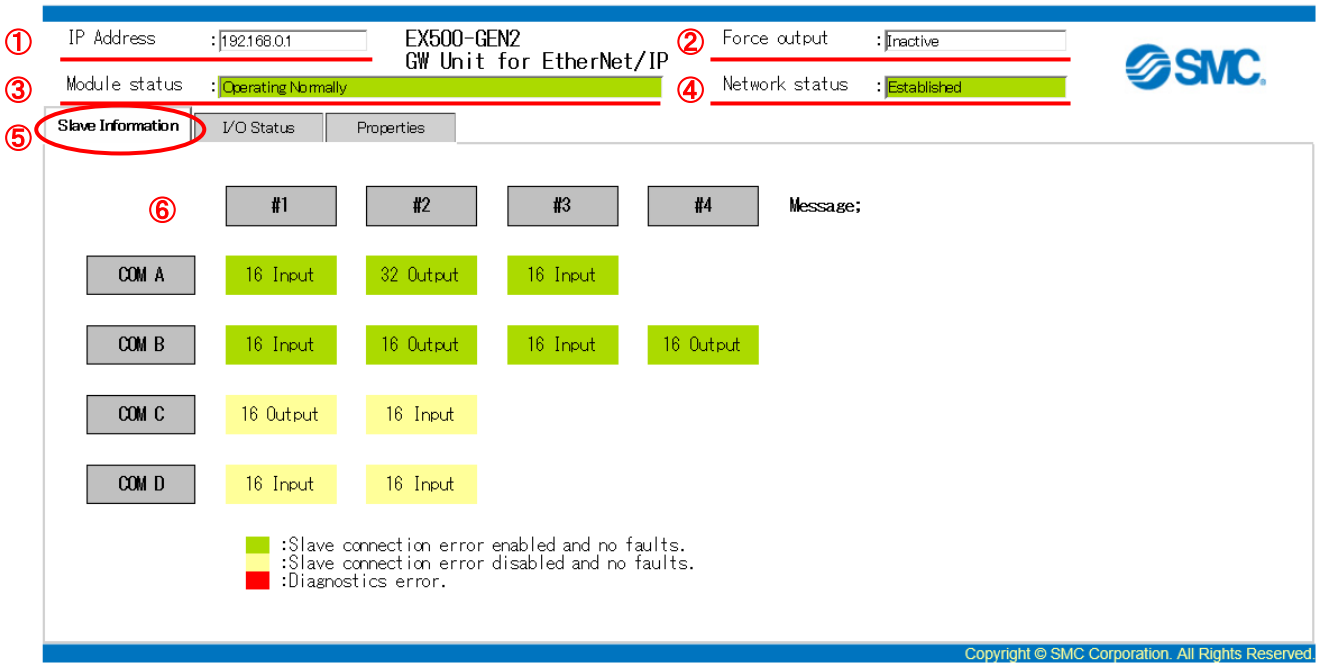
NOTE

Set the same significant 3 octets of PC IP address as GW unit IP address.
Set the PC subnet mask to "255.255.255.0".

Ex. 1 GW unit: 192.168.0.100	PC: 192.168.0.1	OK: Correct IP address setting
Ex. 2 GW unit: 192.168.0.100	PC: 192.168.3.1	NG: Incorrect IP address setting

●Web server contents
Web browser screen when the Web server is connected is shown below.

< Slave information tab (Home screen) >
Slave configuration corresponding to the condition of each COM port is displayed.



16 Input: Input unit is connected.
16 Output: SI unit (16 output) is connected.
32 Output: SI unit (32 output) is connected.
Blank: Slave is not connected.

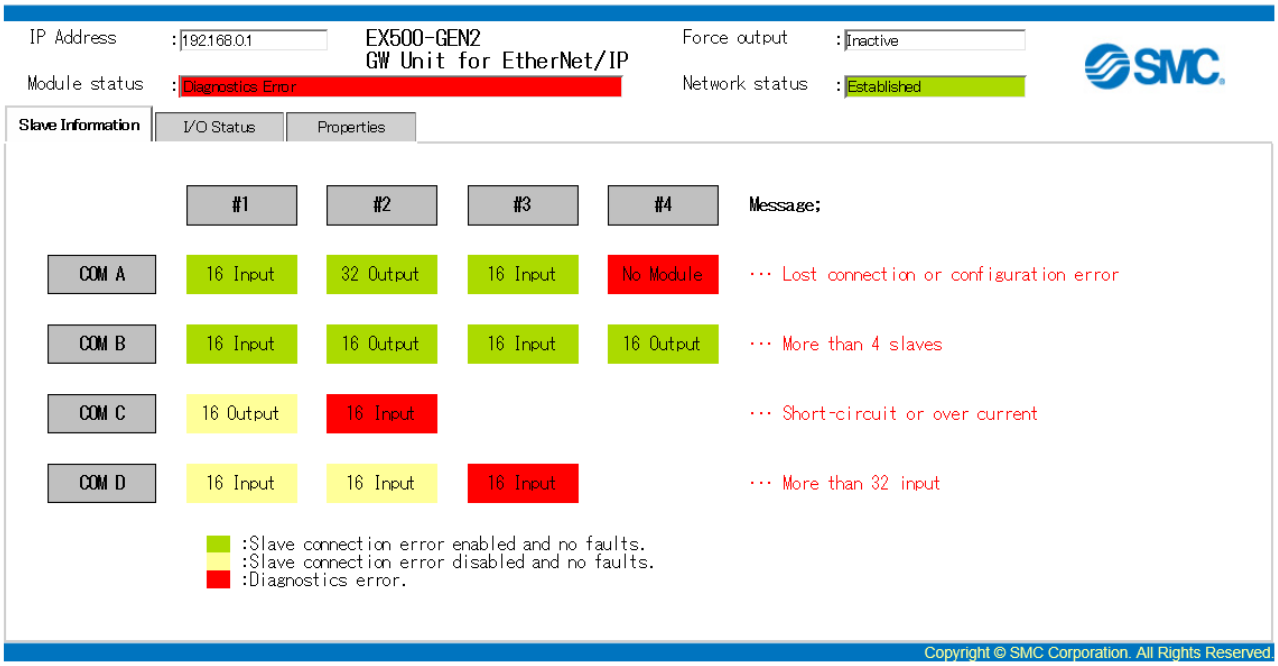
No.	Item	Meaning
1	IP Address	IP address of GW unit connected to Web server
2	Force output	Force output mode enable/disable. Active: Force output mode enabled Inactive: Force output mode disabled
3	Module status	GW unit operating condition. Operating Normally: Normal operation Diagnostics Error: Diagnostic error detected
4	Network status	Displays the communication status of the GW unit EtherNet/IP™. Established: EtherNet/IP™ communication is established Not established: EtherNet/IP™ communication is not established Timeout: EtherNet/IP™ communications time out
5	Menu tab	Menu is changed by selecting the tab.
6	Slave configuration	Configuration of SI unit and input unit connected to each branch port.

*: Slave information is not available for the “Gateway distribution system (64 point)” mode.

●Diagnostic error

Example below shows Slave information when a diagnostic error is generated.

Diagnostic error name is displayed in Message space. *

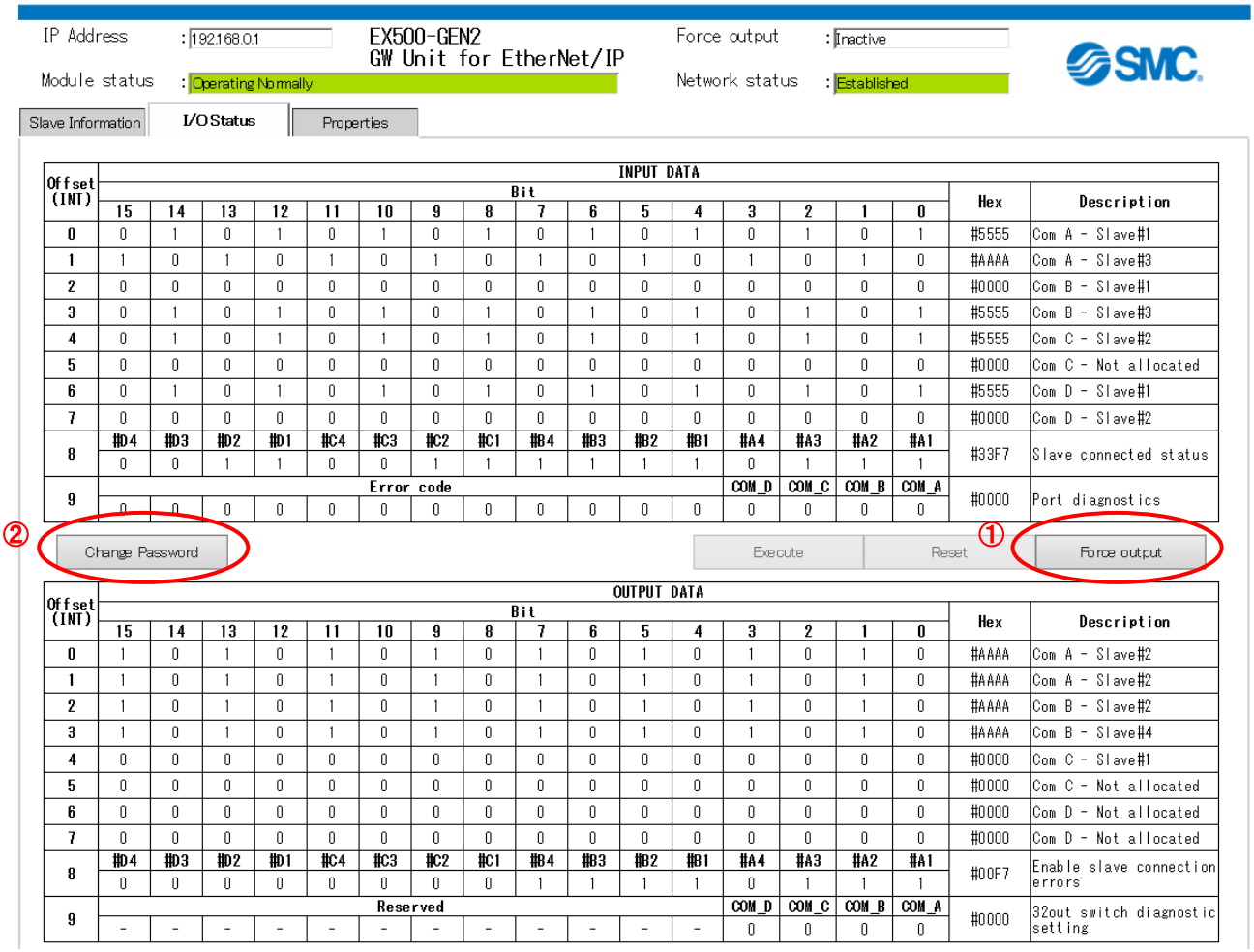


Diagnostic Error name and meaning

Problems	Error meaning
Short-circuit or over current (lost connection)	Short circuit or over current of GW unit branch port input and control power supply.
Short-circuit or over current	Short circuit or over current of input unit sensor connector.
More than 32 input	More than 32 inputs is connected to 1 port.
More than 32 output	More than 32 outputs is connected to 1 port.
More than 4 slaves	More than 4 slaves are connected to 1 port.
Lost connection or configuration error	Slave specified by the diagnostic setting "Slave connection diagnostic" is not connected.
Dip switch is not set to "32out."	SI unit which is not 32 output is connected to the port specified by diagnostic setting < 32 point switch diagnostic >.

*: One representative error is displayed when multiple errors are generated simultaneously in the same port.
Following message will be displayed after the errors are solved.

< I/O Status tab >
Current GW unit I/O memory map is displayed.
[Example] Refer to page 22 for details.



INPUT DATA

Offset (INT)	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Hex	Description
0	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	#5555	Com A - Slave#1
1	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	#AAAA	Com A - Slave#3
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#0000	Com B - Slave#1
3	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	#5555	Com B - Slave#3
4	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	#5555	Com C - Slave#2
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#0000	Com C - Not allocated
6	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	#5555	Com D - Slave#1
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#0000	Com D - Slave#2
8	#D4	#D3	#D2	#D1	#C4	#C3	#C2	#C1	#B4	#B3	#B2	#B1	#A4	#A3	#A2	#A1	#33F7	Slave connected status
	0	0	1	1	0	0	1	1	1	1	1	1	0	1	1	1		
9	Error code												COM_D	COM_C	COM_B	COM_A	#0000	Port diagnostics
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		

OUTPUT DATA

Offset (INT)	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Hex	Description
0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	#AAAA	Com A - Slave#2
1	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	#AAAA	Com A - Slave#2
2	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	#AAAA	Com B - Slave#2
3	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	#AAAA	Com B - Slave#4
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#0000	Com C - Slave#1
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#0000	Com C - Not allocated
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#0000	Com D - Not allocated
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#0000	Com D - Not allocated
8	#D4	#D3	#D2	#D1	#C4	#C3	#C2	#C1	#B4	#B3	#B2	#B1	#A4	#A3	#A2	#A1	#00F7	Enable slave connection errors
	0	0	0	0	0	0	0	0	1	1	1	1	0	1	1	1		
9	Reserved												COM_D	COM_C	COM_B	COM_A	#0000	32out switch diagnostic setting
	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0		

No.	Item	Meaning
1	Force output	Select for force output mode.
2	Change password	Select for changing the password to enable changing to force output mode.

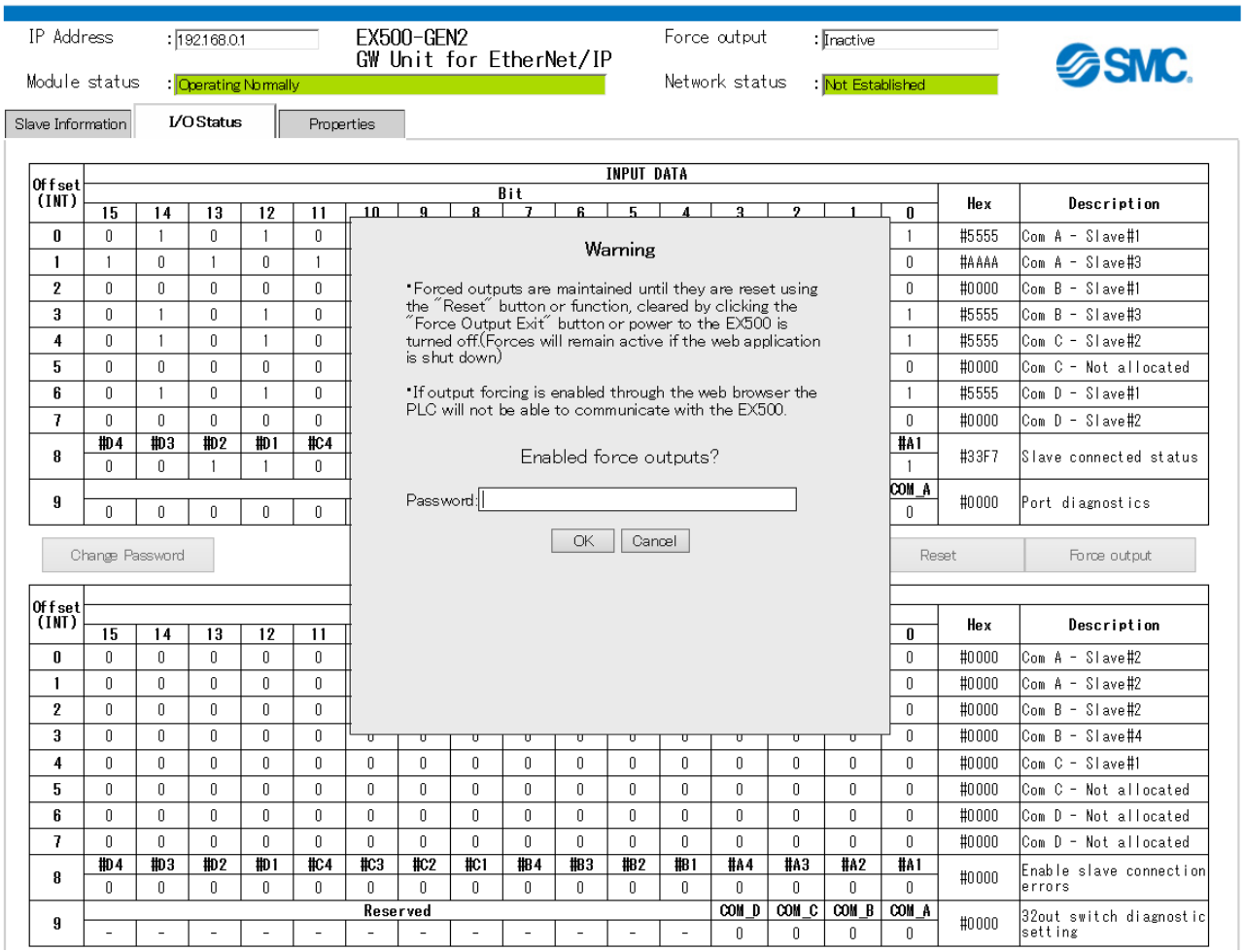
●Forced output mode

Procedure to change to forced output more and the method of forced output.

