No.EX※※-OMX1001

Operation Manual

PRODUCT NAME

SI unit for EtherNet/IP™

MODEL / Series / Product Number

EX260-SEN2-X205

SMC Corporation

Table of Contents

Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage.
These instructions indicate the level of potential hazard with the labels of "Caution", "Warning" or "Danger".
They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)*1), and other safety regulations.

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

⚠ **Caution**	**Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
⚠ **Warning**	**Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
⚠ **Danger**	**Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

⚠ Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results.

The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product.

This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.

The product specified here may become unsafe if handled incorrectly.

The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.

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

Safety Instructions

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

Limited warranty and Disclaimer/Compliance Requirements

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

Limited warranty and Disclaimer

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

Compliance Requirements

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

Operator

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

■Safety Instructions

⚠Warning

■Do not disassemble, modify (including changing the printed circuit board) or repair.
An injury or failure can result.

■Do not operate 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 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

•When conformity to UL is required, the SI unit should be used with a UL1310 Class 2 power supply.

•The SI unit 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.
IP67 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.

∗Environment

•Select the proper type of protection according to the environment of operation.
If using in an environment that is exposed to water splashes, please take measures such as using a cover.

•Do not use in a place where the product could be splashed by oil or chemicals.
If the product is to be used in an environment containing oils or chemicals such as coolant or cleaning solvent, even for a short time, it may be adversely affected (damage, malfunction etc.).

•Do not use the product in an environment where corrosive gases or fluids could be splashed.
Otherwise damage to the product and malfunction can result.

•Do not use in an area where surges are generated.
If there is equipment 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 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.
•The surface on the product may be hot.

∗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.

Model Indication and How to Order

EX260-SEN 2 -X205

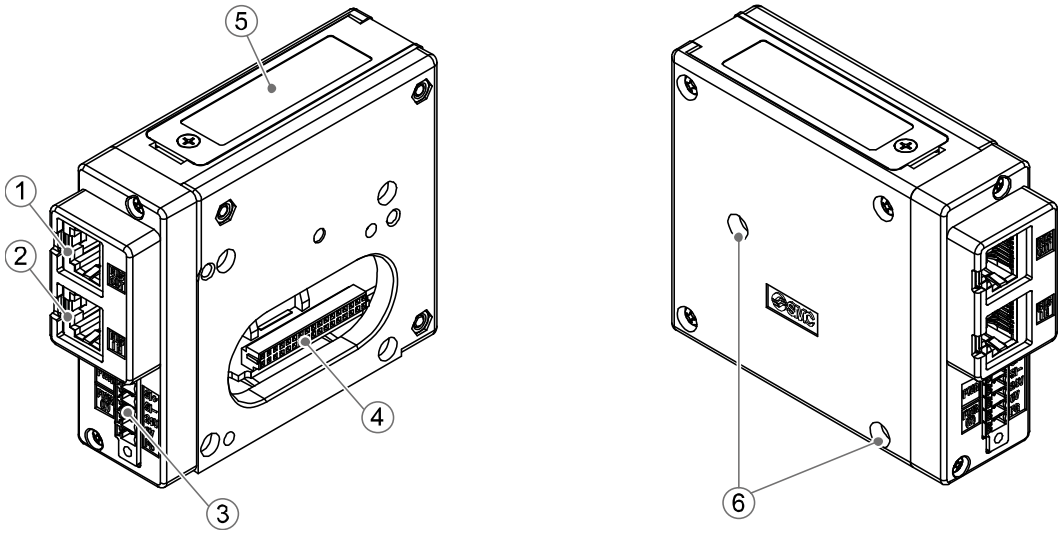
Output specification

2	32 outputs, NPN (positive common)/sink

Fieldbus

EN	EtherNet/IP™

Summary of Product parts



No.	Element	Description
1	Fieldbus interface connector (BUS OUT)	EtherNet/IP™ connection. (BUS OUT) (RJ45 connector)
2	Fieldbus interface connector (BUS IN)	EtherNet/IP™ connection. (BUS IN) (RJ45 connector)
3	Power supply connector	Power supply with load voltage for valves and operating voltage for SI unit.
4	Output connector	Output signal interface for valve manifold.
5	LED display	LED display to indicate the status of the SI unit. *1
6	Mounting hole	Mounting hole for connection to the valve manifold.

Accessories

Hexagon socket head cap screw	2 pcs. M3 x 30 screw for connection to the valve manifold.
Seal cap	1 pc. seal cap for unused fieldbus interface connector (BUS OUT).
Power supply connector	1 pc. connector for power supply.

*1: Refer to page 16 for the "LED Indication and Settings".

■Definition and terminology

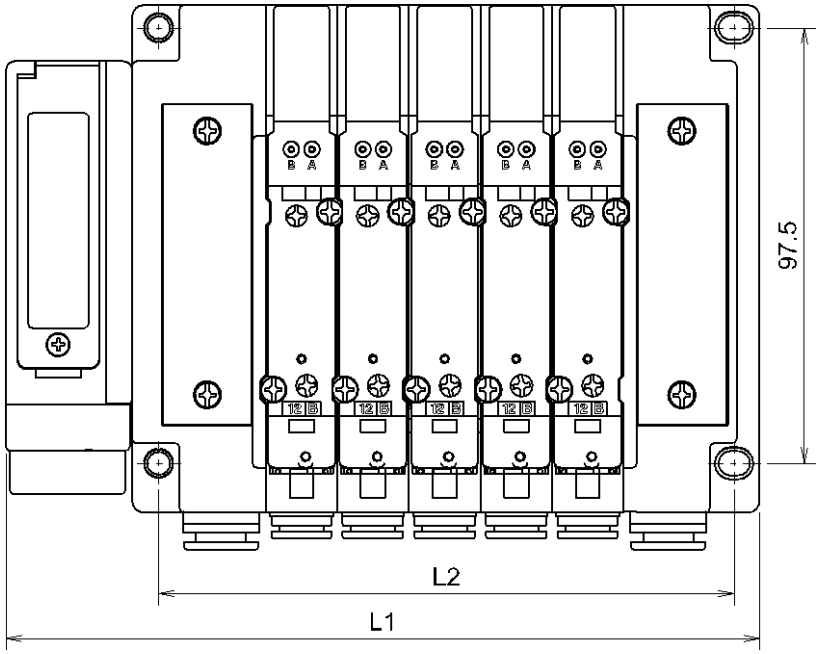
	Terms	Meaning
100	100BASE-TX	Standard of LAN transmission line with communication speed of 100 Mbps.
A	AD value	The signal from the analogue input device is converted to digital, and displayed in decimal and hexadecimal. These hexadecimal and decimal values are also outputted to the analogue output device.
	Auto negotiation	The function that automatically optimizes the communication speed and method between the Ethernet devices.
C	Current consumption	The current necessary to operate each unit.
D	DHCP	The protocol which automatically set the information such as IP address which needs to be registered in order to use the network. Those information are set to each equipment which are connected to TCP/IP network.
	DIN rail	A metal rail conforming with DIN (German) standard.
	DLR	An abbreviation for Device Level Ring: Performs a fast switching of the communication route when any problem occurs with the Ring network, to maintain communication.
E	EDS	Settable attribute information of a device (each parameter's object address, etc.) stored on external disk.
	Enclosure (IP□□)	Abbreviation of international (ingress) protection. A standard related to the protection from external objects (hands, steel ball, steel wire, dust, water, etc.) applied to the product.
F	Fieldbus	The protocol that uses digital communication to exchange signals between field equipment (instruments and actuators) running on site and a PLC.
	Full duplex	Communication system that can send and receive data at the same time bi-directionally
H	Half duplex	Communication system that sends and receives data in one direction at a time.
I	IP address	A 32 bit digit sequence which is assigned to identify devices which are connected to the network.
M	MAC address	A unique number inherent to all devices which are connected to EtherNet/IP™.
	Manifold	A form consisting of multiple components. A form made by combining multiple components
N	NPN output	The output type that uses an NPN transistor to operate output device. It is also known as a positive common type since a positive potential is applied to the power supply common line.
	Number of outputs	The number of points that can operate output device (solenoid valve)
P	PLC	Abbreviation of programmable logic controller. A digital computer used for automation of electromechanical processes.
	PNP output	The output type that uses a PNP transistor to operate output device. It is also known as a negative common type since a negative potential is applied to the power supply common line.
Q	QuickConnect™	The function that reduces the time from the power being supplied to the equipment operating and communication starting.
S	SI unit	Abbreviation of serial interface unit. A unit connected to a PLC to communicate input and output data.
T	Topology	Connection configuration of the network

Installation and Wiring

■Installation

Connect valve manifold to the SI unit.

•Dimensions for installation



n: number of valve stations

L \ n	1	2	3	4	5	6	7	8
L1		120.7	136.7	152.7	168.7	184.7	200.7	216.7
L2		80	96	112	128	144	160	176
L \ n	9	10	11	12	13	14	15	16
L1	232.7	248.7	264.7	280.7	296.7	312.7	328.7	344.7
L2	192	208	224	240	256	272	288	304

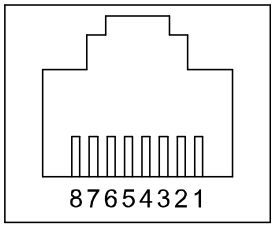
(mm)

The above table shows dimensions as an example for the SY5000 series valve manifold.
Refer to the valve manifold section in the valve catalogue for valve manifold dimensions.

■Wiring

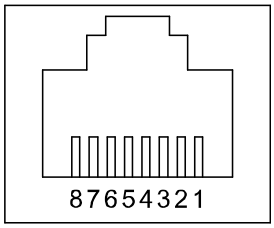
Select the appropriate cables to mate with the connectors mounted on the SI unit.

○Fieldbus interface connector layout



BUS OUT: RJ45 8-pin socket

No.	Designation	Description
1	Tx+	Transmit Data +
2	Tx-	Transmit Data -
3	Rx+	Receive Data +
4	-	-
5	-	-
6	Rx-	Receive Data -
7	-	-
8	-	-

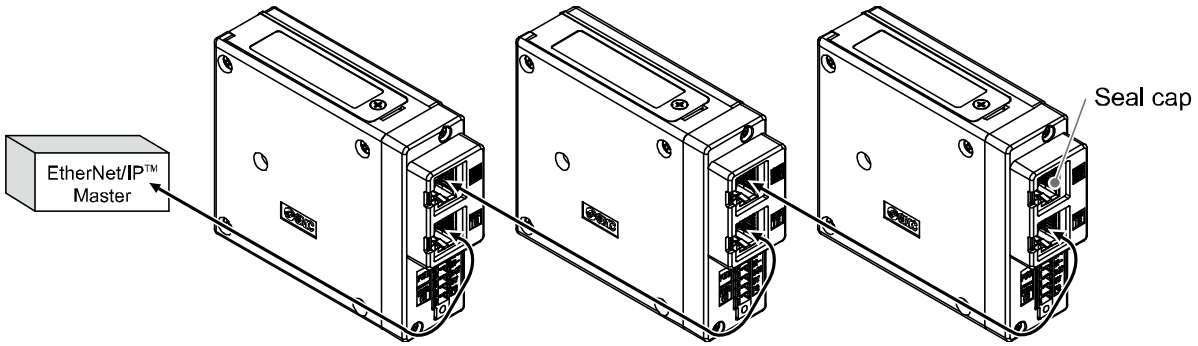


BUS IN: RJ45 8-pin socket

No.	Designation	Description
1	Tx+	Transmit Data +
2	Tx-	Transmit Data -
3	Rx+	Receive Data +
4	-	-
5	-	-
6	Rx-	Receive Data -
7	-	-
8	-	-

- Use only plugs conforming to FCC standards.
- Shielded Ethernet cable is recommended.

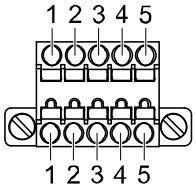
Connect the "BUS IN" connector to the upstream device (PLC etc.) and connect the "BUS OUT" connector to the downstream device.



NOTE

- Be sure to fit a seal cap on any unused connectors.
  The seal cap prevents foreign matter from entering into the product.