Warning and password input screen will appear by selecting the Force output button.

Force output space becomes active when the password entered is successful. The mode will be changed to force output mode.

Initial password is "SMCEX500".



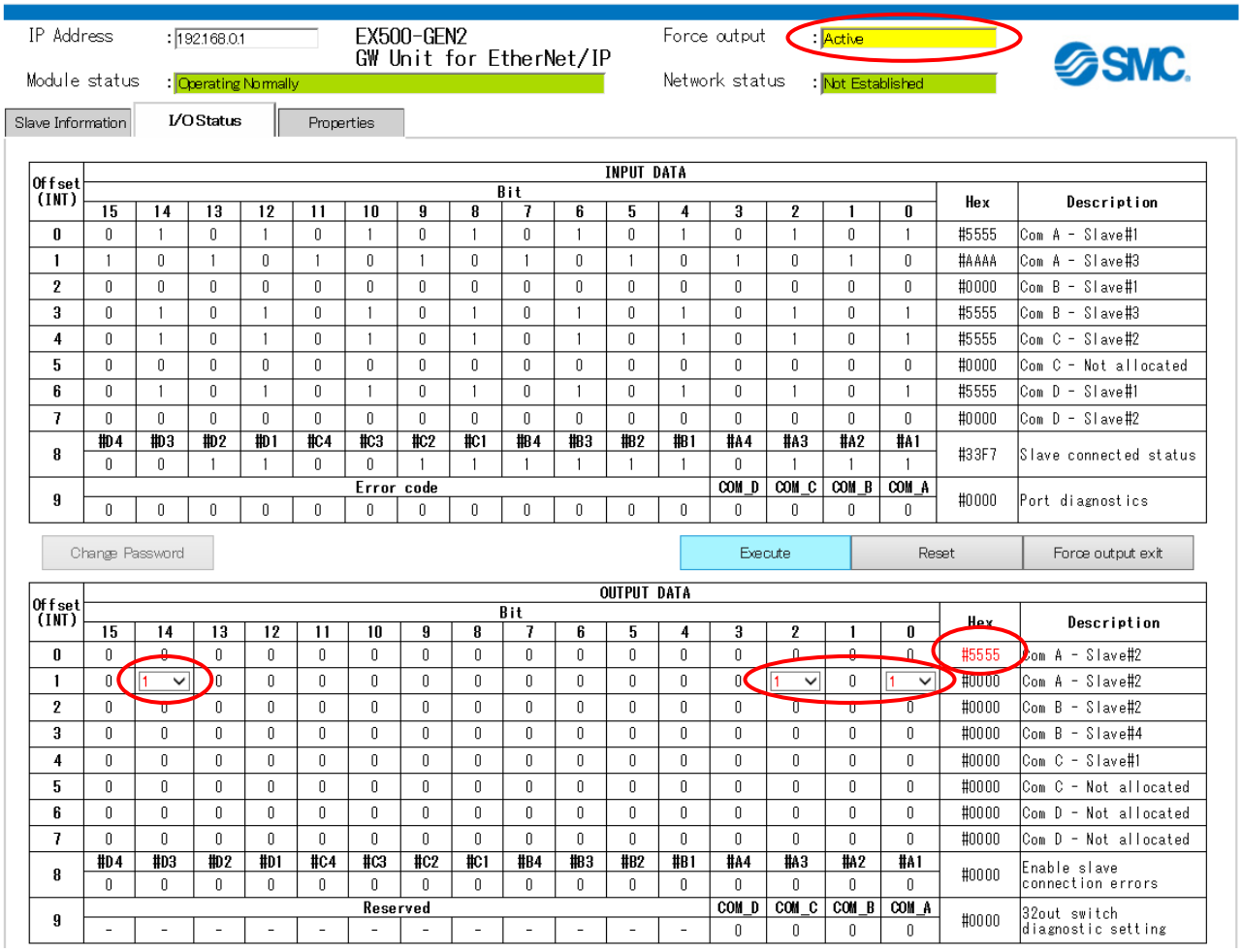
< CAUTION >

●Forced output is valid until selecting Reset or Force output exit.
Forced output is valid even if the network is shut down during forced output mode.
(Forced output is released when GW unit power supply is off.)

●While EtherNet/IP™ communication is established, the message below is shown and it is not possible to change to forced output mode. Set 1 for the configuration data Web forcing when forced output is used while communication is established.

OUTPUT DATA becomes editable in forced output mode.
Edited OUTPUT DATA is displayed in red.

After OUTPUT DATA is edited, the output data will be reflected by selecting "Execute".
Reflected OUTPUT DATA is displayed in yellow.



IP Address : 192.168.0.1
EX500-GEN2
GW Unit for EtherNet/IP
Force output : Active
Module status : Operating Normally
Network status : Not Established

Slave Information | I/O Status | Properties

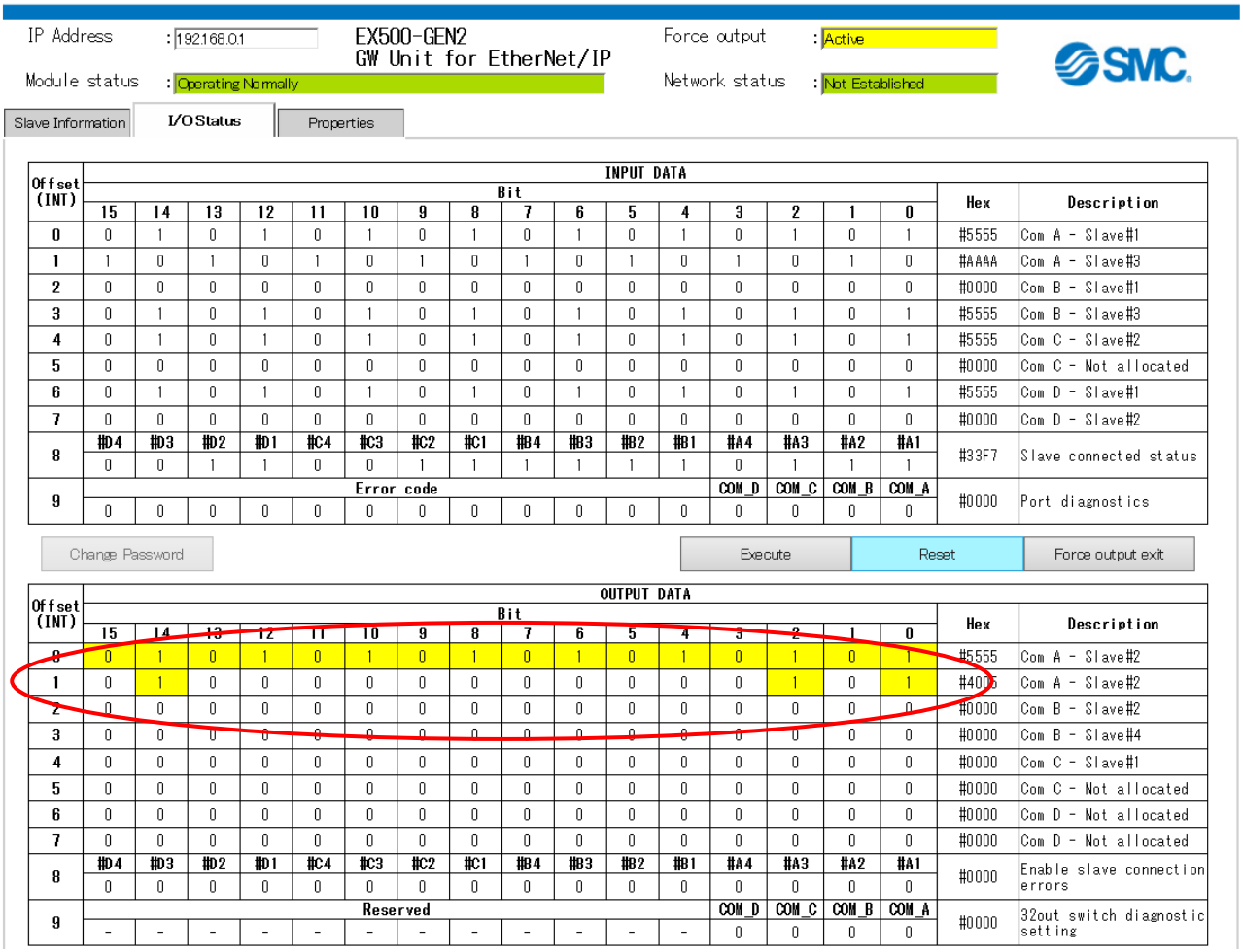
INPUT DATA

Offset (INT)	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Hex	Description
0	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	#5555	Com A - Slave#1
1	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	#AAAA	Com A - Slave#3
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#0000	Com B - Slave#1
3	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	#5555	Com B - Slave#3
4	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	#5555	Com C - Slave#2
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#0000	Com C - Not allocated
6	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	#5555	Com D - Slave#1
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#0000	Com D - Slave#2
8	#D4	#D3	#D2	#D1	#C4	#C3	#C2	#C1	#B4	#B3	#B2	#B1	#A4	#A3	#A2	#A1	#33F7	Slave connected status
	0	0	1	1	0	0	1	1	1	1	1	1	0	1	1	1		
9	Error code												COM_D	COM_C	COM_B	COM_A	#0000	Port diagnostics
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		

Change Password | Execute | Reset | Force output exit

OUTPUT DATA

Offset (INT)	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Hex	Description
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#5555	Com A - Slave#2
1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	#0000	Com A - Slave#2
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#0000	Com B - Slave#2
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#0000	Com B - Slave#4
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#0000	Com C - Slave#1
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#0000	Com C - Not allocated
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#0000	Com D - Not allocated
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#0000	Com D - Not allocated
8	#D4	#D3	#D2	#D1	#C4	#C3	#C2	#C1	#B4	#B3	#B2	#B1	#A4	#A3	#A2	#A1	#0000	Enable slave connection errors
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
9	Reserved												COM_D	COM_C	COM_B	COM_A	#0000	32out switch diagnostic setting
	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0		



IP Address : 192.168.0.1

EX500-GEN2
GW Unit for EtherNet/IP

Force output : Active

Module status : Operating Normally

Network status : Not Established

Slave Information | I/O Status | Properties

INPUT DATA

Offset (INT)	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Hex	Description
0	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	#5555	Com A - Slave#1
1	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	#AAAA	Com A - Slave#3
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#0000	Com B - Slave#1
3	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	#5555	Com B - Slave#3
4	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	#5555	Com C - Slave#2
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#0000	Com C - Not allocated
6	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	#5555	Com D - Slave#1
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#0000	Com D - Slave#2
8	#D4	#D3	#D2	#D1	#C4	#C3	#C2	#C1	#B4	#B3	#B2	#B1	#A4	#A3	#A2	#A1	#33F7	Slave connected status
	0	0	1	1	0	0	1	1	1	1	1	1	0	1	1	1		
9	Error code												COM_D	COM_C	COM_B	COM_A	#0000	Port diagnostics
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		

Change Password | Execute | Reset | Force output exit

OUTPUT DATA

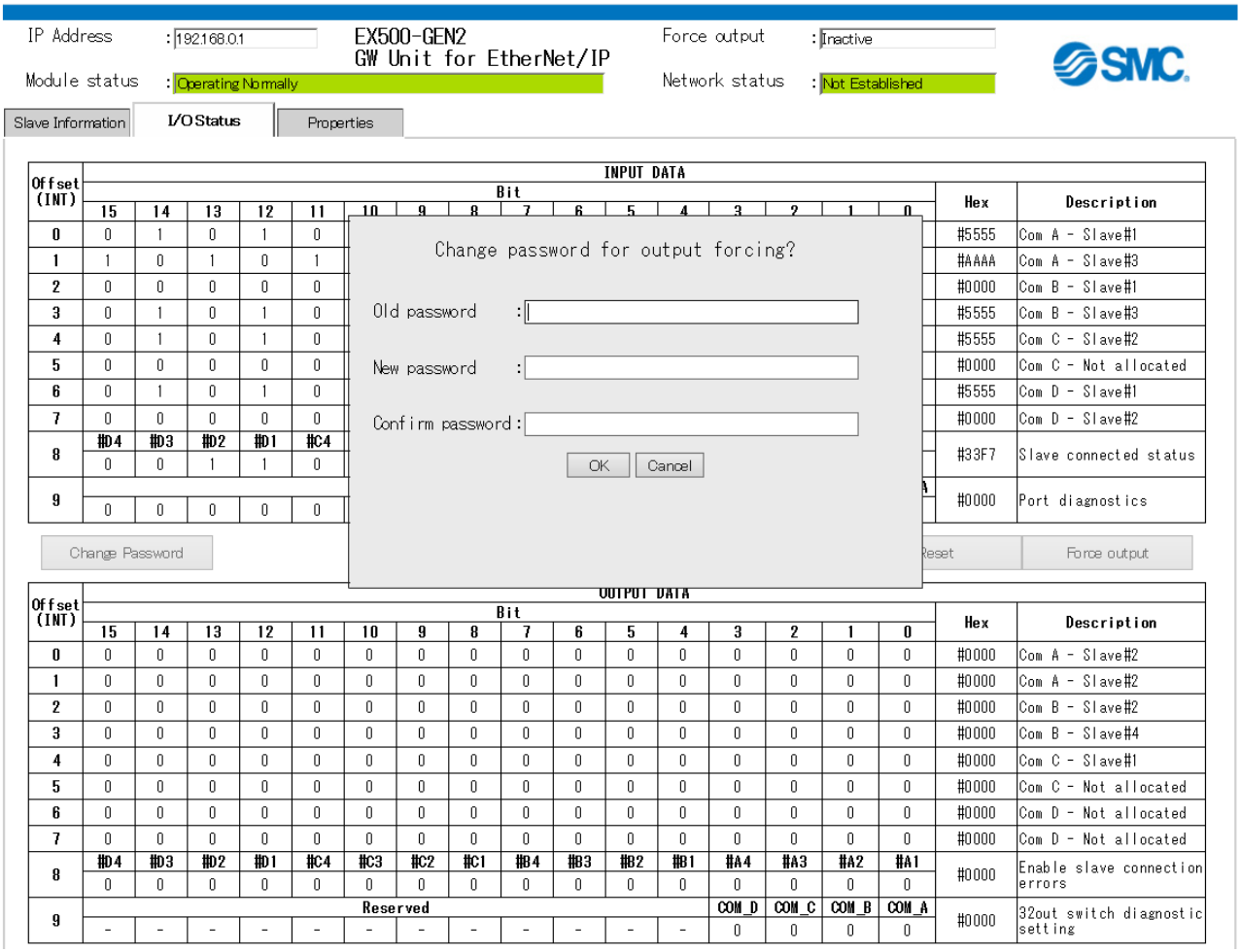
Offset (INT)	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Hex	Description
0	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	#5555	Com A - Slave#2
1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	#4005	Com A - Slave#2
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#0000	Com B - Slave#2
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#0000	Com B - Slave#4
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#0000	Com C - Slave#1
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#0000	Com C - Not allocated
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#0000	Com D - Not allocated
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#0000	Com D - Not allocated
8	#D4	#D3	#D2	#D1	#C4	#C3	#C2	#C1	#B4	#B3	#B2	#B1	#A4	#A3	#A2	#A1	#0000	Enable slave connection errors
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
9	Reserved												COM_D	COM_C	COM_B	COM_A	#0000	32out switch diagnostic setting
	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0		

All output data can be cleared by selecting “Reset”.
Forced output mode is released by selecting “Force output exit“.
At this time, the output data is automatically cleared.

●Password change

Password can be changed by selecting the Change password button.

Type the password before change in the Old password space, and the new password in the New password and Confirm password spaces. Password change is completed by selecting OK.



Offset (INT)	INPUT DATA Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Hex	Description
0	0	1	0	1	0												#5555	Com A - Slave#1
1	1	0	1	0	1												#AAAA	Com A - Slave#3
2	0	0	0	0	0												#0000	Com B - Slave#1
3	0	1	0	1	0												#5555	Com B - Slave#3
4	0	1	0	1	0												#5555	Com C - Slave#2
5	0	0	0	0	0												#0000	Com C - Not allocated
6	0	1	0	1	0												#5555	Com D - Slave#1
7	0	0	0	0	0												#0000	Com D - Slave#2
8	#D4	#D3	#D2	#D1	#C4												#33F7	Slave connected status
	0	0	1	1	0													
9																	#0000	Port diagnostics
	0	0	0	0	0													

Offset (INT)	OUTPUT DATA Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Hex	Description
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#0000	Com A - Slave#2
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#0000	Com A - Slave#2
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#0000	Com B - Slave#2
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#0000	Com B - Slave#4
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#0000	Com C - Slave#1
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#0000	Com C - Not allocated
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#0000	Com D - Not allocated
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#0000	Com D - Not allocated
8	#D4	#D3	#D2	#D1	#C4	#C3	#C2	#C1	#B4	#B3	#B2	#B1	#A4	#A3	#A2	#A1	#0000	Enable slave connection errors
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
9	Reserved												COM_D	COM_C	COM_B	COM_A	#0000	32out switch diagnostic setting
	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0		

< CAUTION >

●Valid character for password is half-width alphanumeric and "-", "_", "." and "@".

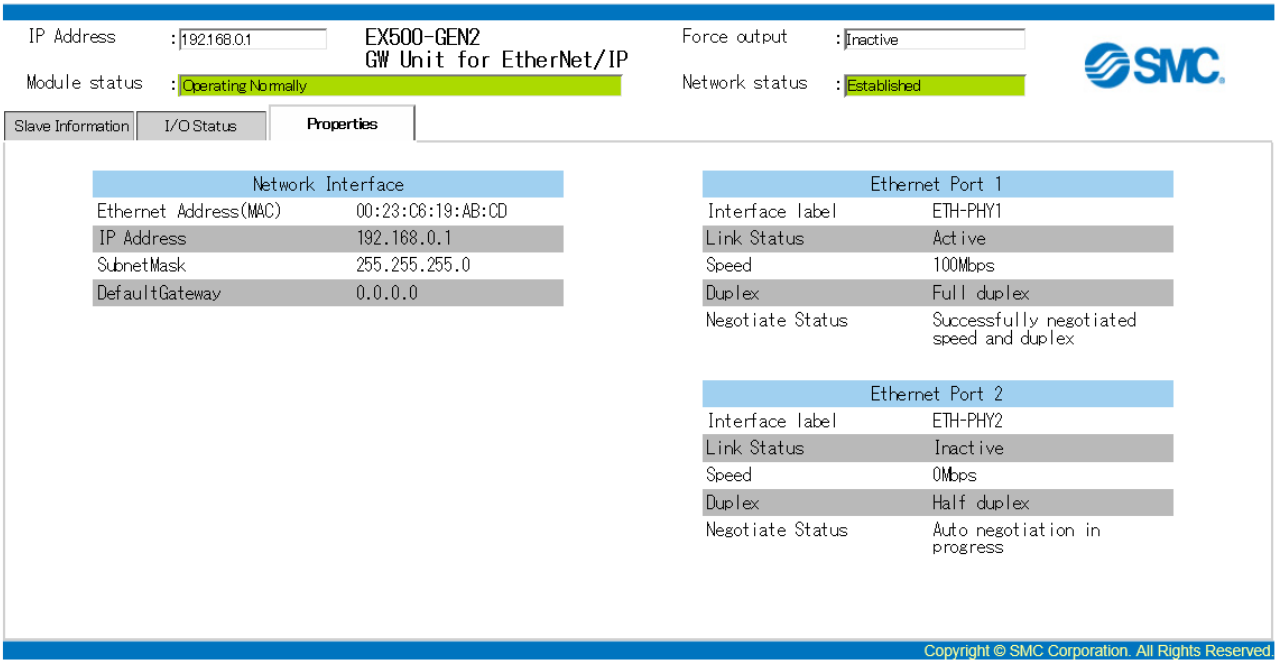
●Maximum number of characters for password is 16.

●Changed password must be strictly controlled.

●If the password is forgotten and needs to be reset, CIP Object Reset service command can initialize the password.

Service	Class ID	Inst ID	Attr ID	Values
Reset	01 h [Identity Object]	1 h	-	01 (Type1 reset)

< Properties tab >
Network information including the GW unit MAC address and communication speed are displayed.



Specification

■Specifications

Basic Specifications

Item	Specifications
Power supply voltage range	Power supply for input and control: 24 VDC ±10% * Power supply for solenoid valve: 24 VDC +10%/-5% *
Rated current	Power supply for input and control: 6.2 A (GW unit internal current consumption: 200 mA or less) Power supply for solenoid valve: 4 A
Number of inputs and outputs	Input: Max. 128 points/Output: Max. 128 points
Standard	CE/UKCA marked, UL (CSA)
Weight	550 g

∗: The direct current power supply to combine should be UL1310 class 2 power supply when conformity to UL is necessary.

Environment specifications

Item	Specifications
Enclosure rating	IP65
Body material	PBT
Operating temperature range	Operation: -10 to 50 ºC, Storage: -20 to 60 ºC (No condensation or freezing)
Operating humidity range	Operation, Storage: 35 to 85%RH (No condensation)
Operating atmosphere	No corrosive gas

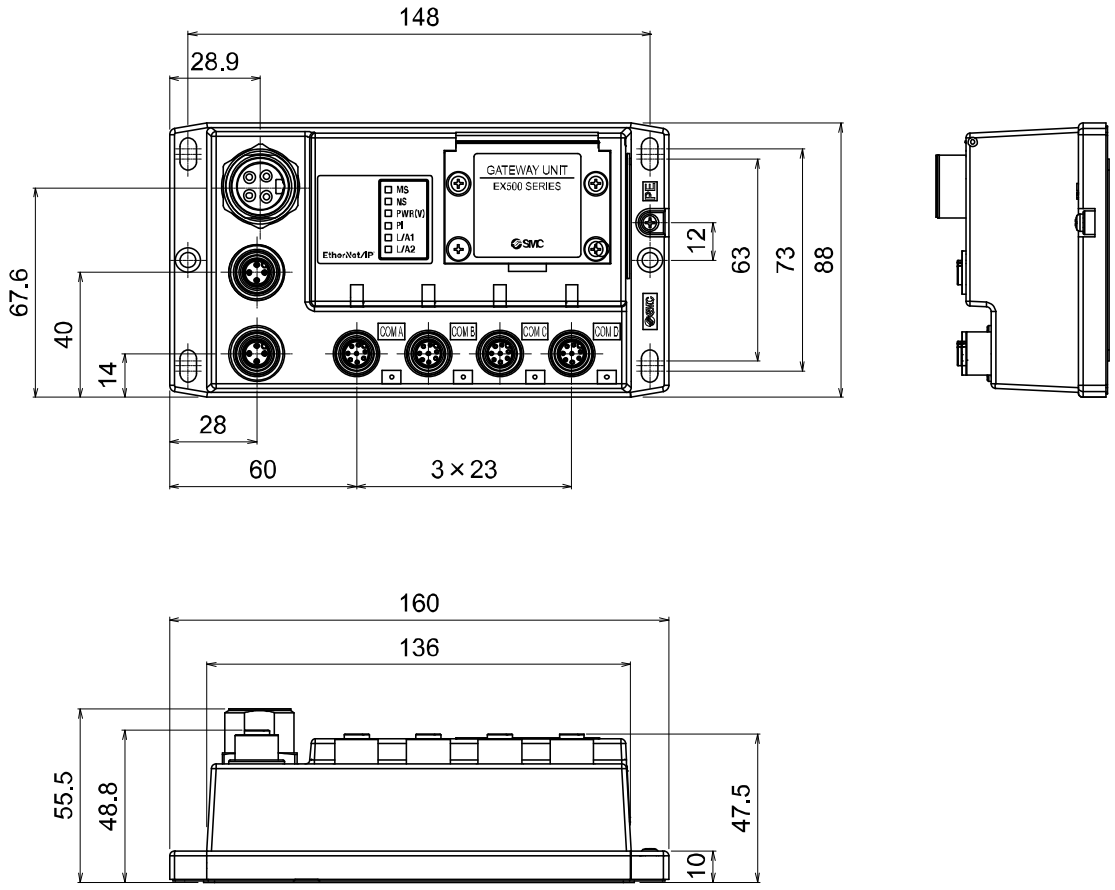
Communication specifications

Item		Specifications
Protocol		Ethernet (IEEE802.3)
	Media	100BASE-TX (CAT5 or more)
	Communication speed	10/100 Mbps (Automatically selected)
	Communication method	Full duplex / half duplex (autumatically selected)
Fieldbus protocol		EtherNet/IP™
I/O Message		Input: 20 bytes (assembly instance: 100) Output: 20 bytes (assembly instance: 150)
IP address setting range		Setting of specified address by DHCP server or internal switch. (192.168.0.1 to 192.168.0.254, 192.168.1.1 to 192.168.1.254)
Device information		Vendor ID: 7 (SMC Corp.) Product type: 12 (Communication adapter) Product code: 198
Applicable function		Quick Connect™ DLR Web server (Applicable browser: Internet Explorer6 to 11, Firefox28.0 to 31.0, Google Chrome 36.0 to 37.0)

Branch port specifications

Item	Specifications
Number of inputs and outputs	128 Inputs/128 Outputs
Applicable system	Gateway distribution system 2 (128 point)
Number of branch port	4 (Input: Max. 32 points/Output: Max. 32 points per branch)
Number of connected slave	Max. 16 (Input unit: 2 pcs./SI unit: 2 pcs. per branch)
Power supply for input equipment and control	24 VDC, Max. 1.5 A per one branch port
Power supply for Solenoid valve	24 VDC, Max. 1.0 A per one branch port
Branch cables	Cable with M12 connector made by SMC (EX500-AC□□□-S□P□)
Branch cable length	Total length 20 m or less per branch

■Dimensions


148
28.9
67.6
40
14
28
60
3 × 23
12
63
73
88
MS
NS
PWR(V)
PI
L/A1
L/A2
EtherNet/IP
GATEWAY UNIT
EX500 SERIES
COM A
COM B
COM C
COM D
160
136
55.5
48.8
47.5
10

SI unit

Model Indication and How to Order

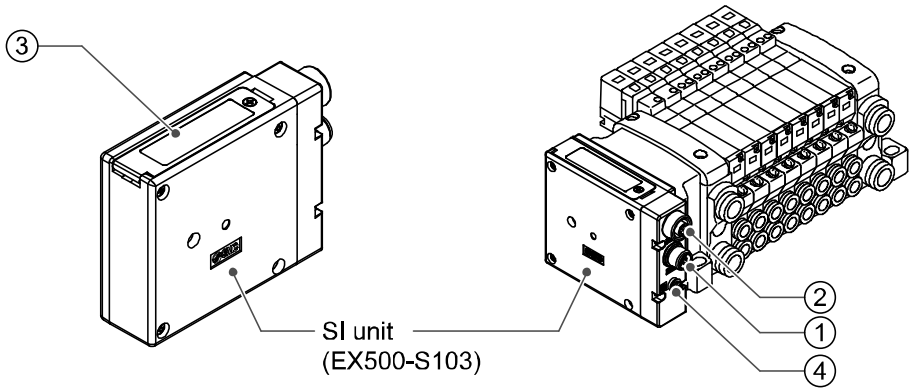
EX500-S 1 03

Output type

1	Source/PNP (negative common)

Summary of Product parts

SI unit is combined with the manifold valve to communicate with GW unit.
The EX9 series general output block can be connected with the SI unit to operate the solenoid valve or relays.



No.	Description	Application
1	Branch connector (IN)	Connector for branch cable (with M12 connector) from the GW unit. *1
2	Branch connector (OUT)	Connector for branch cable (with M12 connector) to the next unit on the branch line. *1
3	Display and switch setting cover	LED display to indicate the SI unit status. *2 Set the output points using the switches under the cover.
4	Grounding terminal (FE)	Used for functional grounding. (M3 thread) (It is recommended to ground with resistance of 100 ohms or less)

Accessories

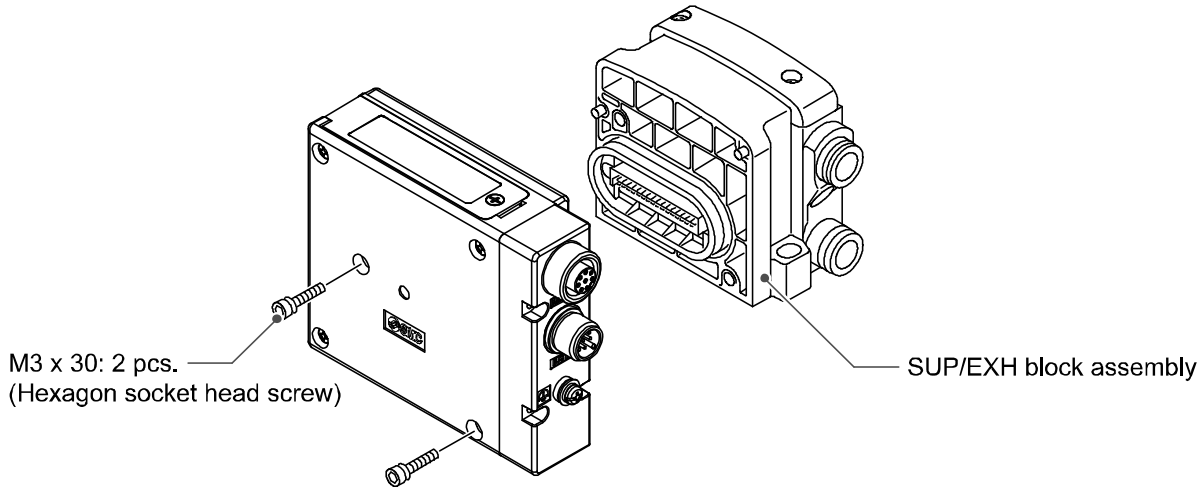
Hexagon socket head cap screw (M3 x 30): 2 pcs.	Connects the SI unit and the valve manifold.
Seal cap: 1 pc. (for M12 connector socket)	For unused branch connector (OUT).

*1: Refer to page 12 for wiring.
*2: Refer to page 47 for display

Mounting and Installation

■Installation

Refer to the drawing below.

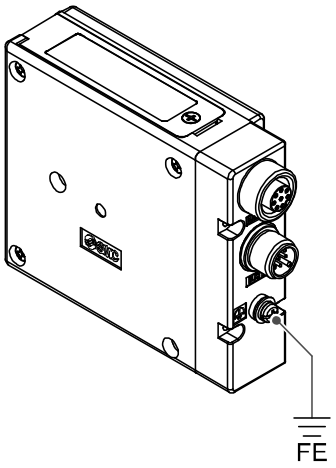


SI unit (EX500-S103)

NOTE
Tighten the screws while holding the SI unit and the supply/exhaust block assembly so that there is no gap between them. Tighten the screws with the tightening torque specified.
(Tightening torque: 0.6 Nm)

∗: Refer to the catalogue and the operation manuals for details of the installation of the solenoid valve and manifold.

○Ground connection



NOTE
Connect the FE terminal to ground.

○Output No. assignment

Output No.	0	2	4	6	8	10	12	14	Solenoid on A side
D Side ← (on SI unit side)									→ U side
Output No.	1	3	5	7	9	11	13	15	Solenoid on B side

Valve manifold

∗: Output No. starts from 0, and will be assigned to the valves in order from the SI unit mounted side (D side).