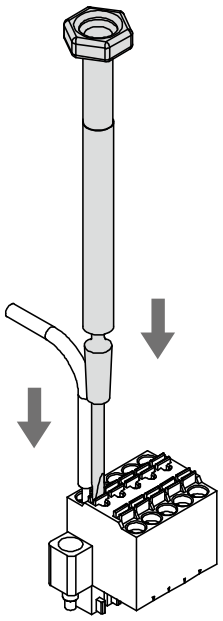
○Power supply connector layout

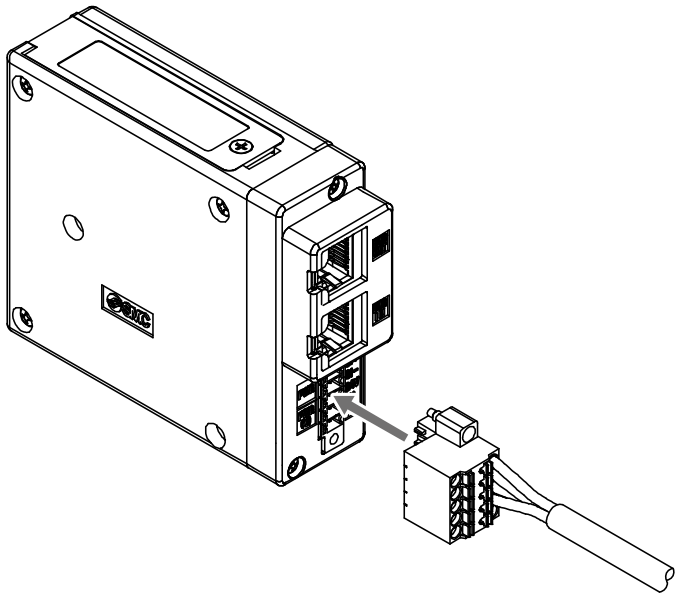


PWR: 5-pin socket

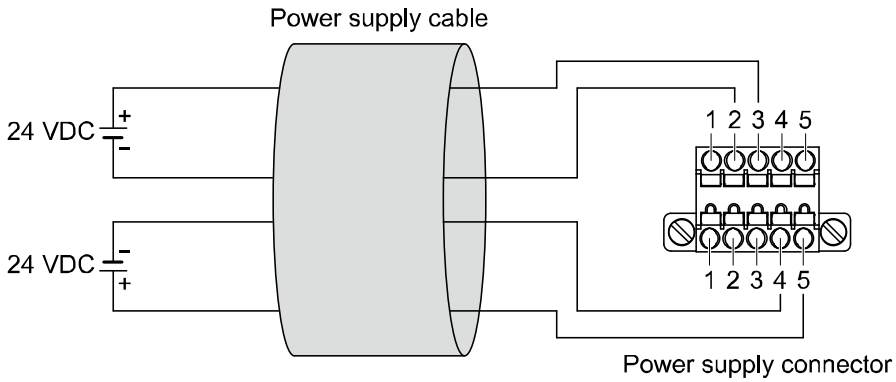
No.	Designation	Description
1	FG	Function earth
2	0 V	0 V for solenoid valve
3	24 V	+24 V for solenoid valve
4	SI-	0 V for SI unit operation
5	SI+	+24 V for SI unit operation

The power supply connector included as an accessory can be used to supply the power.
Applicable wire for the power supply connector is AWG24 to AWG16 (0.2 to 1.5 mm^2).
Tighten the connector flange with a tightening torque of 0.2 to 0.3 Nm.

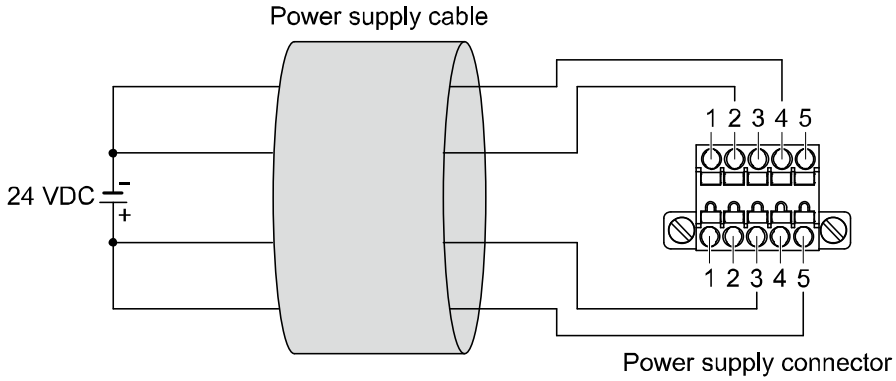




Power-supply line for solenoid valve and power-supply line for SI unit operation are isolated.
Be sure to supply power, respectively.
Either single-source power or two different power supplies can be used.



A. Two different power supply

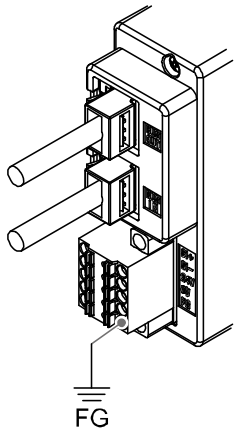


B. Single-source power supply

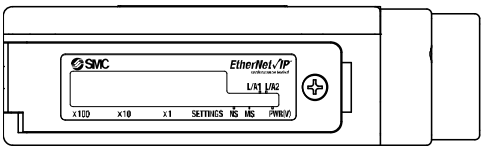
∗: Pay attention not to exceed the tolerance range of power supply voltage.

○Ground terminal

Connect the ground terminal to ground.
Resistance to ground should be 100 ohms or less.



LED Indication and Settings



○LED indication

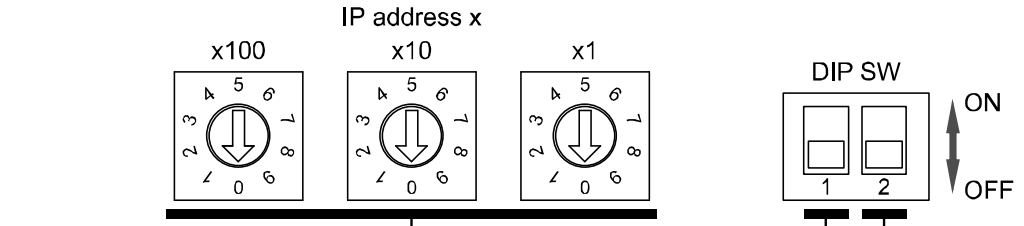
NS MS L/A1 L/A2 PWR(V)

LED	LED Status	Description
NS	OFF	The SI unit operating voltage is not supplied or the IP address is not set.
	Green ON	EtherNet/IP™ communications established.
	Green flashing	EtherNet/IP™ communications not established.
	Red flashing	EtherNet/IP™ communications time out.
	Red ON	IP address duplicated.
MS	OFF	The SI unit operating voltage is not supplied.
	Green ON	Operating normally.
	Green flashing	Either of the following conditions are detected. •The unit has not been configured correctly. •The master is idle state.
	Red flashing	Recoverable error.
	Red ON	Unrecoverable error.
L/A1	OFF	BUS IN side: No Link, No Activity
	Green ON	BUS IN side: Link, No Activity
	Green flashing	BUS IN side: Link, Activity
L/A2	OFF	BUS OUT side: No Link, No Activity
	Green ON	BUS OUT side: Link, No Activity
	Green flashing	BUS OUT side: Link, Activity
PWR(V)	Yellow ON	Load voltage for the valve is supplied
	OFF	Load voltage for the valve is not supplied or is outside the tolerance range (19 V or less)

○Switch setting

The switches should only be set with the power supply turned off.

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



IP address
192.168. Y .[X]

Setting			X
x100	x10	x1	
0	0	0	Remote control *1
0	0	1	1
0	0	2	2
:	:	:	:
2	5	4	254
2	5	5	DHCP mode *2

Manual set up of IP address *3

*: The values of 256 or more are not used.

IP address
192.168.[Y]. X

Y	No.1	Description
1	ON	The IP address is set to "192.168.1.X".
0	OFF	The IP address is set to "192.168.0.X".

HOLD/CLEAR setting

HOLD/CLEAR	No.2	Description
HOLD	ON	Hold the last state before communication error.
CLEAR	OFF	Clear all outputs.

∗1: Remote control (IP Address X switch set to 000)

The mode to respond to the following commands of the BOOTP/DHCP Server, supplied by Rockwell Automation.

When receiving the IP address from the BOOTP/DHCP Server, please check the following points:

•The communication cable is not connected to the master unit.

•Power is not supplied to the master unit.

Enable DHCP

The IP address etc. can be obtained from the BOOTP/DHCP Server. If the power supply is switched off and on again in this state, the SI unit will obtain the IP address etc. again.

Disable BOOTP/DHCP

The IP address etc. cannot be obtained from the BOOTP/DHCP Server. If the power supply is switched off and on again in this state, the previous settings will be maintained.

∗2: DHCP mode (IP Address X switch set to 255)

The mode to obtain the IP address from the DHCP server. The IP address will be lost when the power supply is turned off.

When receiving the IP address from the BOOTP/DHCP Server, please check the following points:

•The communication cable is not connected to the master unit.

•Power is not supplied to the master unit.

∗3: Manual setting of IP address

Manual setting of the IP address within the range 192.168.0.1 to 254, or 192.168.1.1 to 254.

Default setting

The default settings are "Remote Control" and "Enable DHCP" mode.

NOTE

In Remote Control mode, if the EX260 IP address is unknown, change to DHCP mode and re-assign the correct IP address. When the DHCP server has assigned the correct address, turn off the power supply and return the unit to Remote control mode.

Upon power-up, the EX260 will now be available using the address that was set whilst in DHCP mode.

Hardware Configuration

■EDS file and icon

The compatible EDS file is required to configure the SI unit within an EtherNet/IP™ network.
Please download the latest EDS file from the SMC website (URL https://www.smcworld.com).

∗: The method of installing the EDS file depends on the configuration software, so please refer to the configuration software manual.

EDS file

	Product number	File name	Contents (EDS file and icon)
1	EX260-SEN2-X205	ex260_sen2_x205_24_v∗.zip	ex260_sen2_x205_24_v∗.eds, ex260-sen2-x205.ico

■Setting using RSLogix5000™

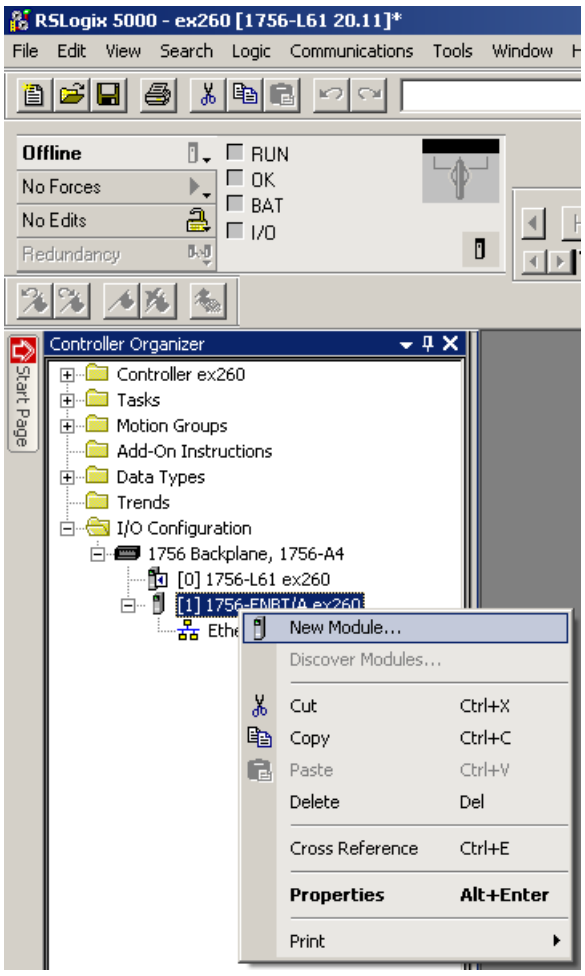
The method of connecting the SI unit with a Rockwell Automation EtherNet/IP™ (master) module is shown below. Refer to the RSLogix5000™ manual for further details.

∗: The screens shown below are based on using the Rockwell Automation RSLogix5000™ software.
RSLogix5000™ is a trademark of Rockwell Automation.

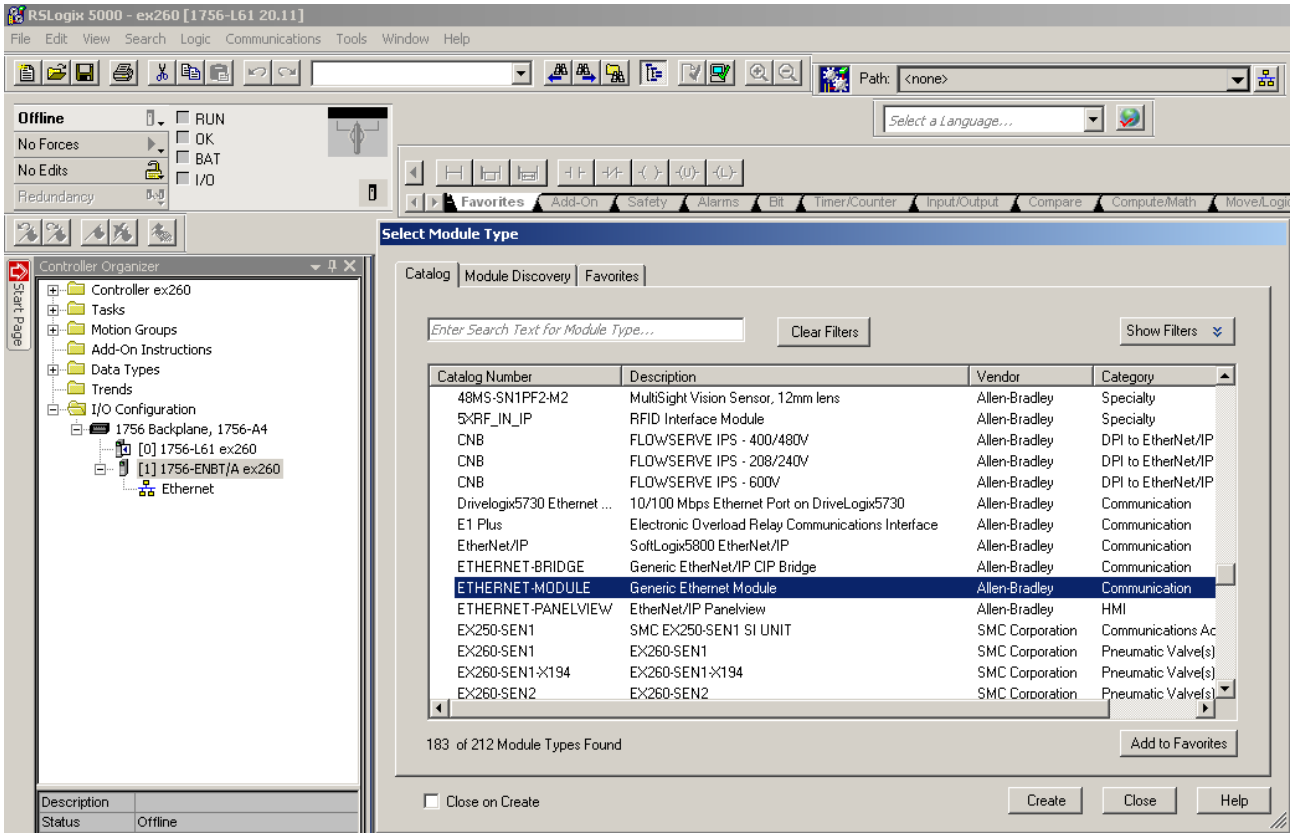
For RSLogix5000™, it is possible to perform settings without using the EDS file.

○Setting without using the EDS file

•Select the master in the [I/O Configuration] folder, and select [New Module].



•The Select Module Type screen will be displayed. Select [ETHERNET MODULE Generic Ethernet Module] and click on Create.



•The Module Properties screen will be displayed. Perform the various settings.

(1) Name: Input a unit name of your choice.

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

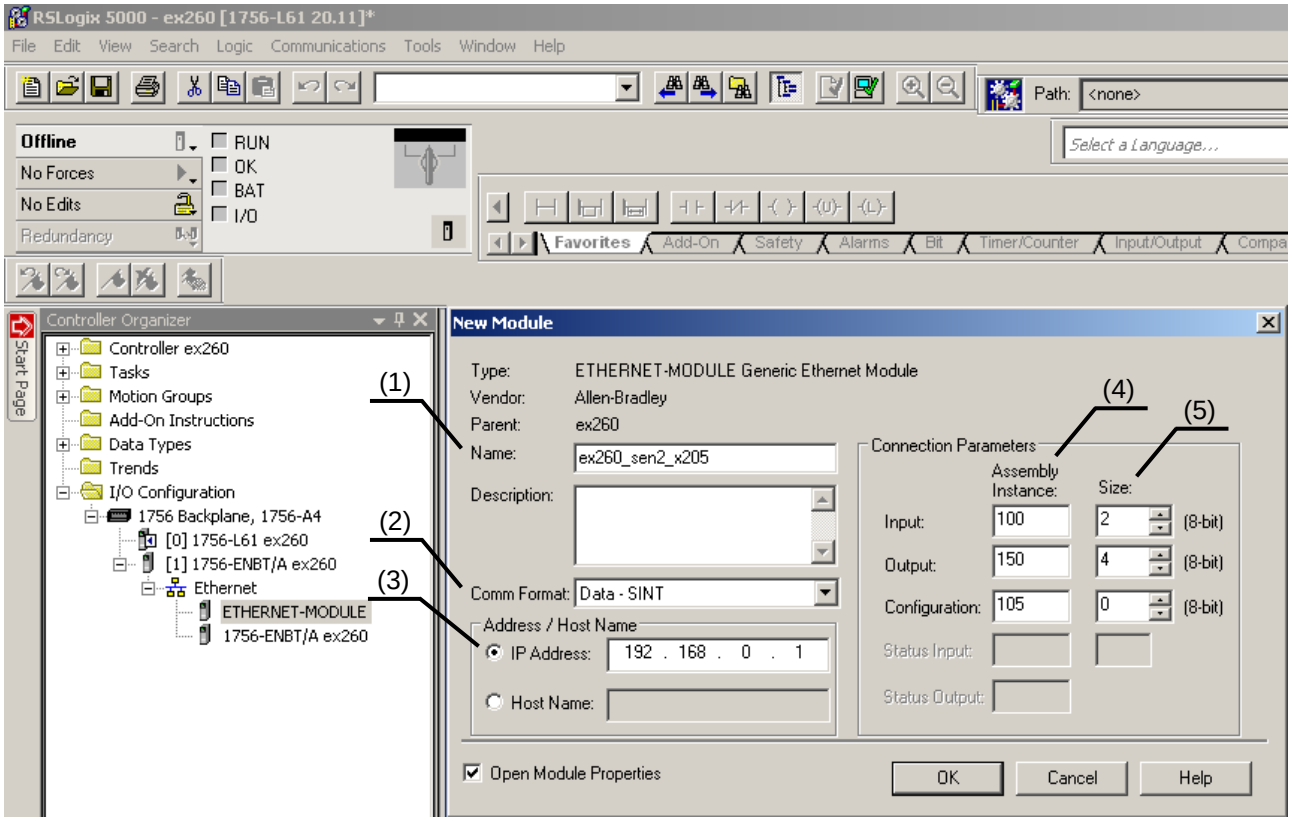
(3) IP Address: Input the IP Address of the SI unit.

(4) Assembly Instance: Set as follows:

Input	= 100
Output	= 150
Configuration	= 105

(5) Size: Set as follows:

Input	= 2 bytes (for Data-SINT)
	= 1 word (for Data-INT)
Output	= 4 bytes (for Data-SINT)
	= 2 words (for Data-INT)
Configuration	= 0

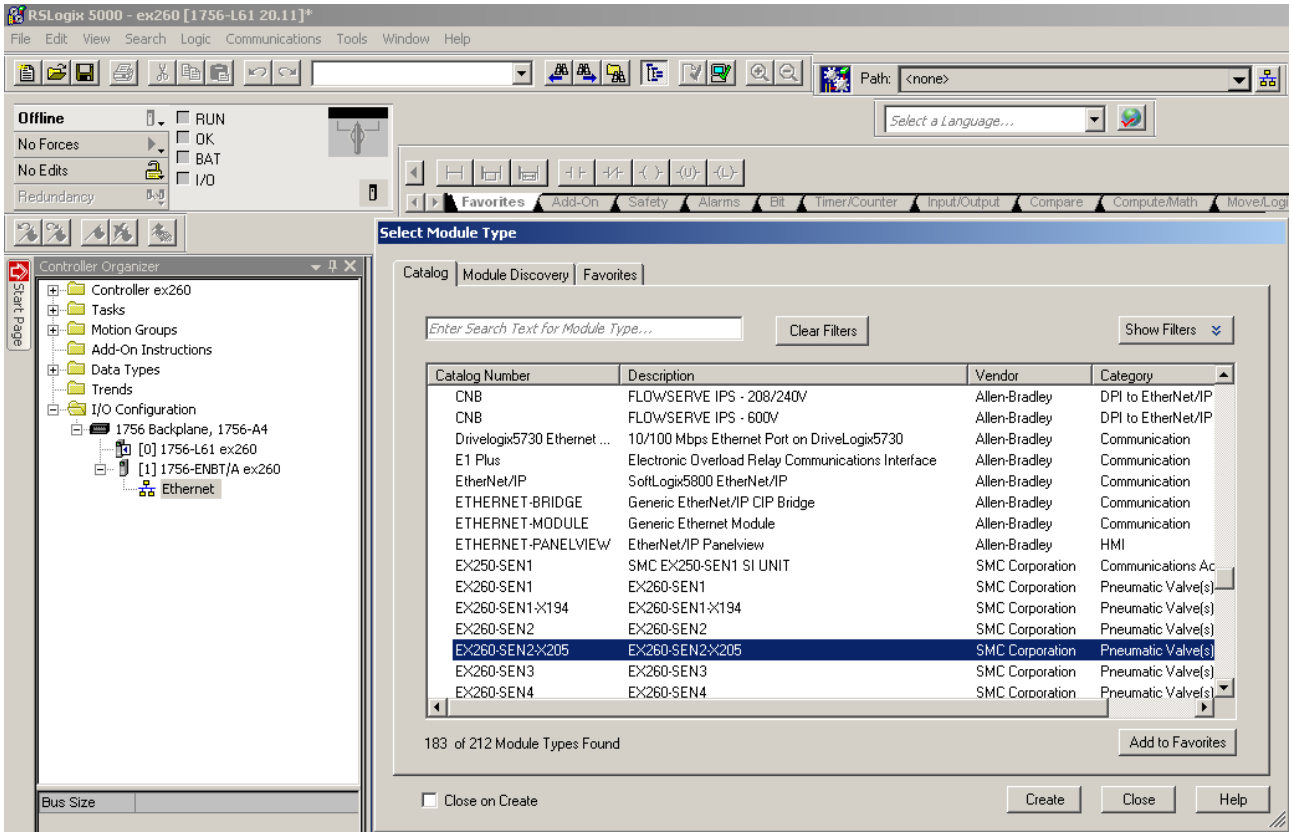


○Setting using the EDS file

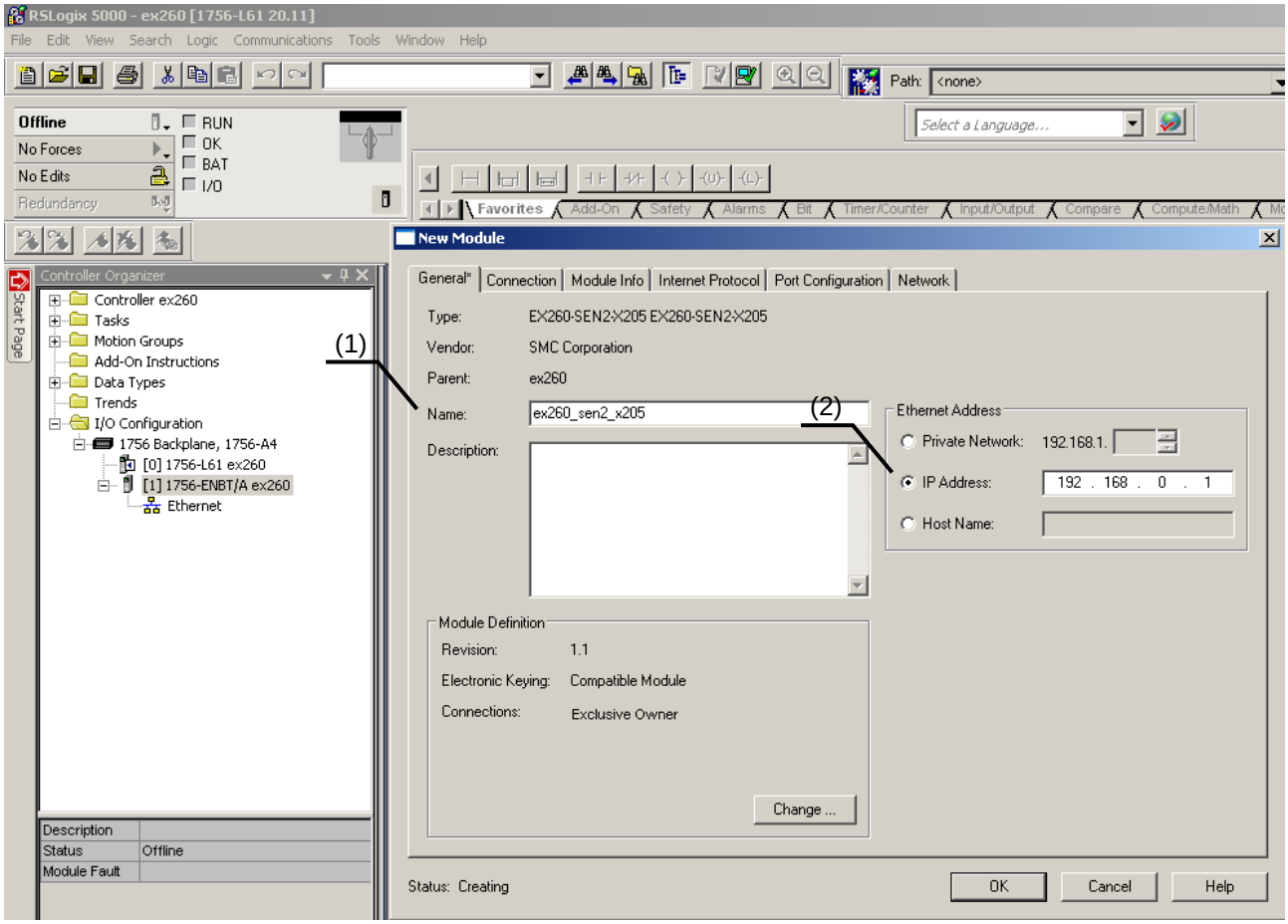
•Install in advance the EDS file using the Rockwell Automation software RSNetWorx™ for EtherNet/IP™. Refer to the Manual for RSNetWorx™ for EtherNet/IP™ for installation instructions.