∗: Standard wiring on the manifold is for double-solenoid valves and output number starts A side and B side in that order. If the mounted valves are single solenoid valves, the output on B side will be empty. (See fig. a)

∗: Special wiring specification with a mixed wiring of single solenoid and double solenoid can be specified with a wiring specification sheet. This makes it possible to specify the output numbers without empty outputs. (See fig. b)

Fig. a

	Double	Single	Double	Double	
No.	0	2	4	6	A side
Station	1	2	3	4	
No.	1	3	5	7	B side

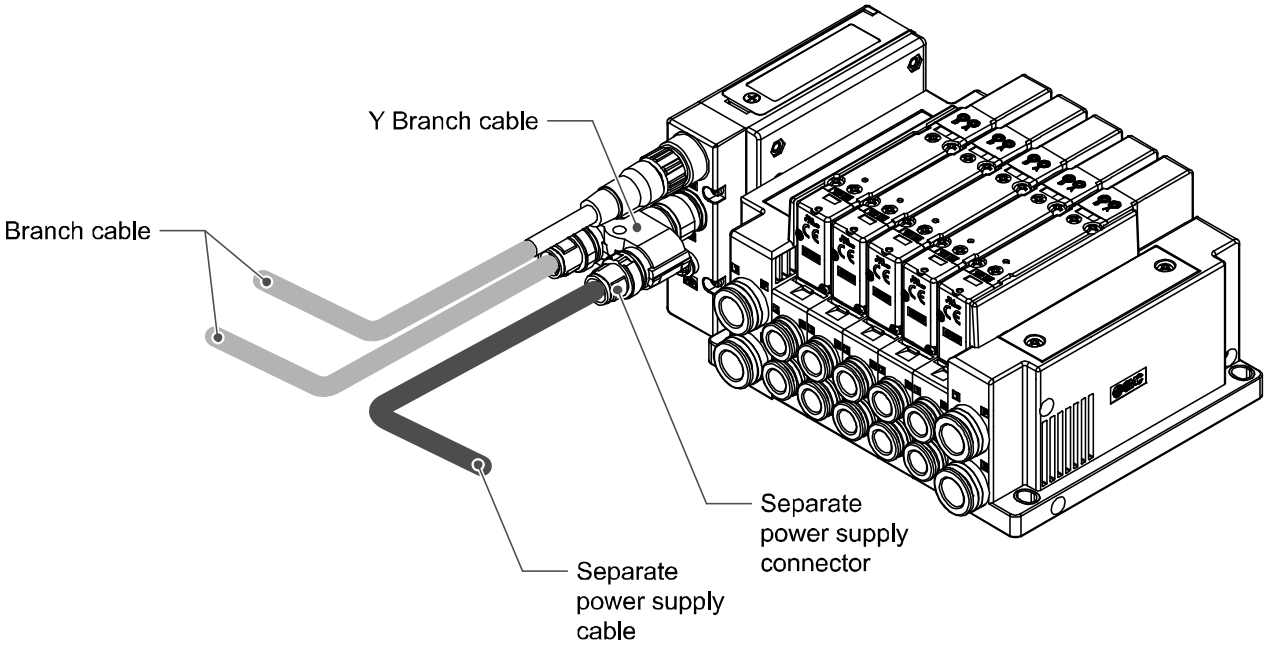
Fig. b

	Double	Single	Double	Double	
No.	0	2	3	5	A side
Station	1	2	3	4	
No.	1	–	4	6	B side

Vacant

■Separate power supply

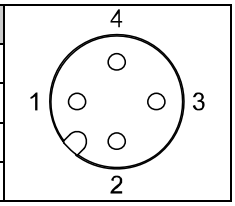
It is possible to provide a separate power supply to the SI unit and valves using a Y branch connector.



Separate connector pin layout

M12, 4 pin, plug

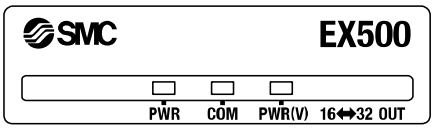
No.	Description
1	24 VDC (For solenoid valves)
2	0 VDC (For solenoid valves)
3	Unused
4	Unused



∗: Refer to page 76 for Y branch connector.

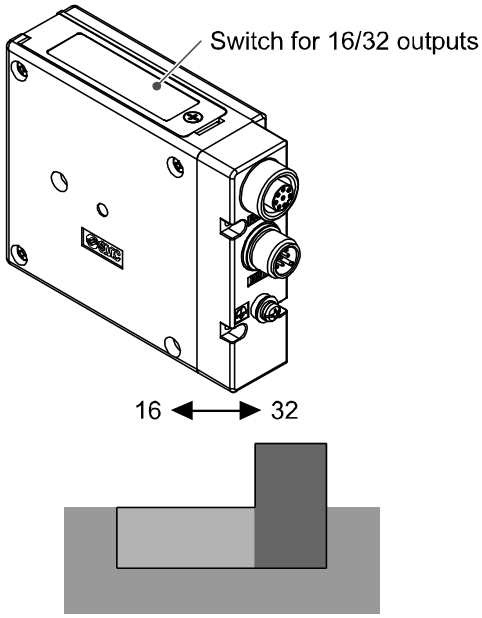
LED Display and Settings

•LED display



Display	Meaning	
PWR	LED is OFF	The power supply for input and control is OFF
	Green LED is ON	Power supply for input and control is ON
COM	LED is OFF	Communication error between GW unit has occurred
	Green LED is ON	Communication between GW unit is normal
PWR(V)	LED is OFF	Power supply for solenoid valve is OFF
	Green LED is ON	Power supply for solenoid valve is ON

•Switch setting



Number of outputs

	Meaning
16	16 output
32	32 output

∗: The default setting is 32.

Specification

■Specifications

Item	Specifications
Output type	PNP (negative common)
Number of outputs	32 points (Internal switch for selecting 16 point or 32 point)
Connected load	Solenoid valve with surge voltage suppressor of 24 VDC and 1.0 W or less (manufactured by SMC)
Short circuit protection	Applicable
Load current	Max power supply of GW unit 1.0 A, Max. external power supply 1.5 A
Internal current consumption	50 mA or less
Enclosure rating	IP67
Body material	PBT
Operating temperature range	Operation: -10 to 50 °C, Storage: -20 to 60 °C (No condensation or freezing)
Operating humidity range	Operation, Storage: 35 to 85%RH (No condensation)
Operating atmosphere	No corrosive gas
Standard	CE/UKCA marked, UL (CSA)
Weight	200 g
System	Gateway distribution system 2 (128 point)

Applicable valve series

Refer to the catalogue and the operation manuals for details of the specifications of the solenoid valve and manifold.

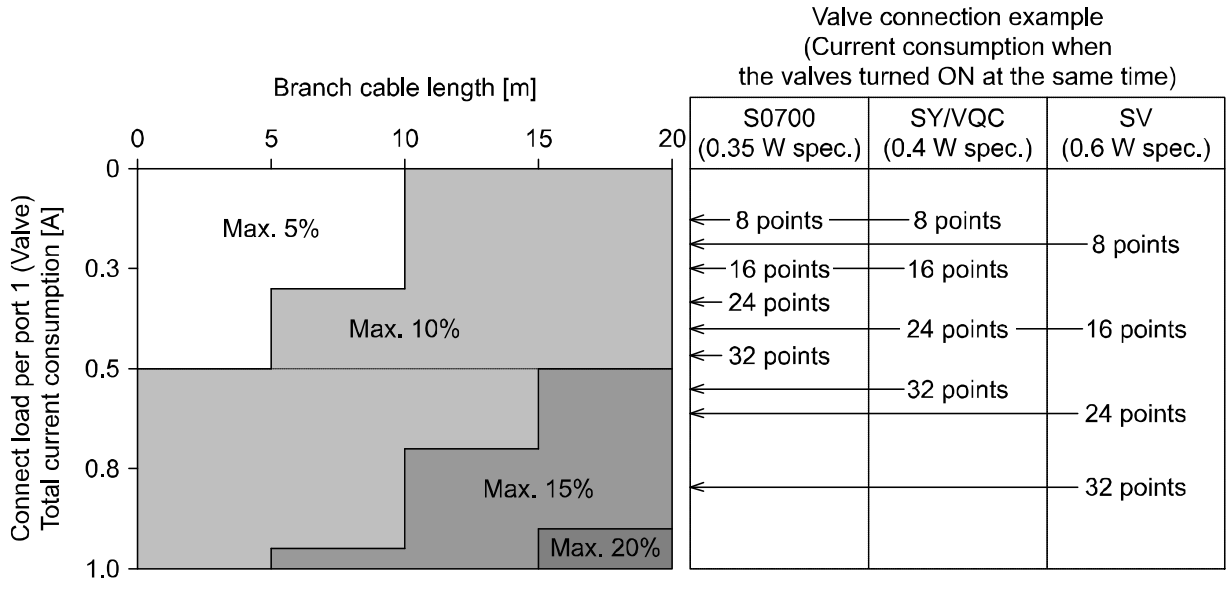
Valve series	
SV series	SV1000、SV2000、SV3000
SY series	SY3000、SY5000、SY7000
VQC series	VQC1000, VQC2000, VQC4000
S0700 series	S0700

Power supply voltage for Solenoid valve

Voltage drop may occur to the source voltage supplied via the SI unit to the valve due to the power consumption of the valves and the length of the branch cable.

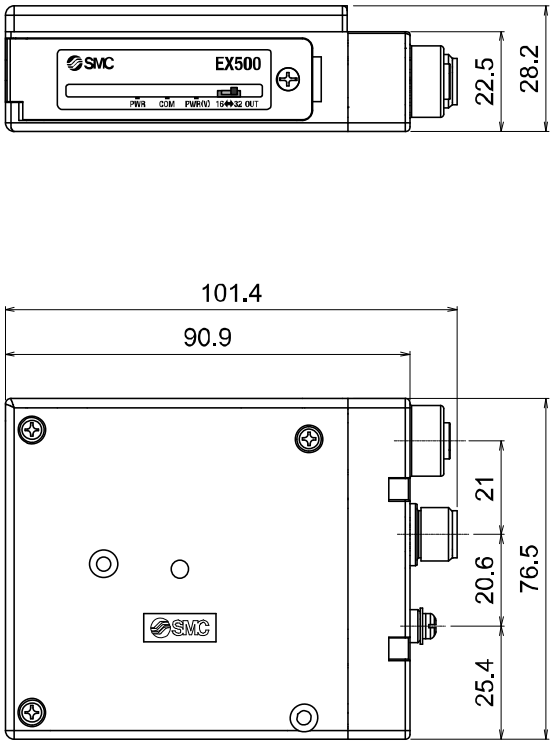
Refer to the guidelines of the Solenoid Valve Power Supply Voltage Drop below.

∗: Y connector is also available depending on your usage.



< Guideline of the Solenoid Valve Power Supply Voltage Drop >

■Dimensions


SMC
EX500
PWR
COM
PWR/V0
16◆32 OUT
22.5
28.2
101.4
90.9
21
20.6
25.4
76.5
SMC
BUS OUT
BUS IN

Input unit

Model Indication and How to Order

EX500-DX P A

- Connector type

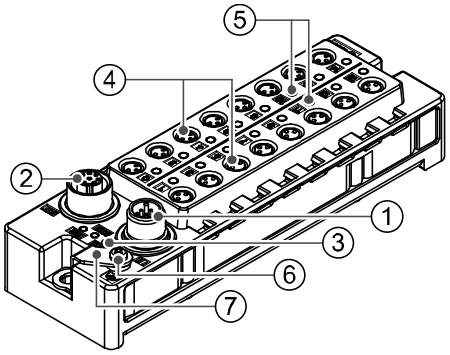
A	M8, 3 pin
B	M12, 5 pin

- Input type

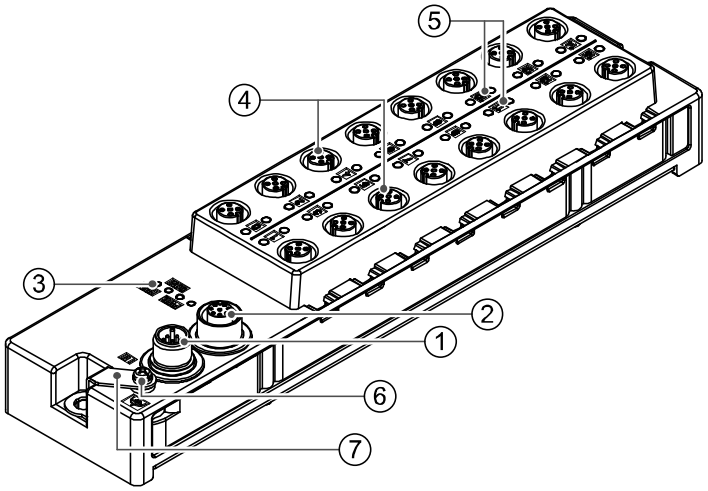
P	PNP sensor input

Summary of Product parts

•EX500-DXPA



•EX500-DXPB



No.	Description	Application
1	Branch connector (IN)	Connector for branch cable (with M12 connector) from the GW unit. *1
2	Branch connector (OUT)	Connector for branch cable (with M12 connector) to the next unit on the branch line. *1
3	Display LED	LED display to indicate the input status. *2
4	Sensor connector	Connector for sensor. *1
5	Display LED	Displays the sensor signal status. *2
6	Grounding terminal	Used for functional grounding. (M3 thread) (It is recommended to ground with resistance of 100 ohms or less)
7	Grounding bracket	Connect the mounting hole to the grounding terminal

Accessories

EX500-DXPA	
Seal cap: 1 pc. (for M12 connector socket)	For unused branch connector (OUT).
Seal cap: 16 pcs. (for M8 connector socket)	Used for unused sensor connector.

EX500-DXPB	
Seal cap: 17 pc. (for M12 connector socket)	For unused branch connector (OUT).

*1: Refer to page 12 for wiring.

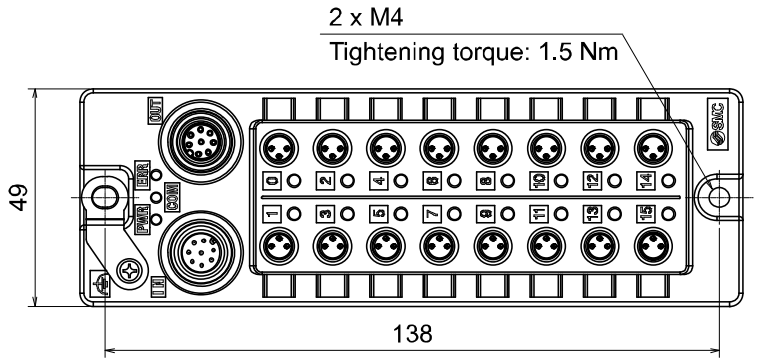
*2: Refer to page 58 for display.

Mounting and Installation

■Installation

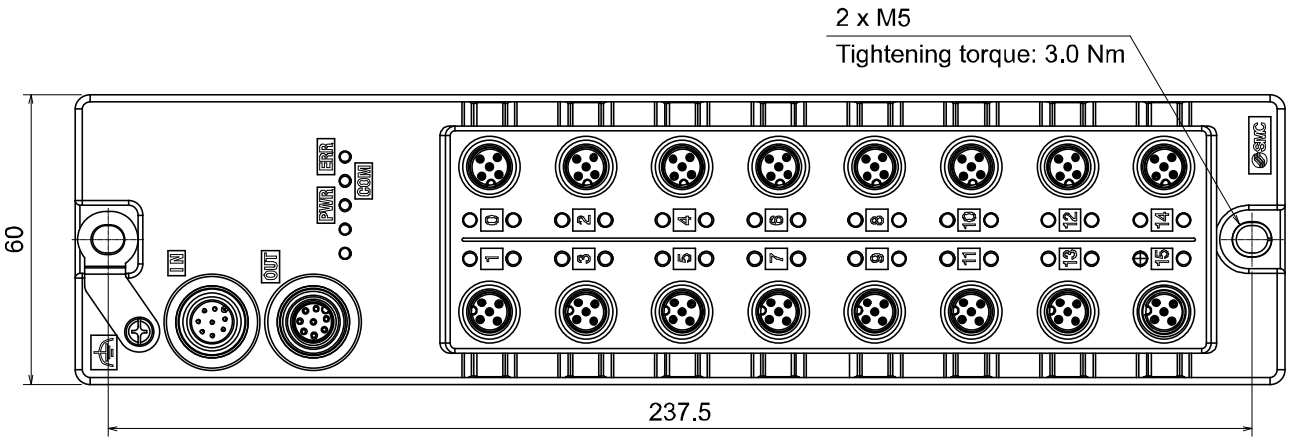
•EX500-DXPA

Install the product using 2 M4 screws x 20 mm or longer with a head ø8 minimum.



•EX500-DXPB

Install the product using 2 M5 screws x 20 mm or longer with a head ø9 to ø11.