∗: RSNetWorx™ is a trademark of Rockwell Automation.

When the EDS file is installed, the SI unit number will be added in the Select Module screen. Select the SI unit number to be used, and click the Create button.



•The Module Properties screen is displayed. Perform each setting.
(1) Name: Enter the desired unit name.
(2) IP Address: Enter the IP address that was set for the SI unit.



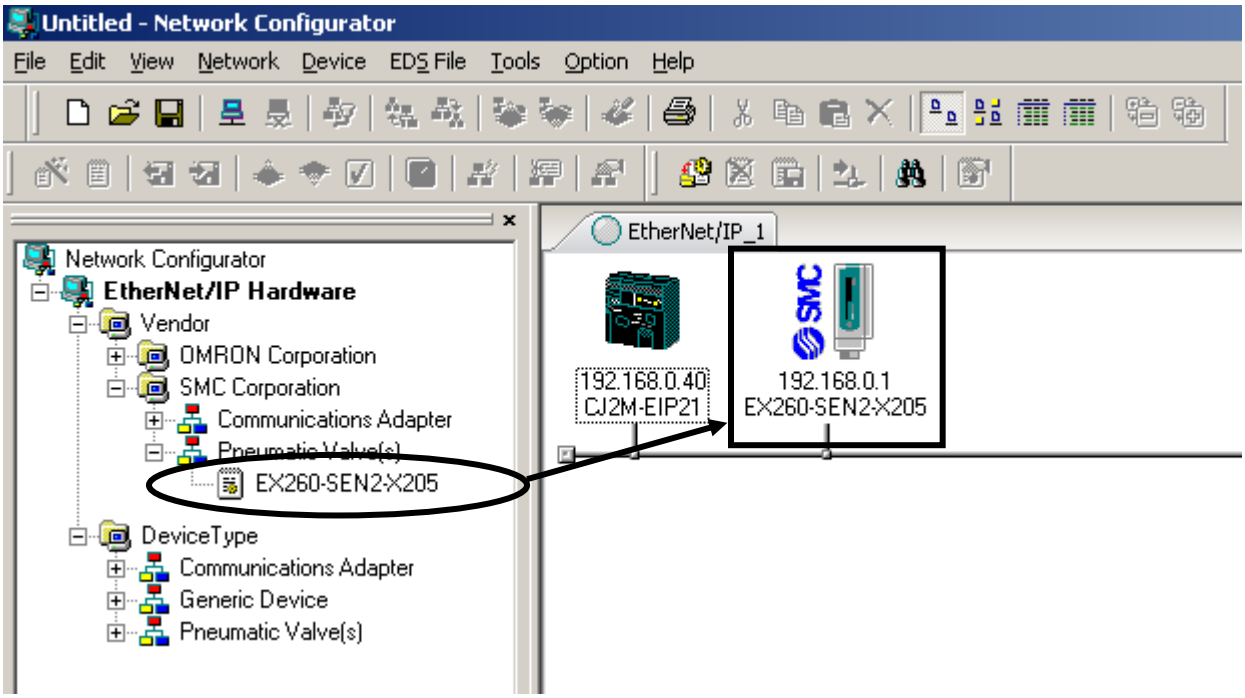
■Setting using Network Configurator *

Method to connect the SI unit to the OMRON EtherNet/IP™ module (master) is shown below.
Refer to the Operation Manual of the Network Configurator for the detailed operation.

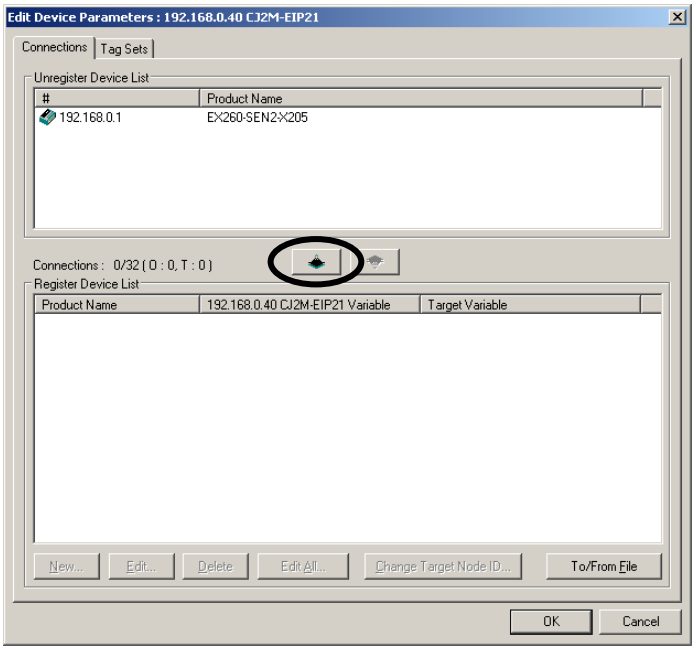
*: The drawing below shows the OMRONS software, Network Configurator.

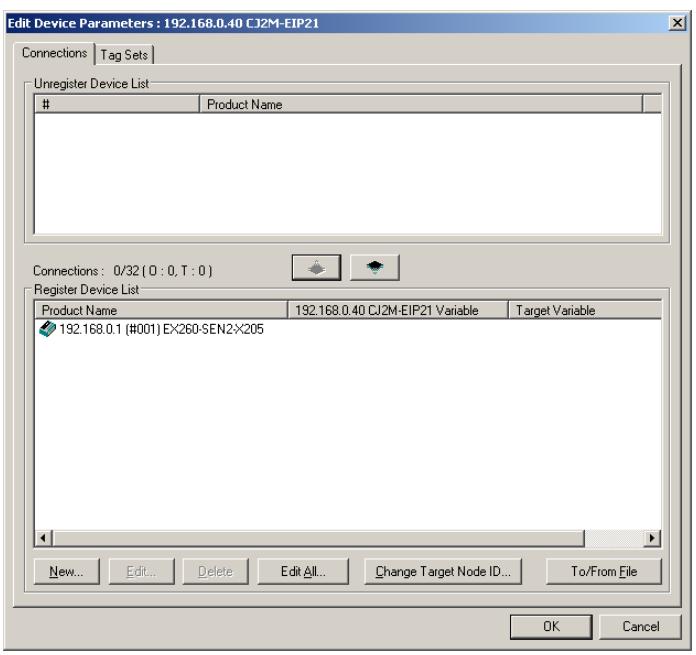
It is necessary to install the EDS file for the Network Configurator. Refer to the manual for the Network Configurator for installation instructions.

•Drag and drop the SI unit and master from the hardware list into the network window. Enter the IP address for each product.



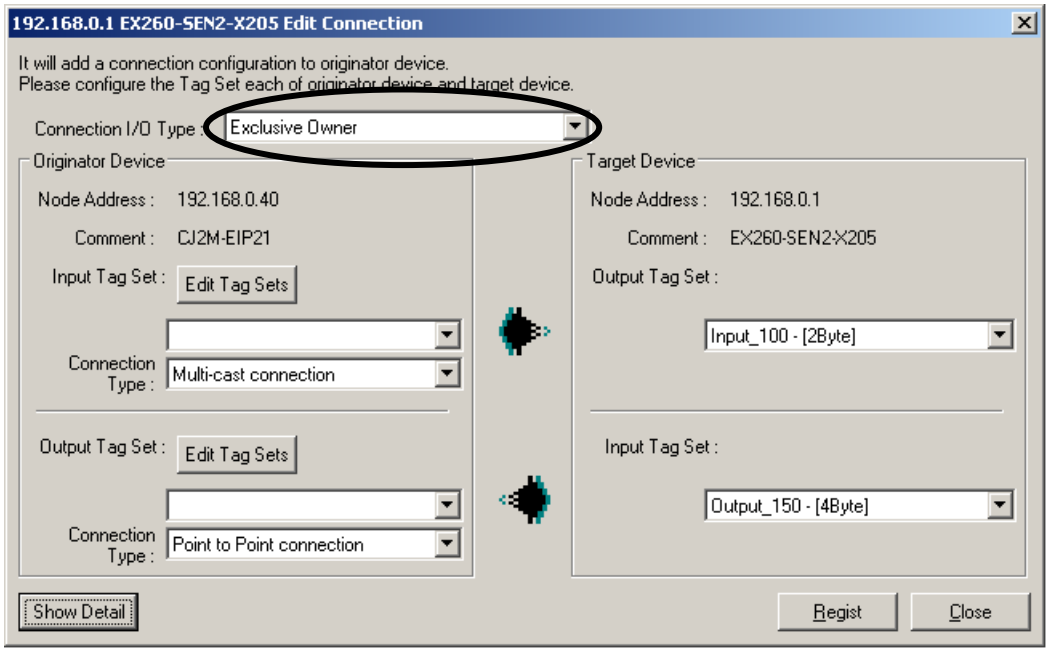
•Double-click on the icon of the master to open the Edit Device Parameter window, and move the SI unit from the [Unregister Device List] to the [Register Device List].