■Wiring

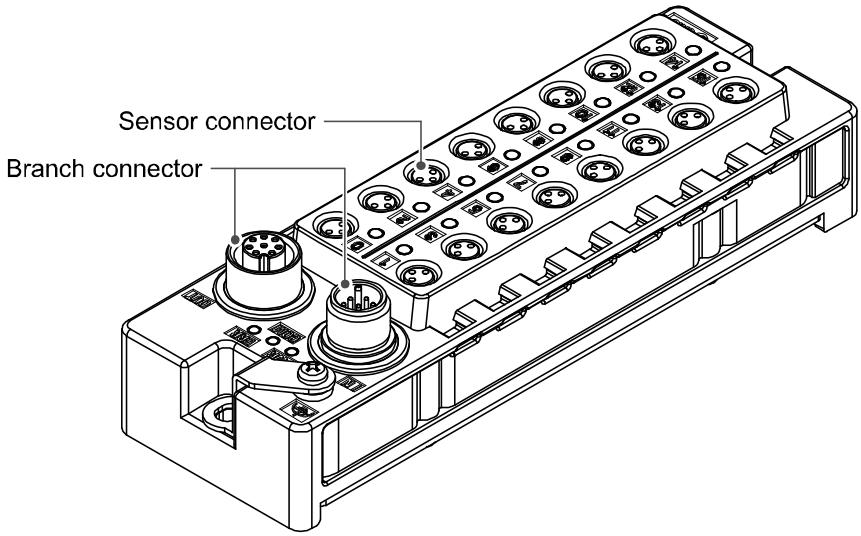
•EX500-DXPA

Branch wiring

Connect the branch cable to the branch connector (IN/OUT). Refer to page 12 for wiring.

Sensor wiring

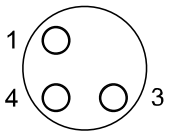
Connect the sensors to the sensor connectors.



Pin layout of the sensor connector

M8 connector (3 pin, socket)

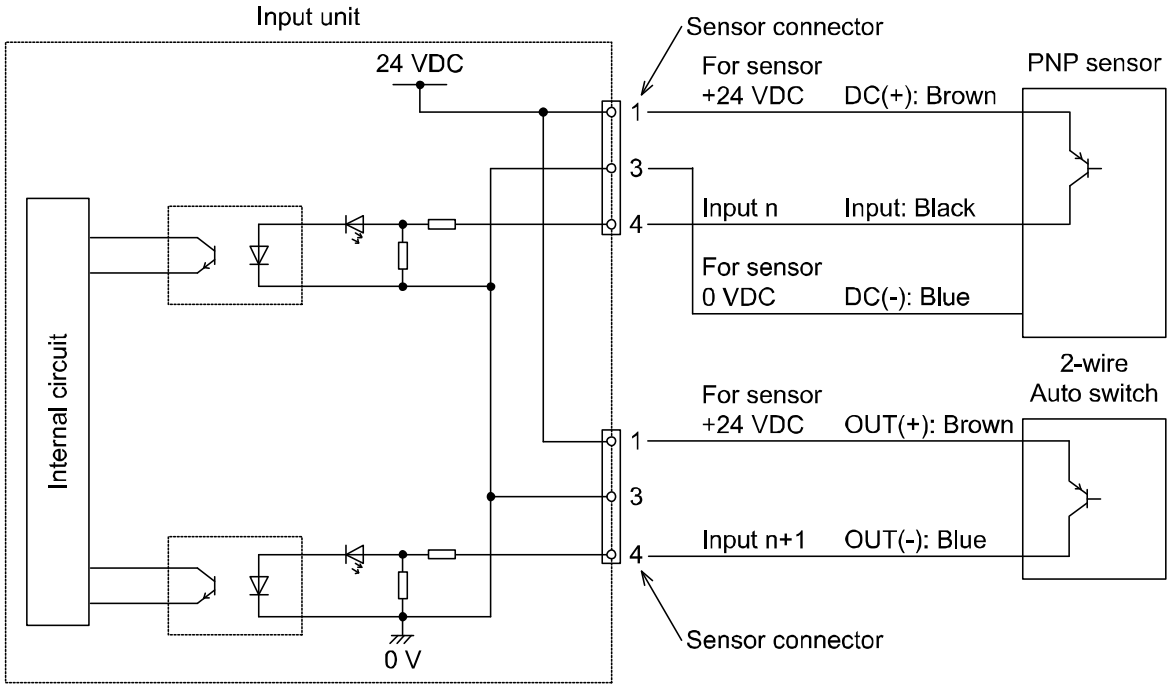
No.	Description
1	Power supply (24 VDC)
3	Power supply (0 V)
4	Input



NOTE

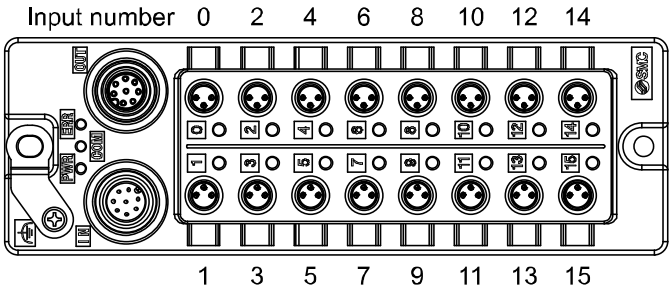
Be sure to fit a seal cap on any unused connectors of the input block.
IP67 is maintained by using the seal cap.
(Tightening torque for M8: 0.05 Nm, M12: 0.1 Nm)

Sensor wiring example (PNP input)

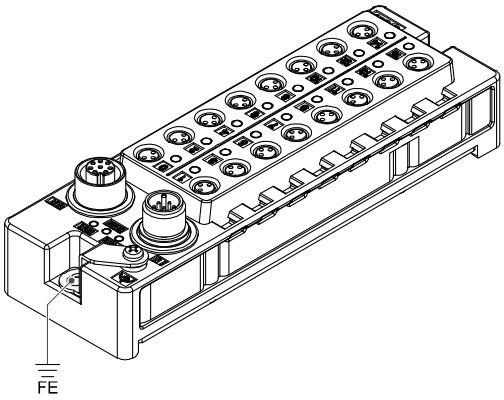


Correspondence between the input number and input

The input number is assigned from 0 to 15 from the branch connector side.



Ground connection



The mounting hole at the branch connector side is connected to the ground terminal using the grounding bracket.

NOTE
Connect the FE terminal to ground.

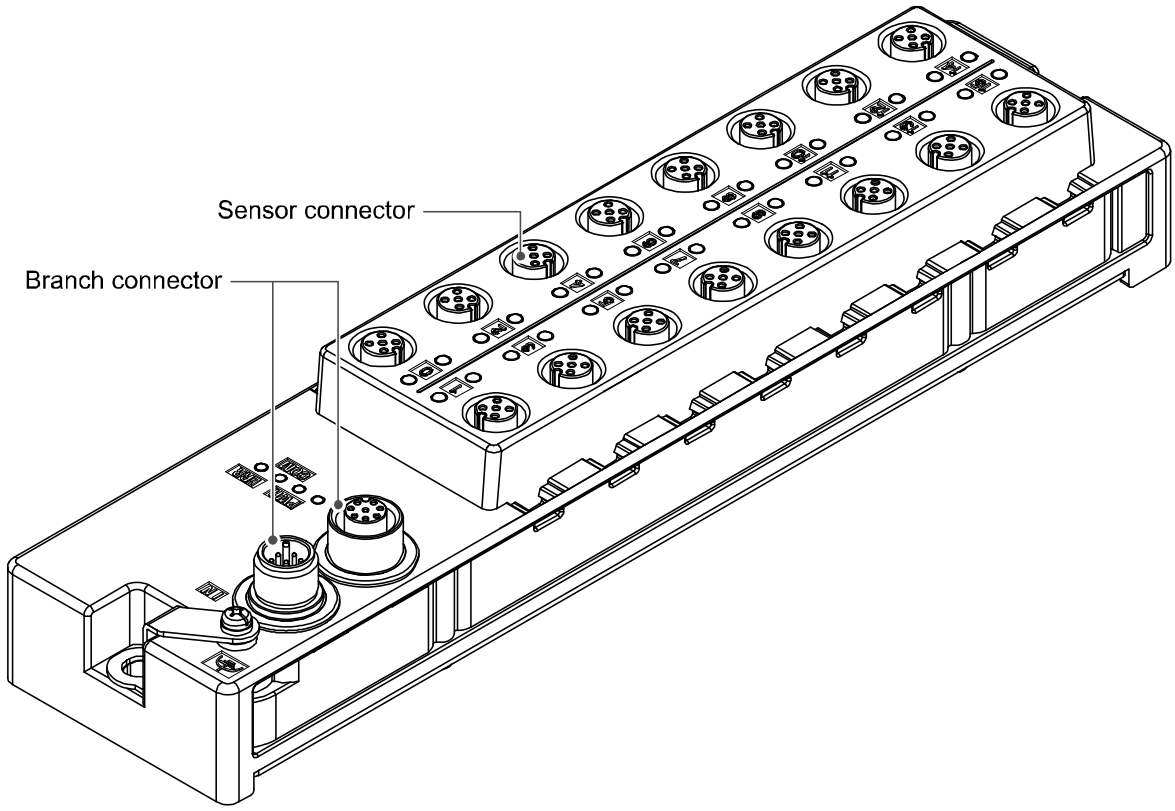
●EX500-DXPB

Branch wiring

Connect the branch cable to the branch connector (IN/OUT). Refer to page 12 for wiring.

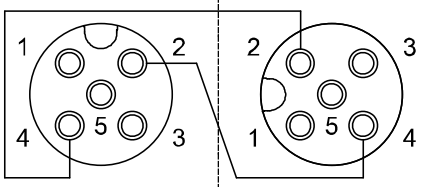
Sensor wiring

Connect the sensors to the sensor connectors.

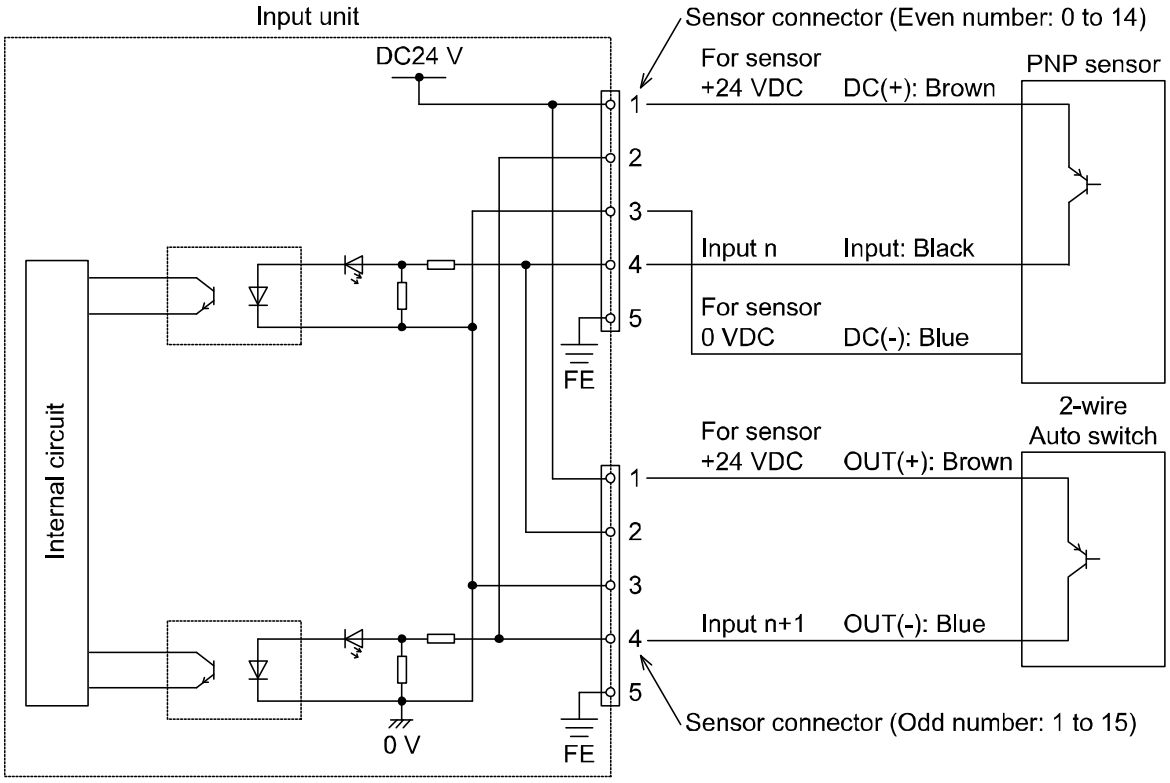


Pin layout of the sensor connector

M12 connector (5 pin, socket)

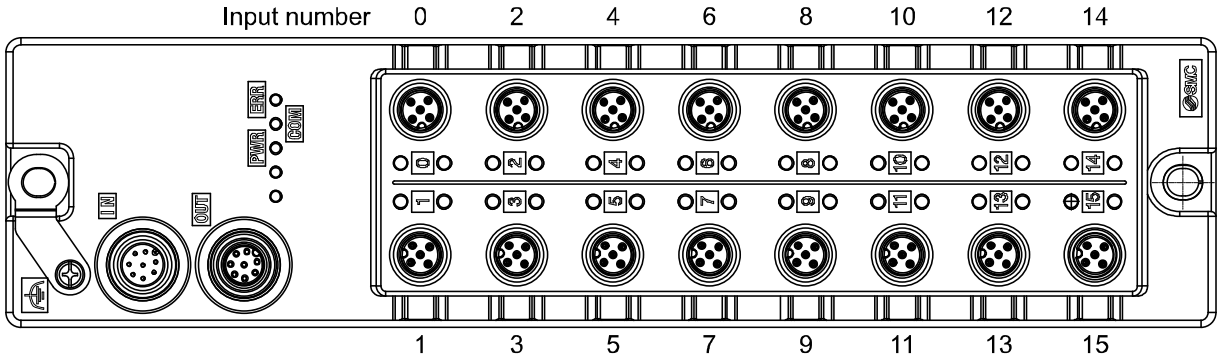
No.	Description	Even number 0 to 14	Odd number 1 to 15
1	Power supply (24 VDC)		
2	(Input)		
3	Power supply (0 V)		
4.	Input		
5	FE		

Sensor wiring example (PNP input)

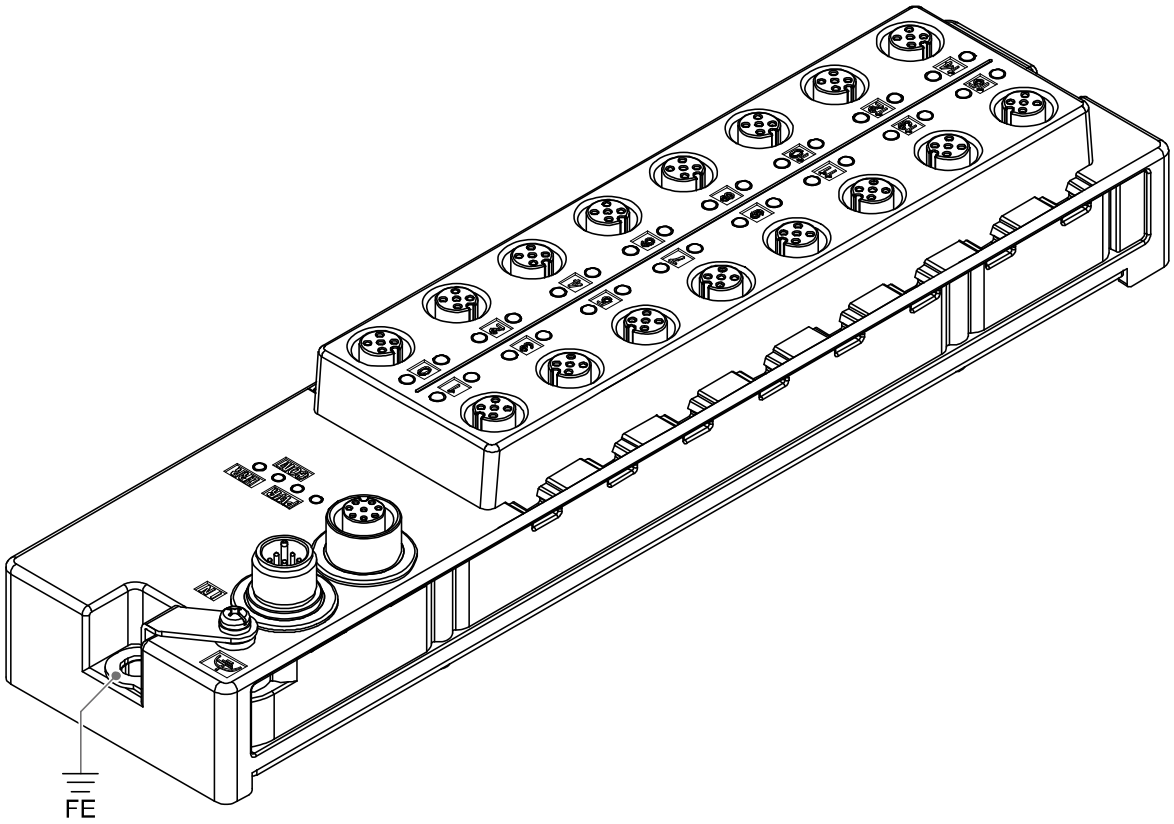


Correspondence between the input number and input

The input number is assigned from 0 to 15 from the branch connector side.



Ground connection

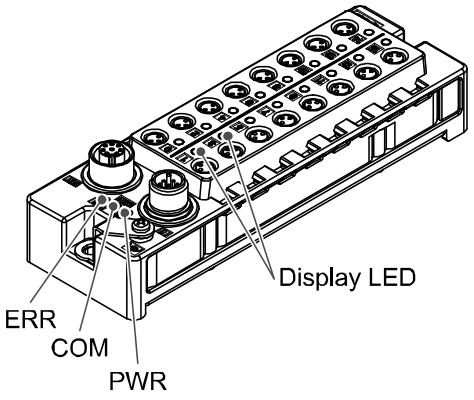


The mounting hole at the branch connector side is connected to the ground terminal using the grounding bracket.

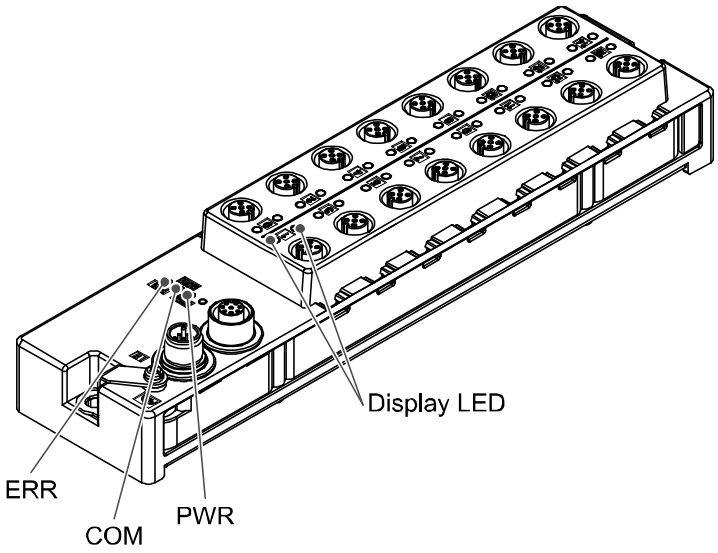
NOTE
Connect the FE terminal to ground.

LED Display

•EX500-DXPA



•EX500-DXPB



Display	Meaning	
PWR	LED is OFF	The power supply for input and control is OFF
	Green LED is ON	Power supply for input and control is ON
COM	LED is OFF	Communication error between GW unit has occurred
	Green LED is ON	Communication between GW unit is normal
ERR	LED is OFF	Normal operation
	Red LED is ON	Short circuit detection
Display LED	LED is OFF	Sensor signal input is OFF
	Green LED is ON	Sensor signal input is ON

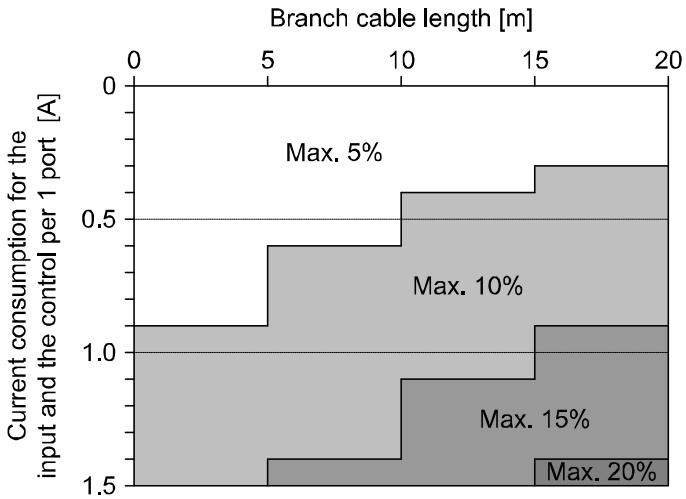
Specification

■Specifications

Item	Specifications
Input type	PNP sensor input
Number of inputs	16
Voltage for input equipment	24 VDC
Current for input equipment	Max. 1.3 A/unit (Total of 8 connectors of even number must be Max. 0.65 A, 8 connectors of odd number must be Max. 0.65 A)
Input ON voltage/input ON current	11 V or more/Typ.7 mA (at 24 VDC)
Input OFF voltage/input OFF current	5 V or less/1.5 mA or less (at 24 VDC)
Rated input current	Approx. 7 mA
Internal current consumption	200 mA or less (when the input signal is ON)
Display	Green LED (Lights when ON)
Sensor connector	EX500-DXPA: M8 connector (3 pin, socket) EX500-DXPB: M12 connector (5 pin, socket)
Short circuit protection	Available
Enclosure rating	IP67
Body material	PBT
Operating temperature range	Operation: -10 to 50 ºC, Storage: -20 to 60 ºC (No condensation or freezing)
Operating humidity range	Operation, Storage: 35 to 85%RH (No condensation)
Operating atmosphere	No corrosive gas
Standard	CE/UKCA marked, UL (CSA)
Weight	EX500-DXPA: 250 g EX500-DXPB: 450 g
System	Gateway distribution system 2 (128 point)

Power supply voltage for input and control

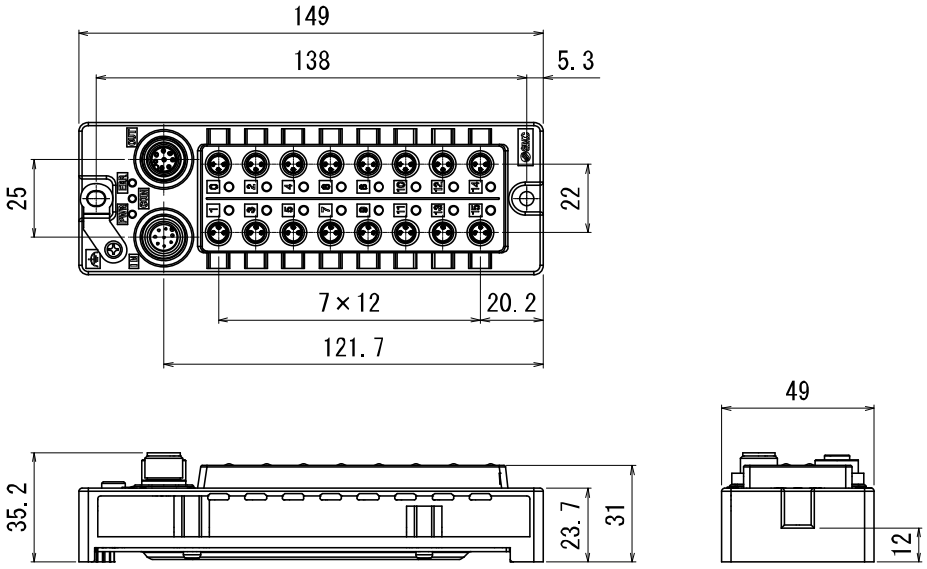
Voltage drop may occur to the source voltage supplied from the input unit to the sensor due to the connected unit, power consumption of the sensor or the length of the branch cable.
Refer to the Guideline of the Voltage Drop of the Power Supply for Input and Control below.



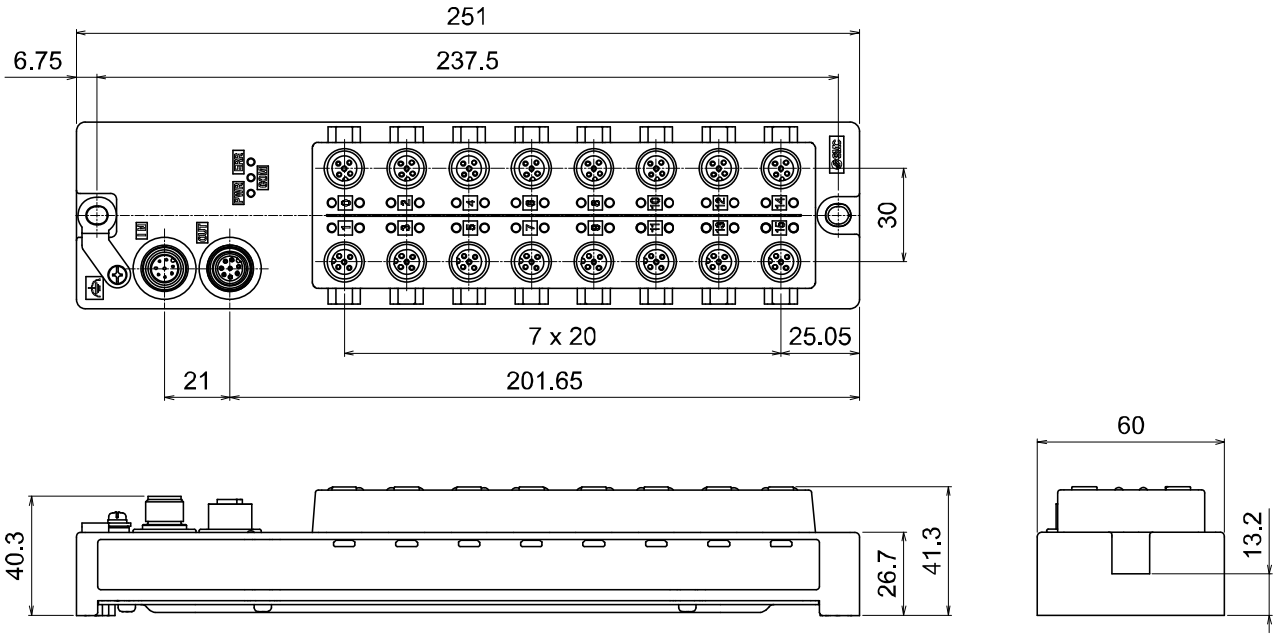
< Guideline of the Voltage Drop of the Power Supply for Input and Control >

■Dimensions

•EX500-DXPA



•EX500-DXPB



Interchangeability of system

Mixed usage Gateway distribution system 2 (128 points) and gateway distribution system (64 points)
EX500-GEN2, EX500-S103, EX500-DXP# are products for gateway distribution system 2 (128 points). Although it is possible to use with existing 64 point gateway distribution system, the operating condition must comply with the specifications of the 64 point gateway system.

		GW unit	
		Gateway distribution system 2 (128 points) •EX500-GEN2 •EX500-GPN2	**Gateway distribution system (64 points)** •EX500-GDN1 •EX500-GPR1A
SI unit Input unit	**Gateway distribution system 2 (128 points)** •EX500-S103 •EX500-DXP#	Usable	Usable ∗:Same specifications of gateway distribution system (64 point)
	Gateway distribution system (64 points) •EX500-S001 •EX500-Q#01 •EEX500-IB1-#	Usable ∗:Same specifications of gateway distribution system (64 point)	Usable

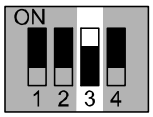
•Specifications of gateway distribution system (64 point)

Item		Specifications
Number of inputs and outputs		64 input (16 input per branch) 64 output (16 output per branch)
Number of occupied slave		Max. 8 (Input unit: 1 pc./SI unit: 1 pc. per branch)
Rated current	GW unit	Power supply for input and control: 3.0 A Power supply for Solenoid valve: 3.0 A
	Input unit	Max. 0.5 A/unit
	SI unit	Max. 0.75 A/ unit
Branch cable length		Total length 10 m or less per branch

GW unit using SI unit for 64 point gateway distribution system and input unit.
If EX500-GEN2 DIP switch No.3 is turned on, the unit starts up with the specifications of 64 point gateway distribution system and it is possible to use with 64 point gateway distribution system.

∗: Diagnostic function of the gateway distribution system 2 (128 points) cannot be used.

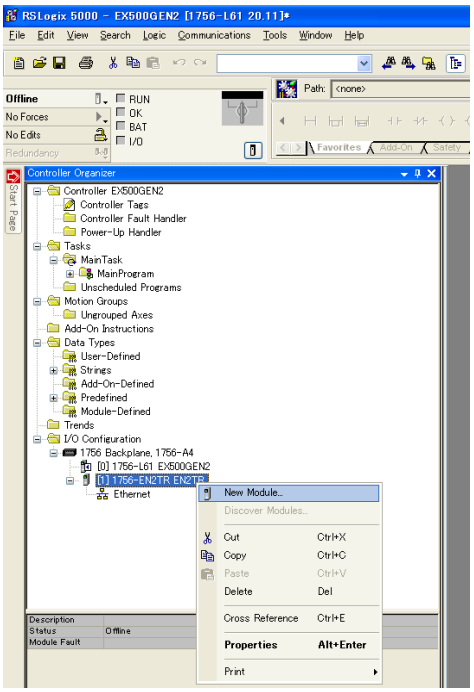
DIP SW



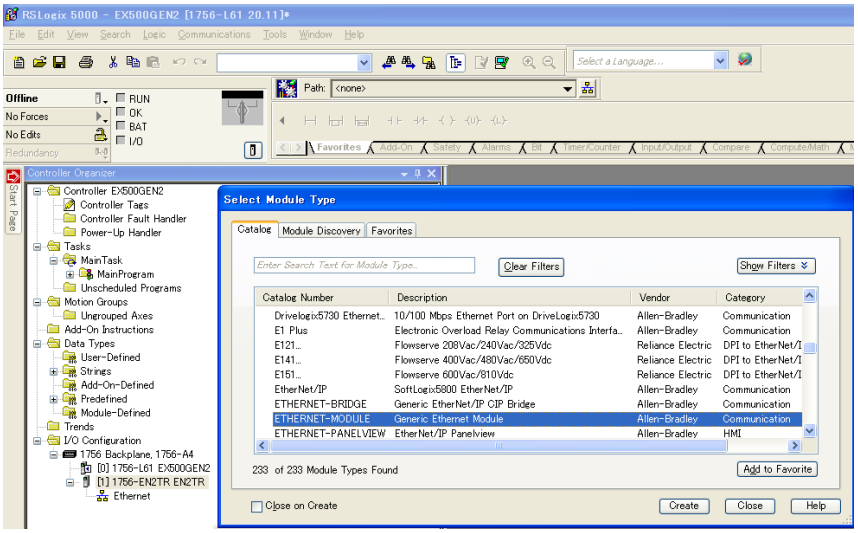
Method to connect GW unit to Rockwell Automation EtherNet/IP™ module (master) is shown below. Refer to the Operation Manual of the RSLogix5000™ for the detailed operation.

∗: This figure shows the display of Rockwell Automation software, RSLogix5000™.

•Select [EtherNet/IP™ module] in [I/O Configuration] folder, then select [New Module].



•The [Select Module] screen is displayed. Select [ETHERNET-MODULE Generic Ethernet Module], then select [Create].



•[Module Properties] screen is displayed. Perform each setting.

(1) Name: Enter the required unit name.

(2) Comm Format: Select the data format of Connection Parameters.

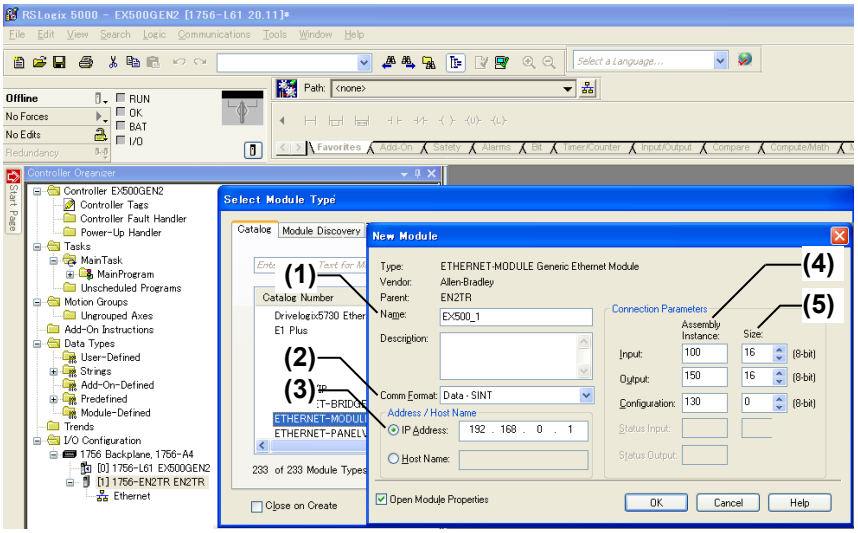
(3) IP Address: Enter the IP address setting for the SI unit.