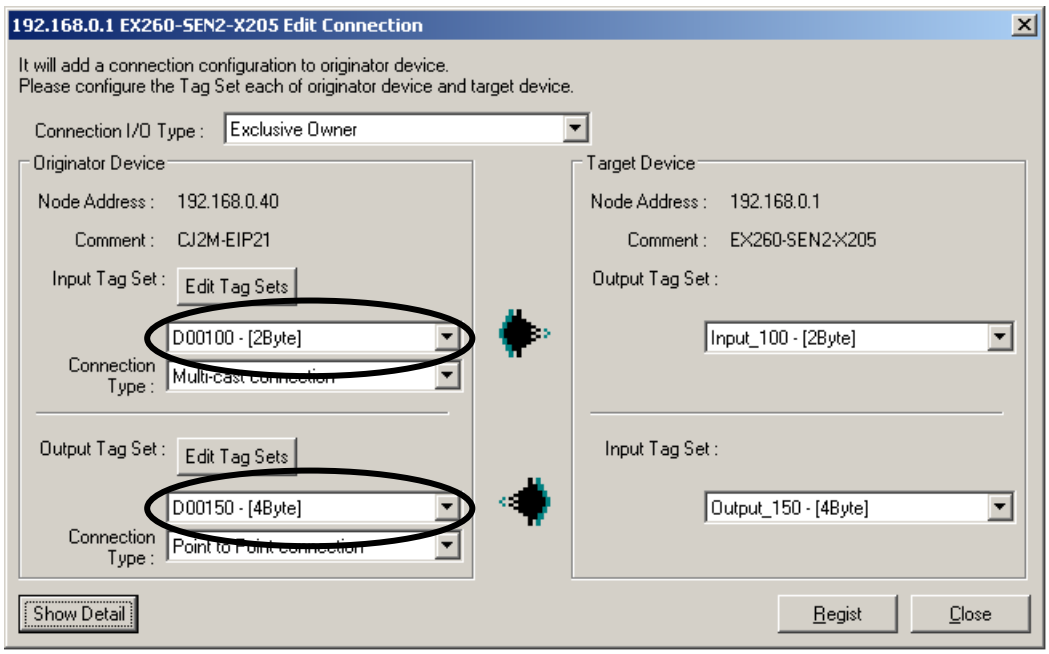


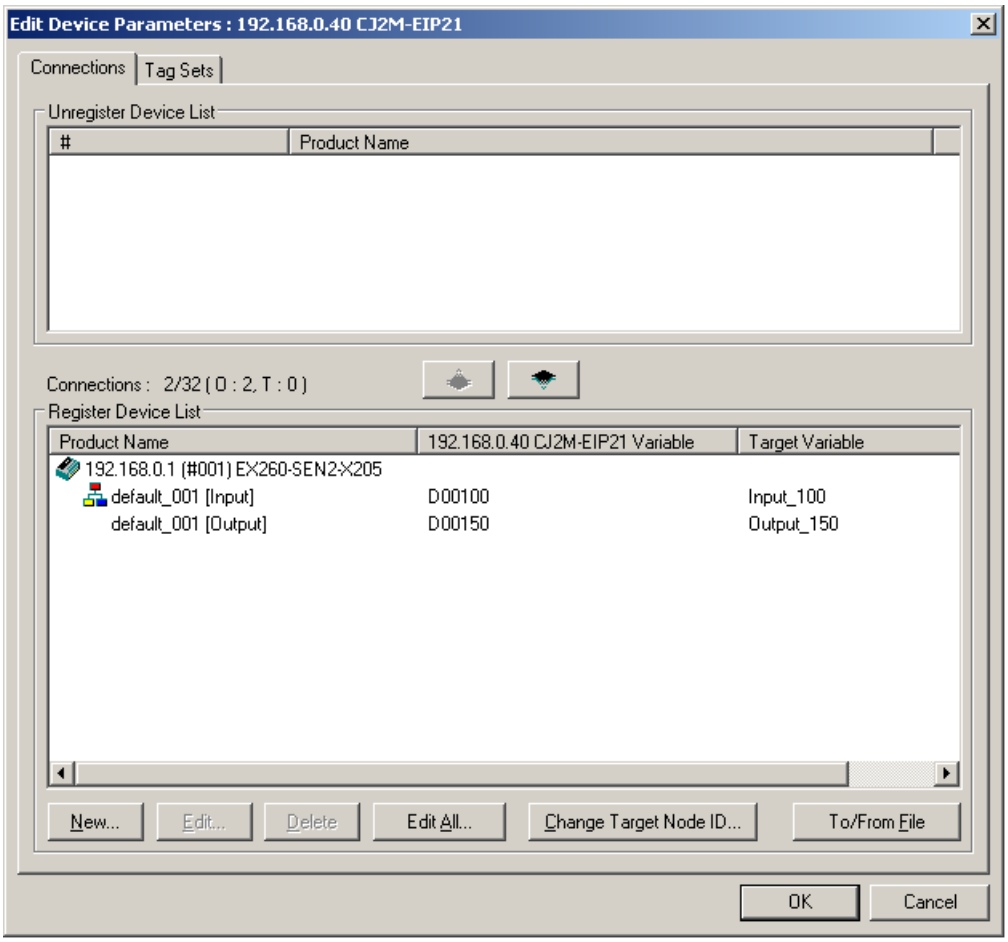


•Double click on the SI unit in the [Register Device List] to open the Edit Connection screen.
For [Connection I/O Type], select [Exclusive Owner]. For the Originator Device, select an arbitrary [Input Tag Set] and [Output Tag Set], with the same number of bytes as the [Output Tag Set] and [Input Tag Set] in the Target Device, and register the Input/Output connection.

Input size = 2 bytes
Output size = 4 bytes

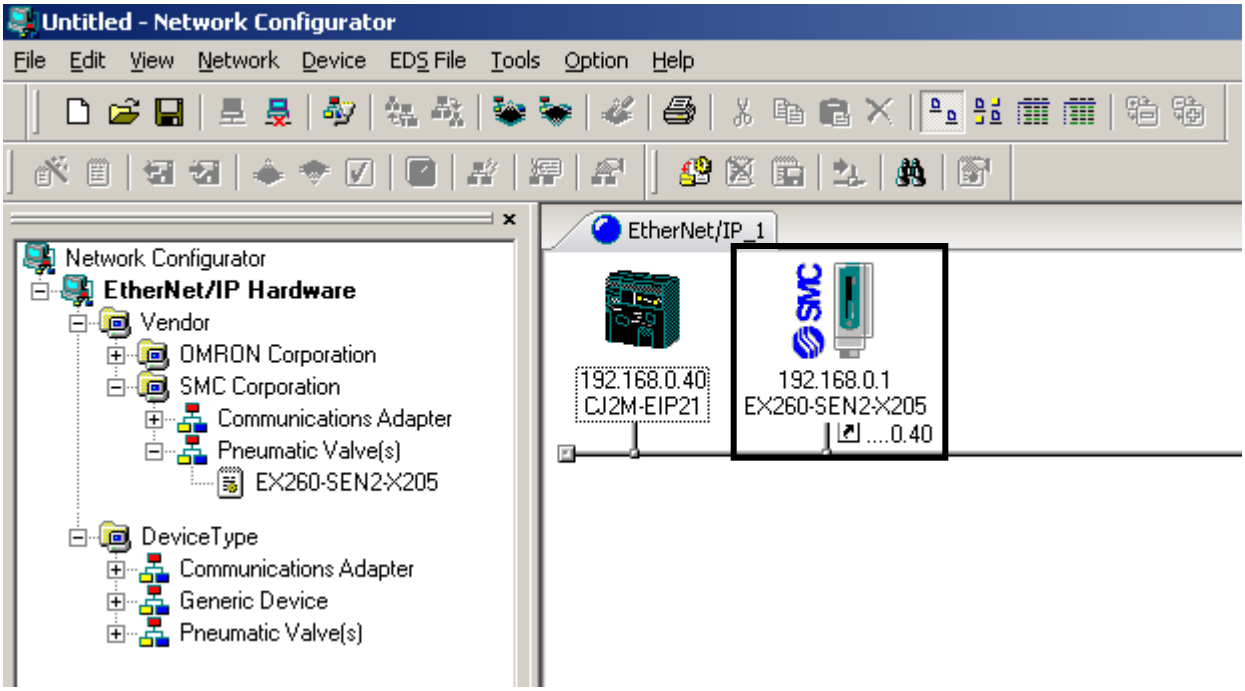






Example: Tag Set D00100 (2 bytes) to the Input, and D00150 (4 bytes) to the Output.

•If the allocation has been correctly completed, the registered IP address will be displayed with the SI unit icon in the network window.



■EtherNet/IP™ Device Level Ring (DLR) function

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

■EtherNet/IP™ QuickConnect™ function

This SI unit can be used as an EtherNet/IP™ compliant node for networks with the QuickConnect™ function.
To enable the QuickConnect™ function, it is necessary to perform the settings 1 to 3 to the SI units shown below.
After satisfying the conditions 1 to 3, 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 setting
   The IP address is set either using the manual setting of the IP address X/Y switch, or by remote control (with the IP address X switch set to "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
   Disable the auto negotiation (A - N) of the ports being used, and set the communication speed to 100 Mbps, and the communication method to full duplex. Change the EtherNet Link Object to the values shown below.
   Make sure the value is set to "01000000" when the QuickConnect™ function is not used.

   (1) BUS IN port setting

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

   (2) BUS OUT port setting

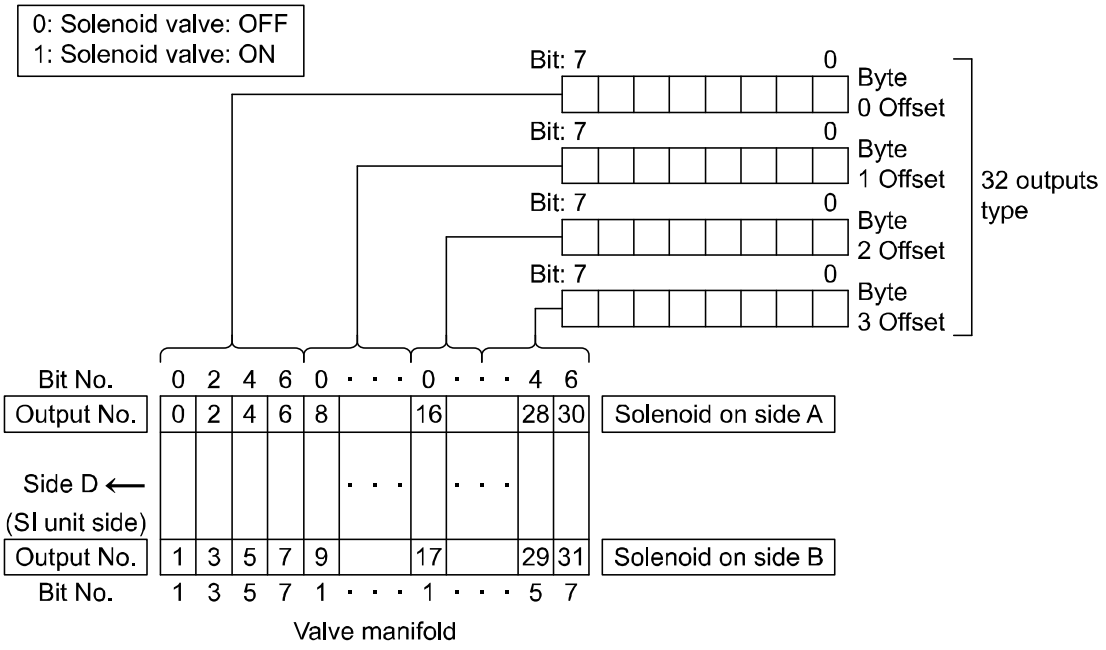
Class ID	Inst ID	Attr ID	Access Rule	Name	Semantics of Values	Quick Connect
F6h [EtherNet Link Object]	2h	6h	Get/Set	Interface Control	01000000 = A-N Enable (Default)	Not use
					02006400 = A-N Disable, Force 100 Mbps Full duplex	Use

3. Enabling the QuickConnect™ function
   Change the TCP/IP Object to the values shown below.
   Make sure the value is set to "0" when the QuickConnect™ function is not used.

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

○Output number assignment

Output data



∗: The output numbering refers to the solenoid position on the manifold and starts at zero.

∗: Standard wiring of the manifold is for double-solenoid valves and the output number starts at the A side and then B side in that order as shown in the figure a.
If a single-solenoid valve is mounted on the standard wiring manifold, the output number for the B side valve is skipped.

∗: Custom wiring for mixed mounting single-solenoid valves and double-solenoid-valves can be specified with a Wiring Specification Sheet. Example wiring is shown in the figure b.

∗: Bit status "0" and "1" in the data corresponds to solenoid valve status OFF and ON (0: OFF, 1: ON), and the output number starts at zero from LSB (least significant bit).

Fig.a

	No.	Station	No.	
Double	4	3	5	
Single	2	2	3	Free
Double	0	1	1	

Fig.b

	No.	Station	No.
Double	3	3	4
Single	2	2	-
Double	0	1	1

■Web server function

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

•Connection of SI unit and PC

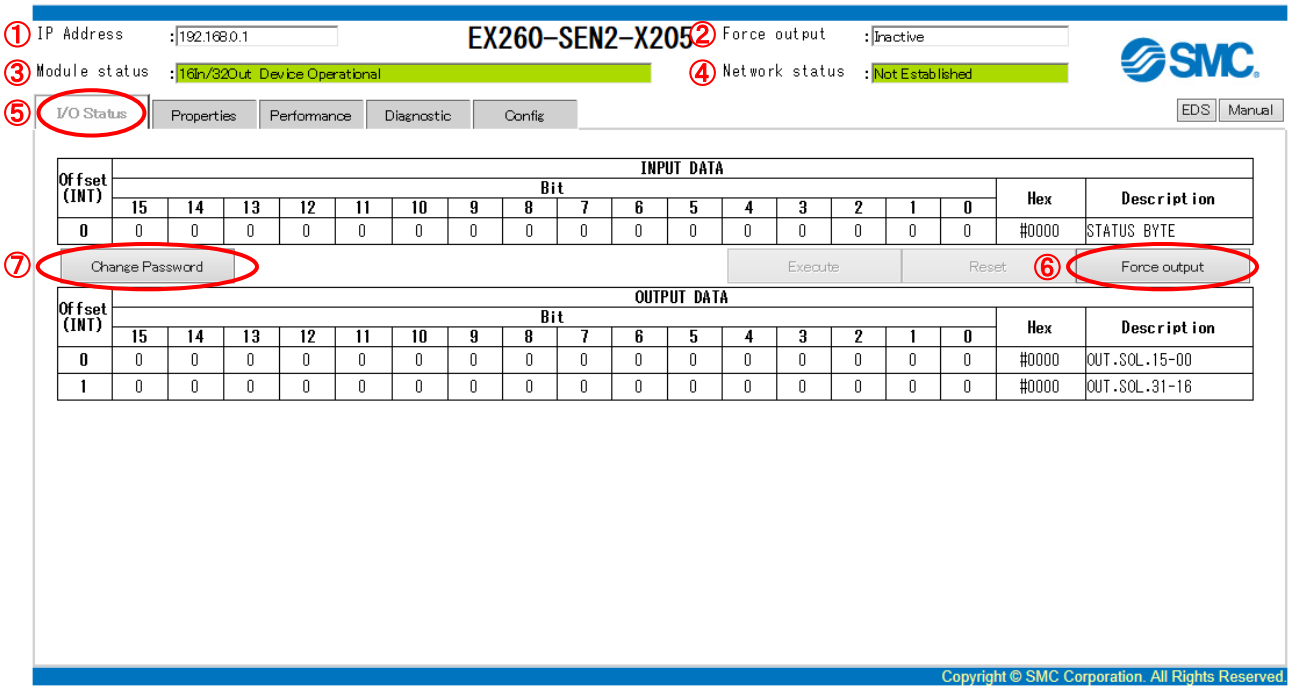
Connect SI unit and PC to the same Ethernet network, then start the Web browser on the PC.
The SI unit can be connected to the Web server by inputting SI unit IP address to the Web browser address bar.