(4) Assembly Instance: Perform setting as shown below.

Item	Decimal	
Common Format	"Data-INT"	"Data-SINT"
Input	100	100
Output	150	150
Configuration	130	130

(5) Size: Perform setting as shown below.

Item	Decimal	
Common Format	"Data-INT"	"Data-SINT"
Input	8(words)	16(bytes)
Output	8(words)	16(bytes)
Configuration	0(words)	0 (bytes)



•I/O memory map for 64 points gateway distribution system mode

Input data

Offset (INT)	Input data																Meaning
	MSB							LSB	MSB							LSB	
	15							8	7							0	
0	IN15	IN14	IN13	IN12	IN11	IN10	IN9	IN8	IN7	IN6	IN5	IN4	IN3	IN2	IN1	IN0	COM A
1	IN31	IN30	IN29	IN28	IN27	IN26	IN25	IN24	IN23	IN22	IN21	IN20	IN19	IN18	IN17	IN16	COM B
2	IN47	IN46	IN45	IN44	IN43	IN42	IN41	IN40	IN39	IN38	IN37	IN36	IN35	IN34	IN33	IN32	COM C
3	IN63	IN62	IN61	IN60	IN59	IN58	IN57	IN56	IN55	IN54	IN53	IN52	IN51	IN50	IN49	IN48	COM D
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Reserved
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Reserved
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Reserved
7	0	0	0	0	0	0	0	0	0	0	0	0	COM D	COM C	COM B	COM A	Port Status

0: Fixed to 0

< Port condition >

Value	Status
0	Connection port
1	Not connected

Output data

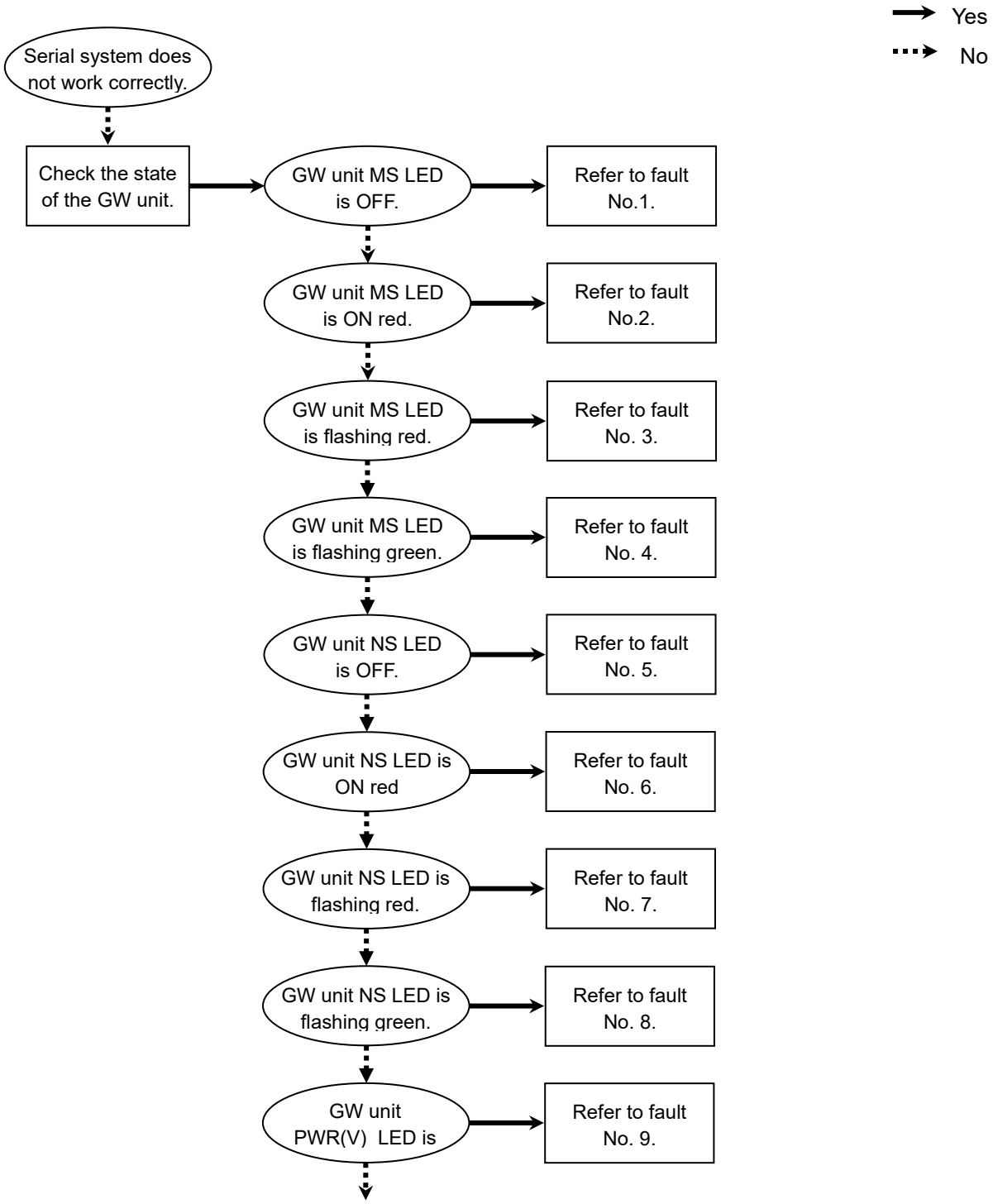
Offset (INT)	Output data																Meaning
	MSB							LSB	MSB							LSB	
	15							8	7							0	
0	OUT15	OUT14	OUT13	OUT12	OUT11	OUT10	OUT9	OUT8	OUT7	OUT6	OUT5	OUT4	OUT3	OUT2	OUT1	OUT0	COM A
1	OUT31	OUT30	OUT29	OUT28	OUT27	OUT26	OUT25	OUT24	OUT23	OUT22	OUT21	OUT20	OUT19	OUT18	OUT17	OUT16	COM B
2	OUT47	OUT46	OUT45	OUT44	OUT43	OUT42	OUT41	OUT40	OUT39	OUT38	OUT37	OUT36	OUT35	OUT34	OUT33	OUT32	COM C
3	OUT63	OUT62	OUT61	OUT60	OUT59	OUT58	OUT57	OUT56	OUT55	OUT54	OUT53	OUT52	OUT51	OUT50	OUT49	OUT48	COM D
4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Reserved
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Reserved
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Reserved
7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Reserved

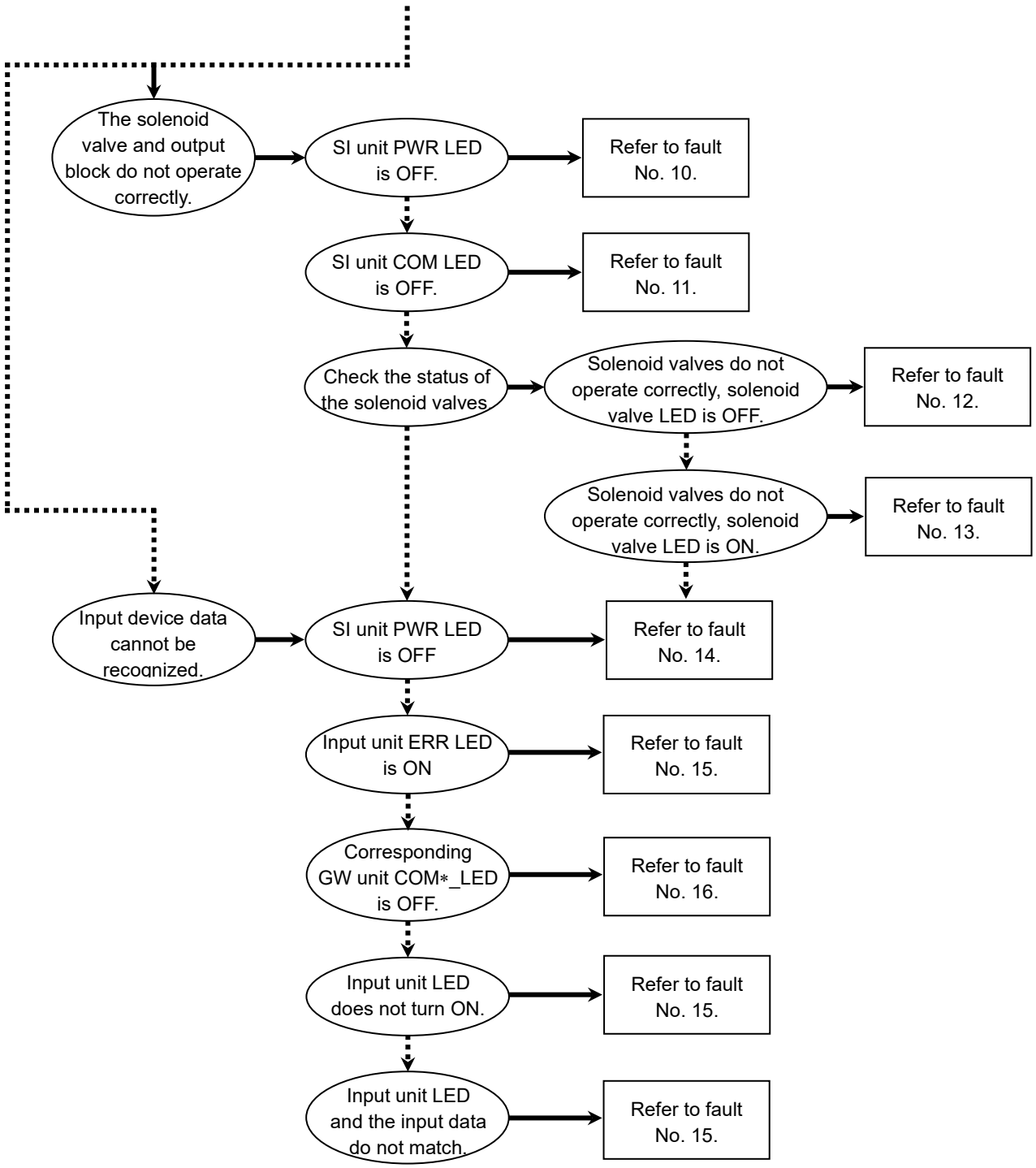
-: Unused

Troubleshooting

Troubleshooting flow chart

When any serial system failure occurs, perform the following trouble shooting.




The solenoid valve and output block do not operate correctly.
SI unit PWR LED is OFF.
Refer to fault No. 10.
SI unit COM LED is OFF.
Refer to fault No. 11.
Check the status of the solenoid valves
Solenoid valves do not operate correctly, solenoid valve LED is OFF.
Refer to fault No. 12.
Solenoid valves do not operate correctly, solenoid valve LED is ON.
Refer to fault No. 13.
Input device data cannot be recognized.
SI unit PWR LED is OFF
Refer to fault No. 14.
Input unit ERR LED is ON
Refer to fault No. 15.
Corresponding GW unit COM∗_LED is OFF.
Refer to fault No. 16.
Input unit LED does not turn ON.
Refer to fault No. 15.
Input unit LED and the input data do not match.
Refer to fault No. 15.

Troubleshooting

Fault No. 1

Fault	Possible cause	Investigation method	Countermeasures
GW unit MS LED is OFF.	Wiring of the power supply for input and control is defective	Check the power supply cable connections and check for broken wires.	Tighten the power supply cable connection. (if there is a broken wire, replace the cable).
			Correct the power cable wiring layout.
	Incorrect power supply for input and control	Check the supply voltage for input and control.	Supply 24 VDC ±10% to the power supply for control and inputs of the product.

Fault No. 2

Fault	Possible cause	Investigation method	Countermeasures
GW unit MS LED is ON red	Malfunction of the GW unit	-	Contact your sales representative.

Fault No. 3

Fault	Possible cause	Investigation method	Countermeasures
GW unit MS LED is flashing red.	Diagnostics error detected	Check the meaning of diagnostic error.	Solve the diagnostic error.

Fault No. 4

Fault	Possible cause	Investigation method	Countermeasures
GW unit MS LED is flashing green.	Parameter setting error	-	Contact your sales representative.

Fault No. 5

Fault	Possible cause	Investigation method	Countermeasures
GW unit NS LED is OFF.	No IP address	Check the communication cable connections and check for broken wires.	Tighten the communication cable connection. (if there is a broken wire, replace the cable)
		Wait for the IP address to be set by the DHCP server.	Set the IP address using the DHCP server.

Fault No. 6

Fault	Possible cause	Investigation method	Countermeasures
GW unit NS LED is ON red	IP address has been duplicated	Check that the IP address has not been duplicated on another slave unit.	Set the IP address so that it is not duplicated.

Fault No. 7

Fault	Possible cause	Investigation method	Countermeasures
GW unit NS LED is flashing red.	EtherNet/IP connection time out	Check the communication cable connections and check for broken wires.	Tighten the communication cable connection. (if there is a broken wire, replace the cable)
		Check that the communication cable length is within the maximum specified length. Check that the recommended cable for EtherNet has been used. Check that the communication cable wiring is correct.	Wire the communication cable according to the EtherNet wiring specifications.
		Check that there is no noise source or high voltage line around the EtherNet™ cables and power cables.	Separate the communication and power supply cables away from noise sources.

Fault No. 8

Fault	Possible cause	Investigation method	Countermeasures
GW unit NS LED is flashing green.	Waiting for connection to be established.	Check the address and communication setting.	Review the setting of the switch and address.
		Check the communication cable connections and check for broken wires.	Tighten the communication cable connection. (if there is a broken wire, replace the cable)
		Check if the PLC is operating normally.	Review the setting of PLC.

Fault No. 9

Fault	Possible cause	Investigation method	Countermeasures
GW unit PWR(V)_LED is OFF.	Wiring of the solenoid valve power supply is defective.	Check the power supply cable connections and check for broken wires.	Tighten the power supply cable connection. (if there is a broken wire, replace the cable)
			Correct the power cable wiring layout.
	Solenoid valve power supply failure	Check proper supply voltage of solenoid valve power supply.	Power supply for solenoid valves: 24 VDC +10%/-5%

Fault No. 10

Fault	Possible cause	Investigation method	Countermeasures
SI unit PWR LED is OFF.	Power supply for input and control: 24 VDC ±10%	Check the branch cable connections and check for broken wires.	Tighten the branch cable connection. (if there is a broken wire, replace the cable)

Fault No. 11

Fault	Possible cause	Investigation method	Countermeasures
SI unit COM LED is OFF.	Communication failure of the branch port	Check the branch cable connections and check for broken wires.	Tighten the branch cable connection. (if there is a broken wire, replace the cable)
		Check the wiring length of the branch cable and check that the recommended cable is used.	Review wiring Total length 20 m or less per branch
		Check that there is no high voltage cable or equipment that generates noise around the branch cable.	Separate the branch cable away from noise sources.

Fault No. 12

Fault	Possible cause	Investigation method	Countermeasures
Solenoid valves not operating correctly. Solenoid valve LED is OFF.	Defective connection between the SI unit and solenoid valve manifold.	Check for any loose screws at the connection between the SI unit and the valve manifold.	Same as Investigation method.
	Polarity of the solenoid valve and the SI unit output are not compatible.	Check that the solenoid valve polarity specification and output polarity of the SI unit are compatible.	The solenoid valve polarity specification and output polarity of the SI unit are compatible.
	Solenoid valve failure	Refer to the troubleshooting of the solenoid valve.	Same as Investigation method.

Fault No. 13

Fault	Possible cause	Investigation method	Countermeasures
Solenoid valves not operating correctly. Solenoid valve LED is ON.	Solenoid valve failure	Refer to the troubleshooting of the solenoid valve.	Same as Investigation method.