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

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

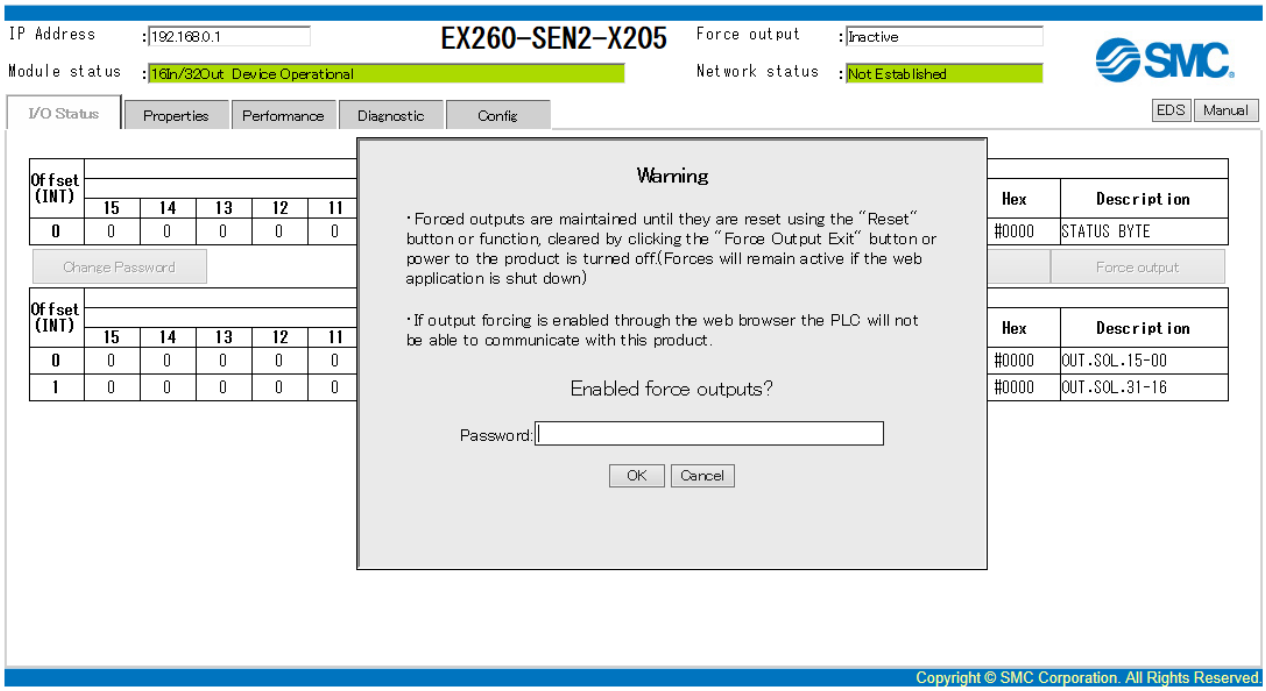
•Web server contents
Web browser screen when the Web server is connected is shown below.

<I/O Status tab>
Current SI unit I/O memory map is displayed.
Refer to page 30 for I/O memory map details.



No.	Item	Meaning
1	IP Address	IP address of SI 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	SI unit operating condition. 16 In/32 Out Device Operational: Normal operation
4	Network status	Displays the communication status of the SI 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	Force output	Select for force output mode.
7	Change password	Select for changing the password to enable changing to force output mode.

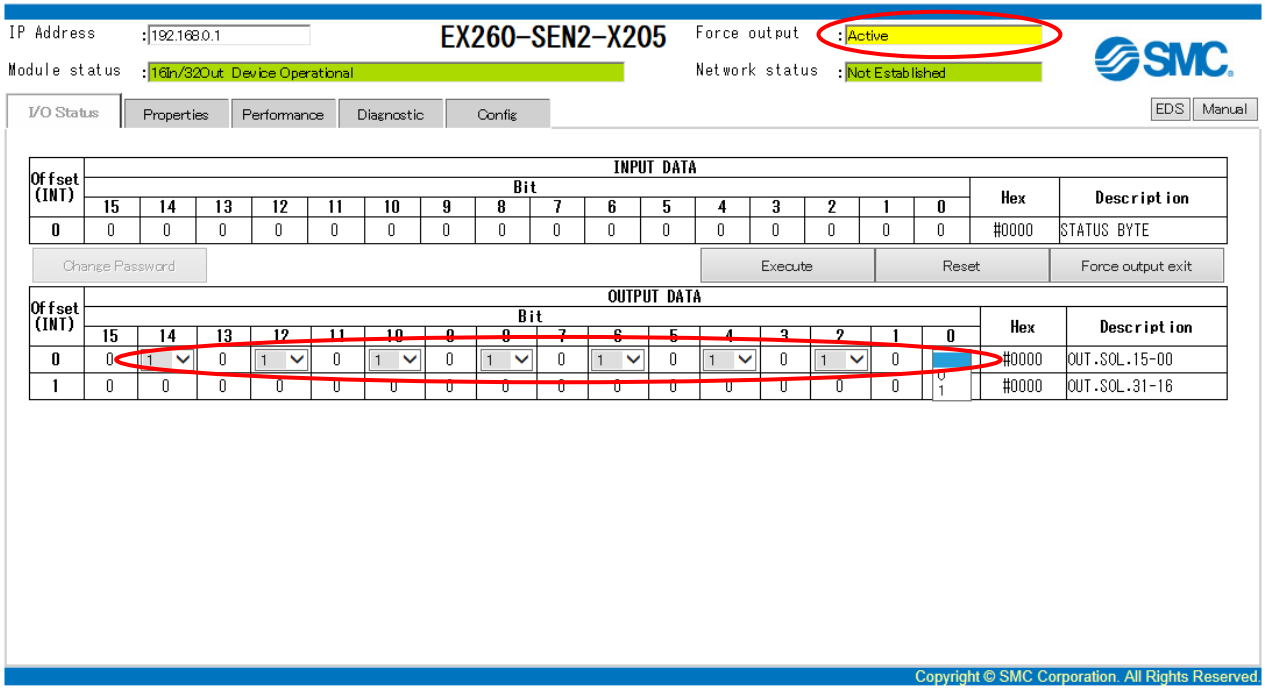
•Forced output mode
Procedure to change to forced output more and the method of forced output.
Warning and password input screen will appear by selecting the Force output button.
Force output space becomes active when the password entered is successful. The mode will be changed to force output mode.
Initial password is "SMCEX260".

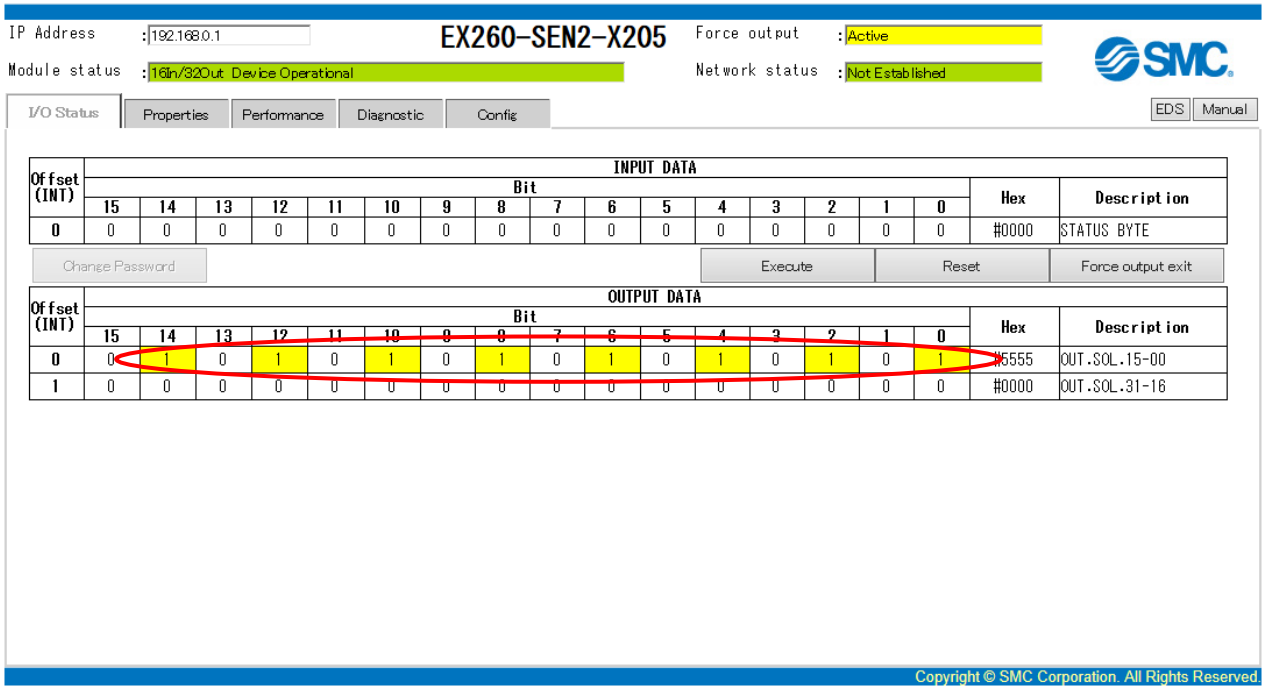


<CAUTION>
•Forced output is valid until selecting Reset or Force output exit.
Forced output is valid even if the network is shut down during forced output mode.
(Forced output is released when SI unit power supply is off.)
•While EtherNet/IP™ communication is established, the message below is shown and it is not possible to change to forced output mode.

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.



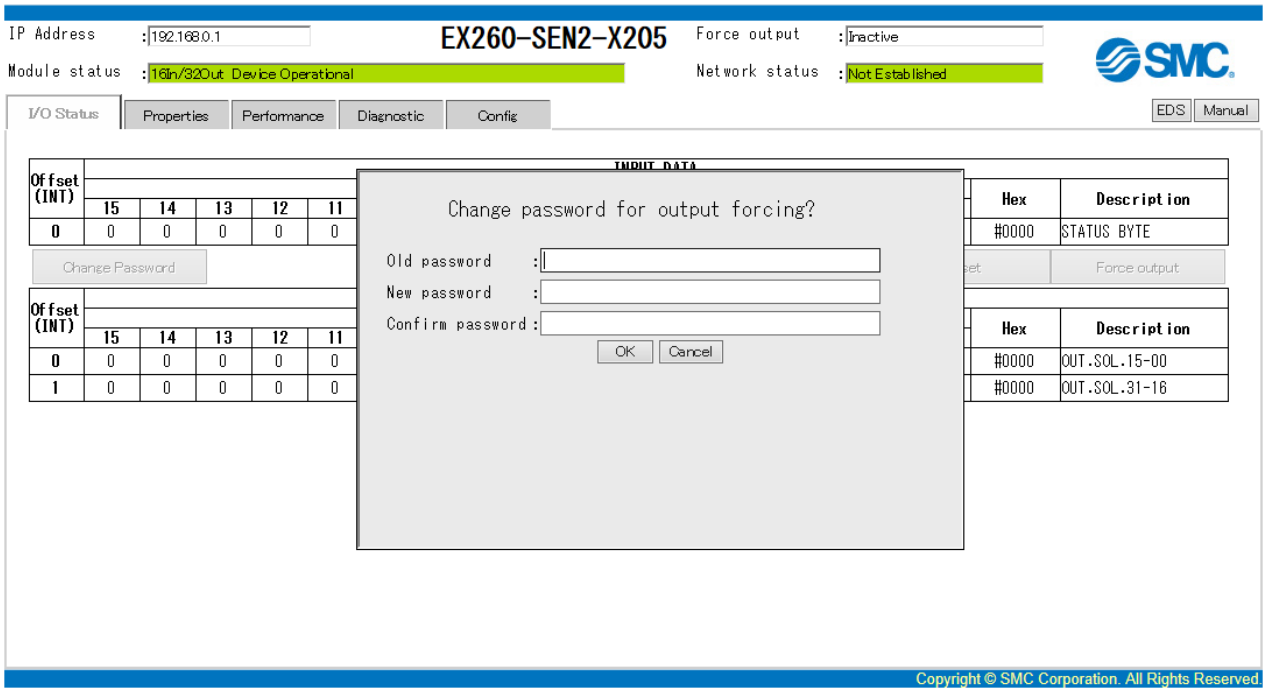


All output data can be cleared by selecting “Reset”.
Forced output mode is released by selecting “Force output exit“.
At this time, the output data is automatically cleared.