Fault No. 14

Fault	Possible cause	Investigation method	Countermeasures
Input unit PWR LED is OFF.	Power supply for input and control: 24 VDC ±10%	Check the branch cable connections and check for broken wires.	Tighten the branch cable connection. (if there is a broken wire, replace the cable)

Fault No. 15

Fault	Possible cause	Investigation method	Countermeasures
Input unit ERR LED is ON	Over current power supply for input and control	Check the total current consumption of the input devices such as the sensor used.	Ensure that the total current consumption is within the specified range of the input unit.
			Resolve the short-circuit or over current.
		Check the input devices used, and check the wiring to the input devices. Refer to the input device operation manual troubleshooting section, or contact the input device manufacturer.	Same as Investigation method.
	Power supply short-circuit of the input devices used.	Check the troubleshooting of input equipment Or, confirm with the manufacturer of the input equipment.	

Fault No. 16

Fault	Possible cause	Investigation method	Countermeasures
Corresponding GW unit COM ∗LED is OFF.	Communication failure of the branch port	Check the branch cable connections and check for broken wires.	Tighten the branch cable connection. (if there is a broken wire, replace the cable)
		Check the wiring length of the branch cable and check that the recommended cable is used.	Revise the wiring length: Total length 20 m or less per branch Exclusive cables: EX500-AC□□□-S□P□
		Check that there is no high voltage cable or equipment that generates noise around the branch cable.	Separate the branch cable away from noise sources.

Fault No. 17

Fault	Possible cause	Investigation method	Countermeasures
Input unit display LED does not turn ON.	Polarity of the input unit and input device including sensor are not compatible.	Check that the polarity of the input unit and the input device are compatible.	Use an input device polarity compatible with the polarity of the input unit.
	Defective connection between the input unit and input device.	Check the input device connection and wiring (pin layout) and check for broken wires.	Tighten the cable connection. (Replace the cable if it is broken.)
			Rectify the wiring of the input device cable.
	Malfunction of input unit	-	Contact your sales representative.

Fault No. 18

Fault	Possible cause	Investigation method	Countermeasures
Input unit display LED and the input data do not match.	Communication failure of the branch port	Check the wiring length of the branch cable and check that the recommended cable is used.	Review wiring Total length 20 m or less per branch
		Check that there is no high voltage cable or equipment that generates noise around the branch cable.	Separate the branch cable away from noise sources.
	Malfunction of input unit	-	Contact your sales representative.

Accessories

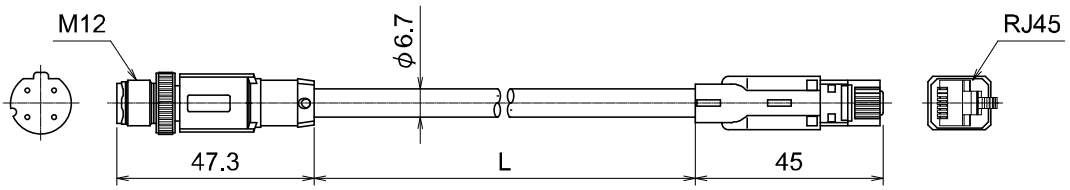
(1) Ethernet communication connector cable

How to Order: EX9-AC 020 EN-PSRJ

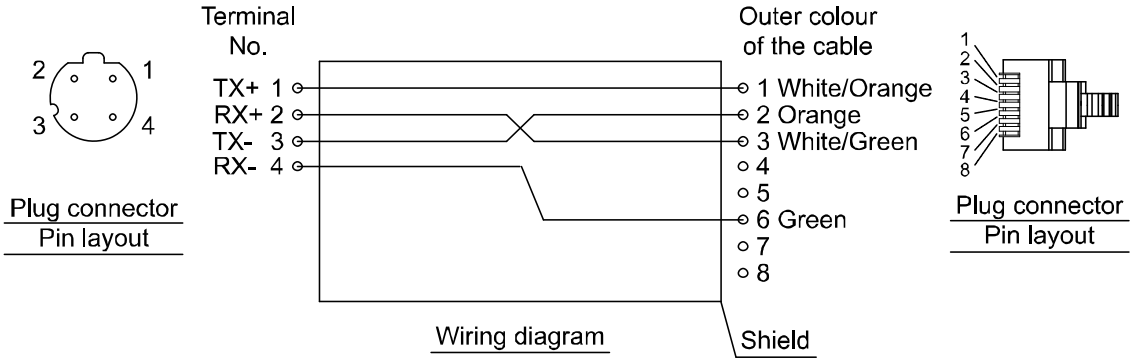
Cable length (L) ● ● Connector specification

010	1 m
020	2 m
030	3 m
050	5 m
100	10 m

M12 RJ45



With M12 socket connector
EX9-AC□EN-PSRJ



Plug connector Pin layout

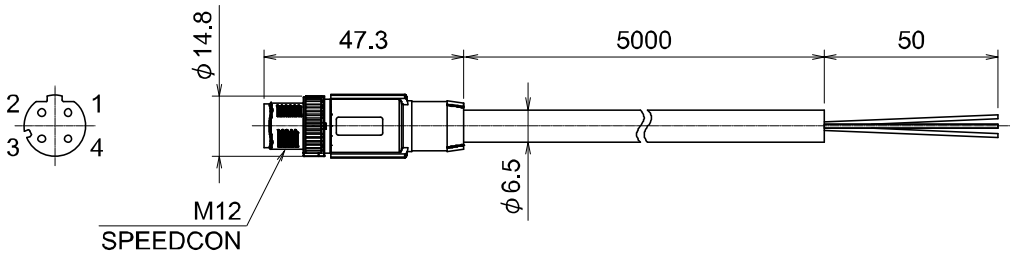
Wiring diagram

Plug connector Pin layout

Item	Specifications
Cable O.D.	ϕ6.7 mm
Min. bending radius	34 mm

How to Order: PCA-1446566

- Cable specification
  With M12 plug connector (one side): 5 [m]



M12 plug connector
PCA-1446566

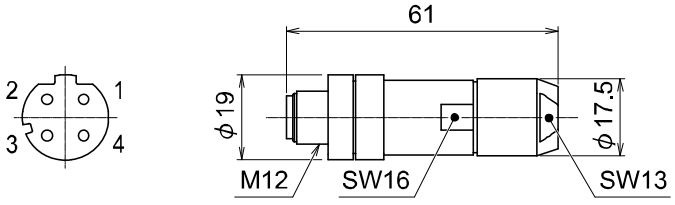
Item	Specifications
Cable O.D.	ϕ6.5 mm
Nominal cross section	AWG22
Wire diameter (Including insulator)	1.5 mm
Min. bending radius	45.5 mm

Pin No.	Cable color: Signal
1	Yellow: TX+
2	White: RX+
3	Orange: TX-
4	Blue: RX-

(2) Assembly type communication connector for Ethernet

How to Order: PCA-1446553

- Connector specification
  M12 plug connector



Applicable cable

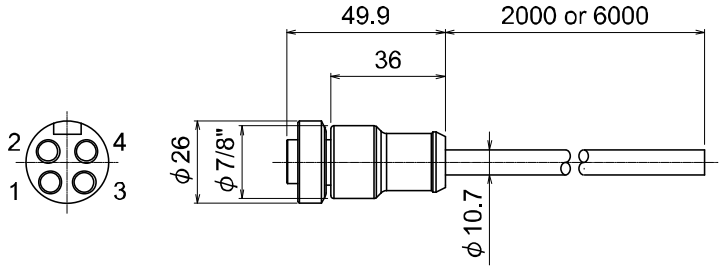
Item	Specifications
Cable O.D.	ϕ4.0 to 8.0 mm
Electric wire cross section (Twist line)	AWG26 to 22

(3) Cable with 7/8 inch connector for power supply.

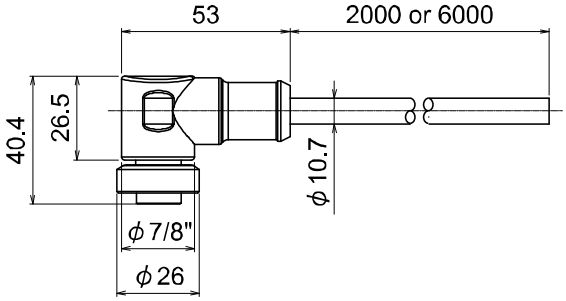
How to Order: PCA-1415999

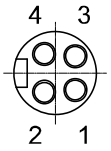
Cable specification

1415999	Straight: 2 m
1415996	Straight: 6 m
1416000	Angle: 2 m
1415997	Angle: 6 m



Straight connector type
2 m: PCA-1415999
6 m: PCA-1415996





Angled connector type
2 m: PCA-1416000
6 m: PCA-1415997

Item	Specifications
Cable O.D.	10.7 mm
Nominal cross section	AWG16
Min. bending radius	94 mm (when fixed)

Pin No.	Cable color: Signal
1	Red: 24 VDC (For solenoid valves)
2	Green: 24 VDC (For input and control)
3	White: 0 V (For input and control)
4	Black: 0 V (Solenoid valve)

(4) Branch cable with M12 connector

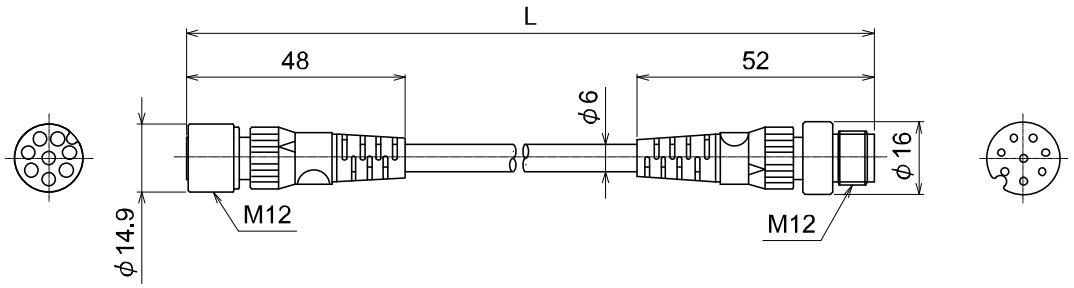
How to Order: EX500-AC 030 - SSPS

Cable length (L)

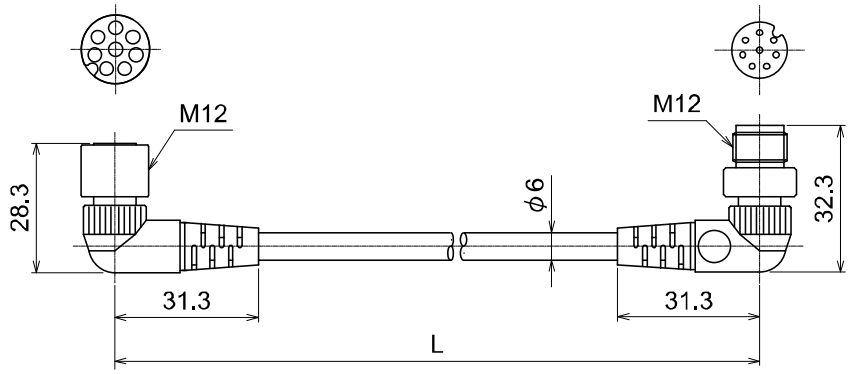
003	0.3 m
005	0.5 m
010	1 m
030	3 m
050	5 m
100	10 m

Connector specification

SSPS	Socket side: Straight, Plug side: Straight
SAPA	Socket side: Angled, Plug side: Angled



Straight connector type
EX500-AC□-SSPS



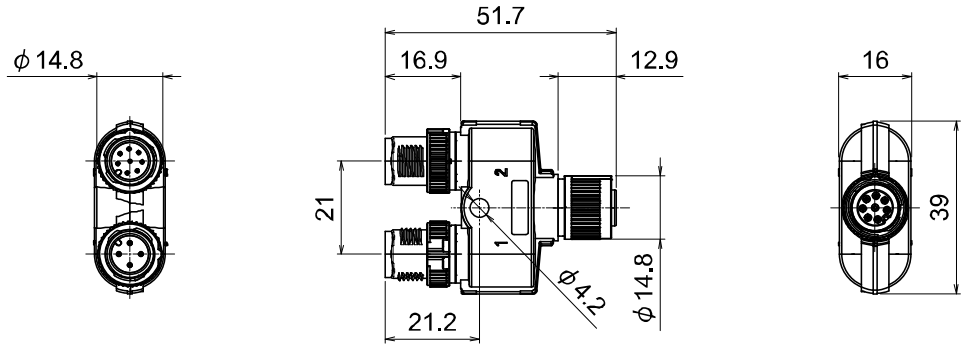
Angled connector type
EX500-AC□-SAPA

L = 300, 500, 1000, 3000, 5000, 10000 (mm)

Item	Specifications
Cable O.D.	ø6 mm
Min. bending radius	40 mm (When fixed)

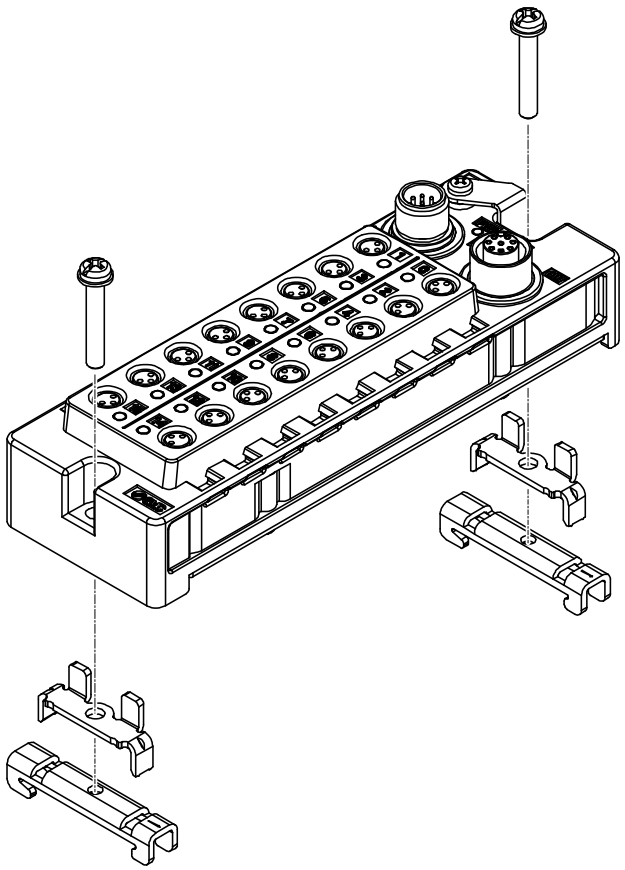
(5) Y branch connector
Connector to provide a separate power supply to SI unit valve.

How to Order: EX500-ACY01-S



(6) DIN rail bracket (2 pcs.)
Bracket for mounting the input unit (EX500-DXPA, EX500-DXPB) to DIN rail.

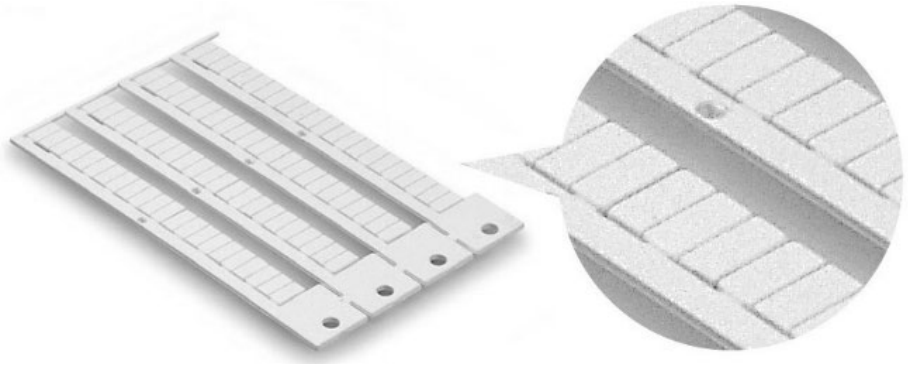
How to Order: EX500-ZMA1



Example: EX500-DXPA

(7) Marker (1 sheet, 88 pcs.)
The signal name of the input device and unit address can be written on the marker, and can be installed to each unit.

How to Order: EX600-ZT1

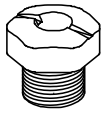


(8) Seal cap
Mount the seal cap in the unused ports of the GW unit and input unit.
IP65/67 is satisfied by using the seal cap properly.
(The seal cap is provided with each product.)

How to Order: EX9-AW□

Connector specification

ES	M8, connector (for socket): 10 pcs.
TS	M12, connector (for socket): 10 pcs.



NOTE
Tighten the seal caps to the tightening torque specified.
(For M8: 0.05 Nm, M12: 0.1 Nm)

Revision history
A: Contents are added. B: Contents revised in several places [May 2024]

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