•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.



<CAUTION>

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

•Maximum number of characters for password is 16.

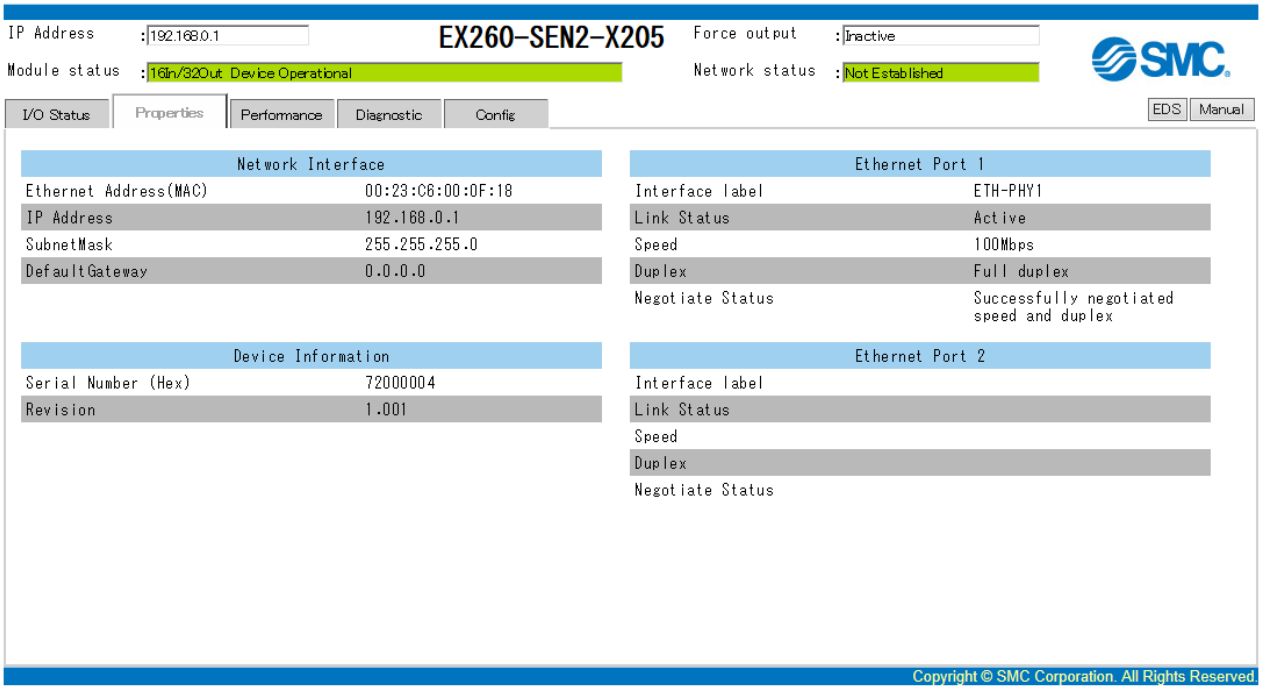
•Changed password must be strictly controlled.

•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)

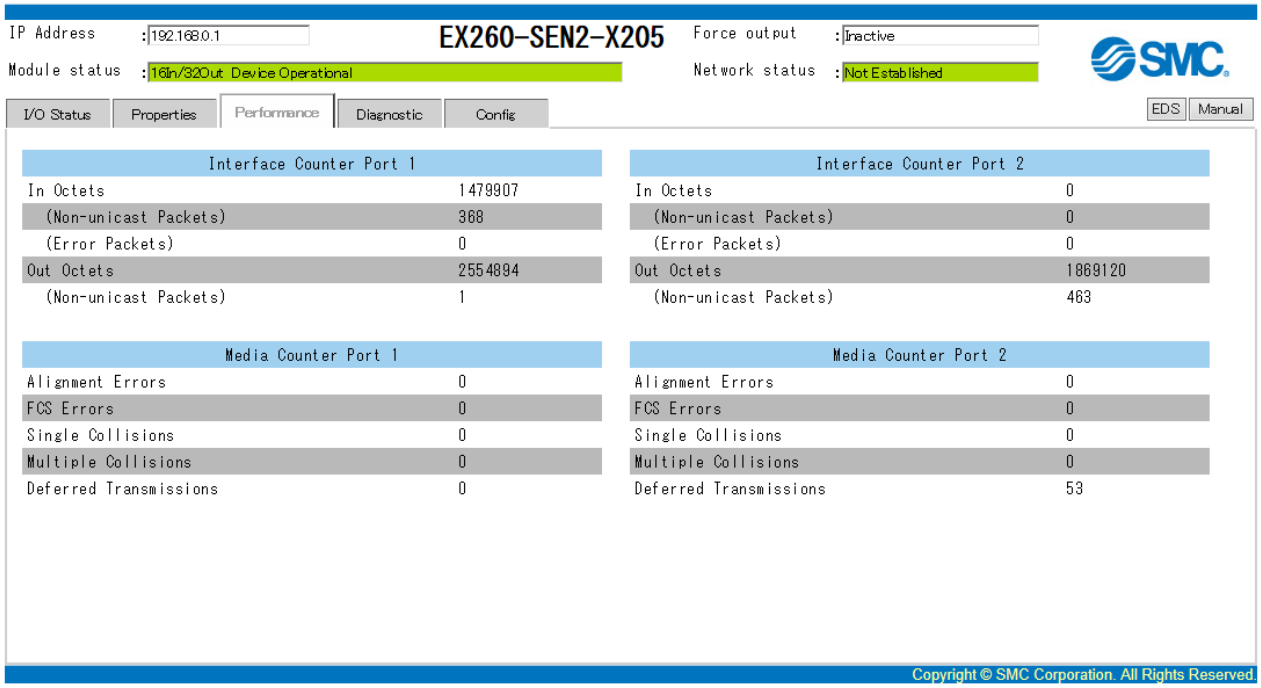
<Properties tab>

Network information including the SI unit MAC address and communication speed are displayed.



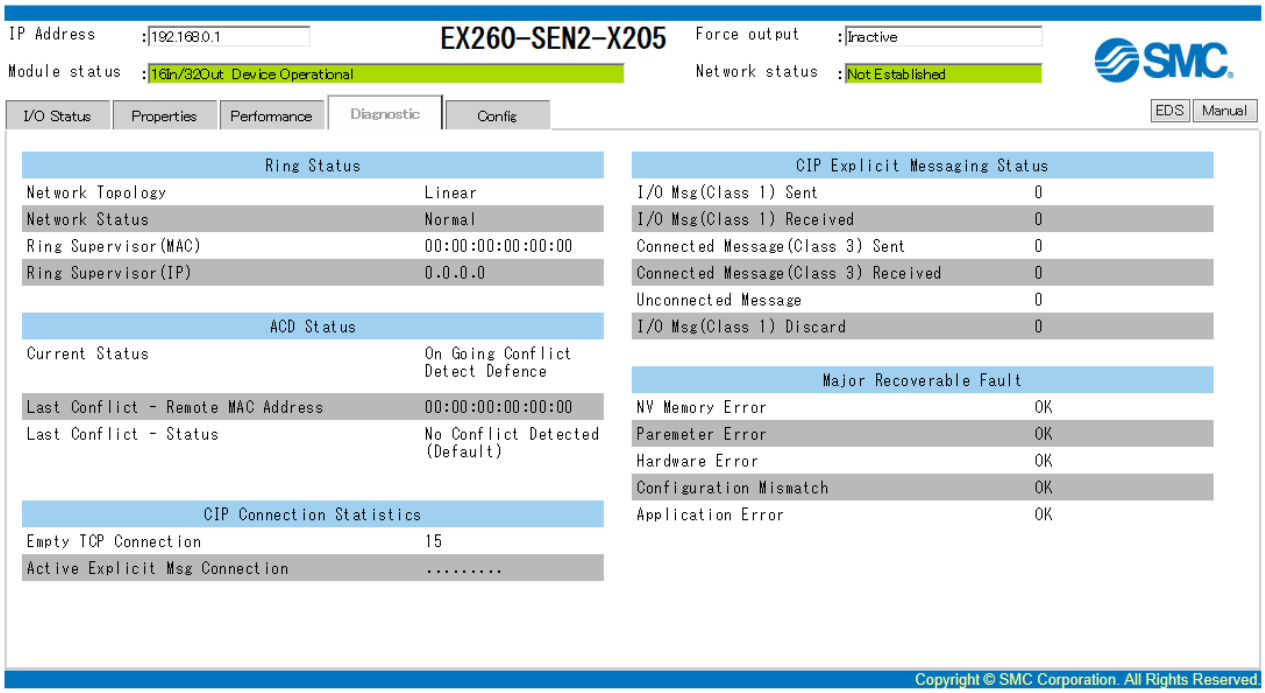
<Performance tab>

The EtherNet performance of the SI unit is displayed.



<Diagnostic tab>

The communication status of the SI unit is displayed.



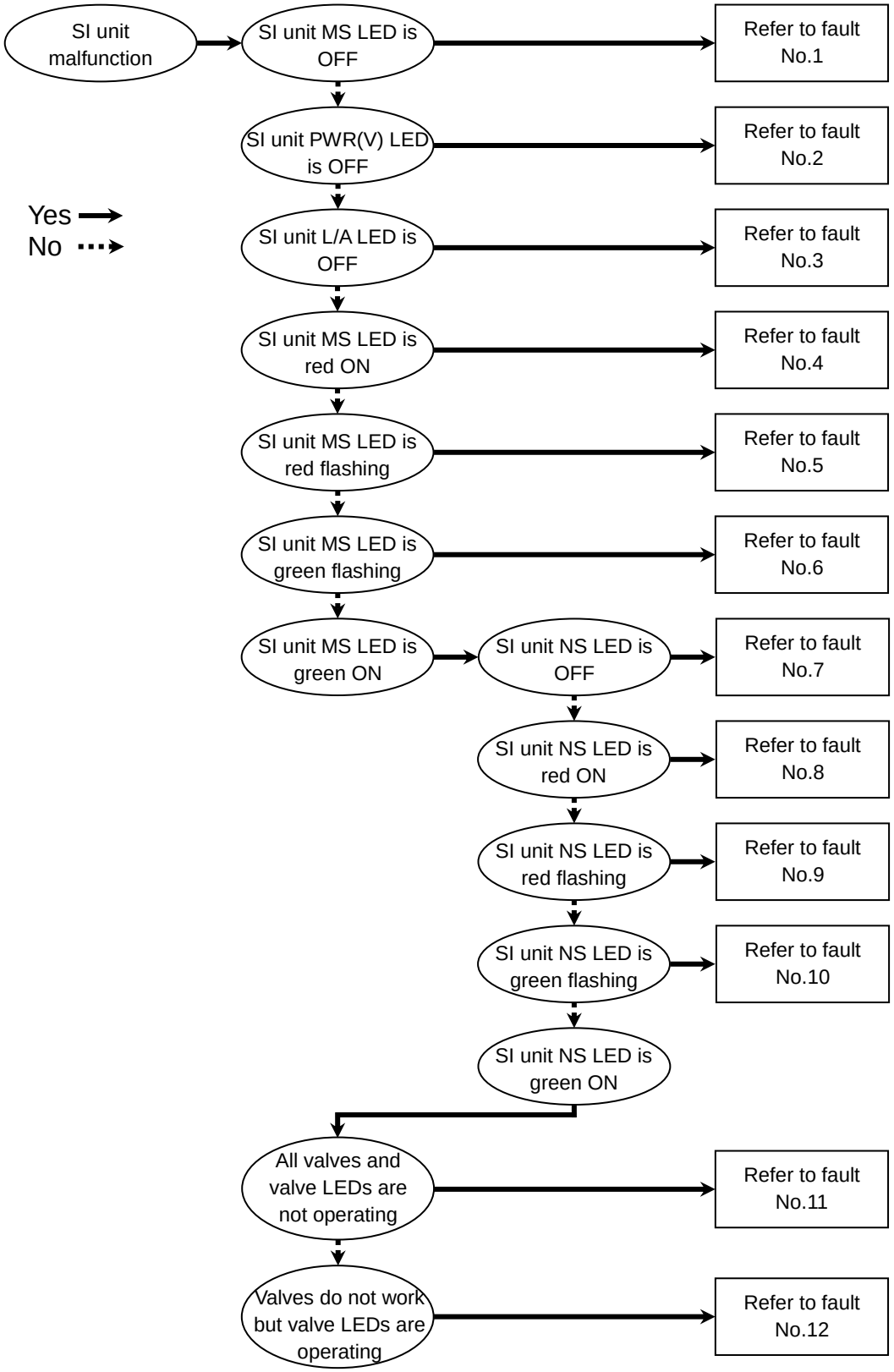
<Config tab>

The EtherNet/IP™ QuickConnect™ of the SI unit can be set using the Config tab.
Similarly, it can be set using the [QuickConnect™] function of the EtherNet/IP™ (page 29).
Please refer to page 29 for configuration.

Troubleshooting and Maintenance

○Troubleshooting chart

When any malfunction is observed, it is recommended to perform the following troubleshooting.



Troubleshooting table

Fault No.1

Fault	Probable cause	Recommended error handling	Recommended action
SI unit MS LED is OFF (Green/Red is OFF)	Defective power cable wiring for SI unit operation	Check the condition of the power cable wiring to the SI unit.	Re-tighten the power cable. (Replace the cable if it is broken)
			Correct the power cable wiring layout.
	SI unit operating voltage is not supplied	Check the condition of the supply voltage to the SI unit.	Supply 24 VDC ±10% to the SI unit.

Fault No.2

Fault	Probable cause	Recommended error handling	Recommended action
SI unit PWR(V) LED is OFF	Defective power cable wiring for the solenoid valve	Check the condition of the power cable wiring for the valve.	Re-tighten the power cable. (Replace the cable if it is broken)
			Correct the power cable wiring layout.
	Load voltage for the valve is not supplied	Check the condition of the supply voltage for the valve.	Supply 24 VDC +10%/−5% to the valves.

Fault No.3

Fault	Probable cause	Recommended error handling	Recommended action
SI unit L/A LED is OFF	EtherNet/IP™ communication error between the SI unit and the upstream EtherNet/IP™ device.	Check the status of the upstream EtherNet/IP™ device.	Supply power to the upstream EtherNet/IP™ device.
		Check the BUS IN side communication cable connections and check for broken wires.	Tighten the communication cable connection. (Replace the cable if it is broken)
		Check that there are no high voltage cables or equipment that generates noise around the communication cable and SI unit.	Take measures to keep the communication cable and SI unit away from noise sources.

Fault No.4

Fault	Probable cause	Recommended error handling	Recommended action
SI unit MS LED is red ON	Failure of SI unit	Replace the SI unit and check that it operates normally.	Replace the SI unit.

Fault No.5

Fault	Probable cause	Recommended error handling	Recommended action
SI unit MS LED is red flashing *	Abnormal state of SI unit	Check that there are no high voltage cables or equipment that generates noise around the power supply cable.	Take measures to keep the power supply cable away from noise sources.

*: In the case of "Device Revision 2.1" manufactured in May 2016 or earlier, MS LED will be a flashing RED when the solenoid valve power is OFF or the supply voltage level is insufficient.

Fault No.6

Fault	Probable cause	Recommended error handling	Recommended action
SI unit MS LED is green flashing	Configuration is not correctly	Set the configuration properly. Refer to "Hardware Configuration" (page 19) for details.	Check the PLC configuration.
	The master is idle state	Set the PLC to RUN status.	Refer to the master device manual, and review the settings.

Fault No.7

Fault	Probable cause	Recommended error handling	Recommended action
SI unit NS LED is OFF (Green/Red is OFF)	IP address has not been set	Check the IP address setting.	Set the IP address.

Fault No.8

Fault	Probable cause	Recommended error handling	Recommended action
SI unit NS LED is red ON	IP address duplication error	Check that the IP address is not duplicated.	Set an IP address that is not duplicated.

Fault No.9

Fault	Probable cause	Recommended error handling	Recommended action
SI unit NS LED is red flashing	Communication time-out	Check the communication cable connections and check for broken wires.	Tighten the communication cable connection. (Replace the cable if it is broken)
		Check that there are no high voltage cables or equipment that generates noise around the communication cable.	Take measures to keep the communication cable away from noise sources.

Fault No.10

Fault	Probable cause	Recommended error handling	Recommended action
SI unit NS LED is green flashing	Connection is not established	Check if the master is operating normally.	Refer to the master device manual, and review the settings.

Fault No.11

Fault	Probable cause	Recommended error handling	Recommended action
All valves and valve LEDs are not operating	Poor connection between SI unit and valve manifold	Check if there are any loose screws making the connection between the SI unit and the valve manifold.	Tighten the screws with the specified tightening torque (i.e. 0.6 Nm) and make sure there is no gap between the SI unit and the valve manifold.
	Mismatch polarity between solenoid valve and SI unit output	Check if the solenoid valve common specification matches the output polarity of the SI unit.	Match polarity between solenoid valve and SI unit output.
	Defective solenoid valve	Follow the troubleshooting for the solenoid valve.	Same as left.

Fault No.12

Fault	Probable cause	Recommended error handling	Recommended action
Valves do not work but valve LEDs are operating	Mismatch polarity between solenoid valve and SI unit output	Check if the solenoid valve common specification matches the output polarity of the SI unit.	Match polarity between solenoid valve and SI unit output.

○Maintenance

Replacement of the SI unit

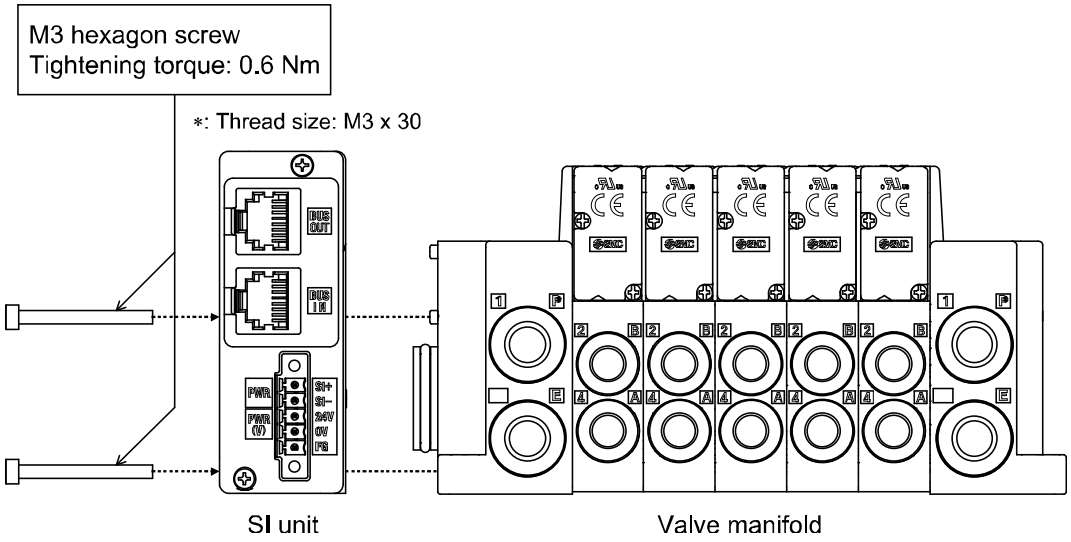
•Remove the M3 hexagon screws from the SI unit and release the SI unit from the valve manifold.
•Replace the SI unit.
•Tighten the screws with the specified tightening torque. (0.6 Nm)

Precautions for maintenance

(1) Be sure to switch off the power.
(2) Check there is no foreign matter inside the SI unit.
(3) Check there is no damage and no foreign matter on the gasket.
(4) Be sure to tighten the screws with the specified torque.

If the SI unit is not assembled properly, inside PCBs may be damaged or liquid and/or dust may enter into the unit.

○Assembly and disassembly of the SI unit



Specifications

General specifications

Item	Specifications
Ambient temperature	−10 to +50 ºC
Ambient humidity	35 to 85%RH (No condensate)
Ambient temperature for storage	−20 to +60 ºC
Withstand voltage	500 VAC applied for 1 minute
Insulation resistance	500 VDC, 10 MΩ or more
Operating atmosphere	No corrosive gas
Enclosure	IP20 (when connected to manifold) *1
Weight	200 g or less
Standard	CE marked

*1: Be sure to fit a seal cap on any unused connectors.

Electrical specifications

Item		Specifications
Current consumption in power supply voltage range	Current consumption of controller power supply	21.6 to 26.4 VDC 0.1 A max.
	Solenoid valve power supply	22.8 to 26.4 VDC 2.0 A or less, according to the solenoid valve station specification
Solenoid valve connecting specification	Output type	NPN (positive common)/sink
	Number of outputs	32 outputs
	Output condition at the time of communication error	Output HOLD/CLEAR
	Connected load	Solenoid valve with surge voltage suppressor of 24 VDC and 1.5 W or less (manufactured by SMC)
	Insulation type	Photo coupler insulation type
	Residual voltage	0.4 VDC or less

Communication specifications

Item	Specifications
Protocol	Ethernet (IEEE802.3)
Transmission medium	Standard Ethernet cable (CAT5 or more) (100BASE-TX)
Transmission speed	10 Mbps/100 Mbps (Auto negotiation)
Transmission method	Full duplex/Half duplex (Auto negotiation)
Fieldbus protocol	EtherNet/IP™ Volume1 (Edition 3.25) Volume2 (Edition 1.23)
Vendor ID	7h (SMC Corporation)
Product type	1Bh (Pneumatic Valve)
Product code	F9h
Network topology	Star: Applicable Linear Bus: Applicable Ring (including DLR): Applicable
Applicable function	QuickConnect™ DLR (Device Level Ring)
IP address setting range	Manual setting using switches in SI unit: 192.168.0.1 to 254 or 192.168.1.1 to 254 Via DHCP server: Arbitrary address
Configuration file	ex260_sen2_x205_24_v**.eds
Occupied area (number of inputs/outputs)	16/32

Connectable valve series

Valve Series	
JSY series	JSY1000, JSY3000, JSY5000
SY series	SY3000, SY5000, SY7000
VQC series	VQC1000, VQC2000, VQC4000, VQC5000

○I/O Mapping

Input area mapping

Offset (Word)	Input data															
	MSB							LSB	MSB							LSB
	15							8	7							0
0	L	L	L	L	SOLV	L	L	L	L	L	L	L	L	L	L	L

L: Low fixed (0)

Input status area

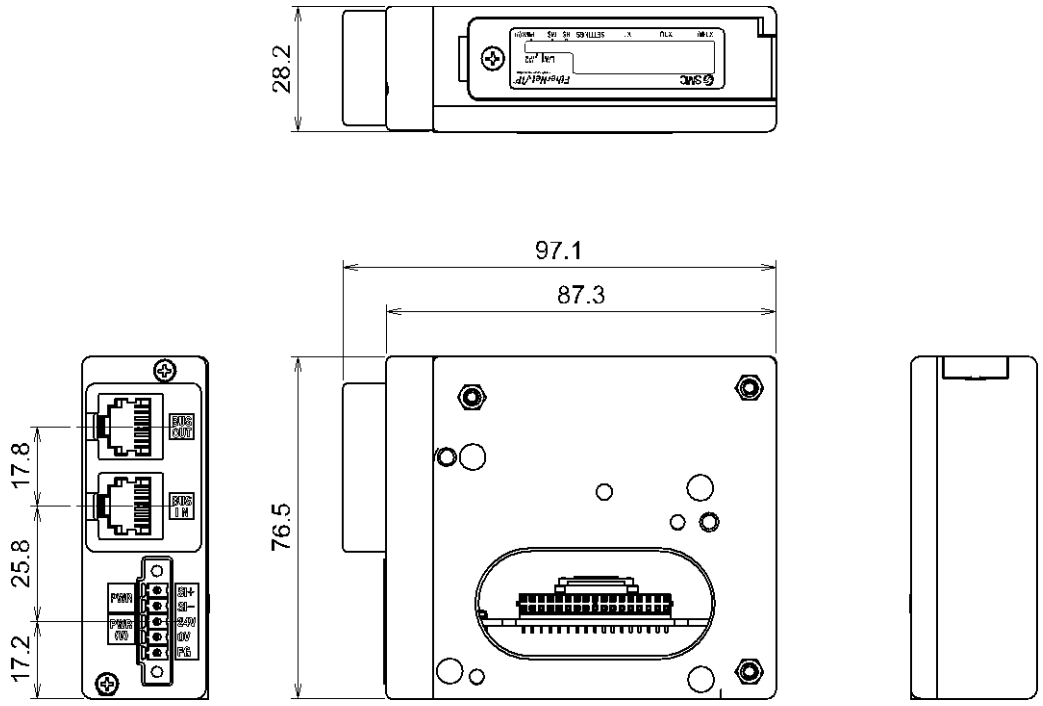
Input status area specifications

Item	Status	State	
SOLV	State of power supply for solenoid valve	0	Normal
		1	Abnormal (19 V or less)

Output area mapping

Offset (Word)	Output data															
	MSB							LSB	MSB							LSB
	15							8	7							0
0	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16

■Dimensions


28.2
97.1
87.3
76.5
17.8
25.8
17.2
BUS OUT
BUS IN
PWR
PWR I/O
SG
SG
24V
0V
FG

Revision history

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