EtherNet/IP

Operation Manual Ninth Edition

Programming Type Controller Edition

IAI Corporation

Please Read Before Use

Thank you for purchasing our product.

This instruction manual explains the handling methods, structure and maintenance of this product, providing the information you need in order to use the product safely.

Before using the product, be sure to read this manual and fully understand the contents explained herein to ensure safe use of the product.

Please downloaded the user's manual from our website.
You can download it free of charge. User registration is required for the first time downloading.
URL : www.iai-robot.co.jp/data_dl/CAD_MANUAL/

When using the product, print out of the necessary portions of the relevant manual, or please display it on your computer, tablet terminal, etc. so that you can check it immediately.

After reading the instruction manual, keep it in a convenient place so that whoever is handling the product can refer to it quickly when necessary.

[Important]

- This Operation Manual is original.
- IAI shall not be liable whatsoever for any loss or damage arising from the result of using the product for any other purpose from what is noted in the manual.
- The information contained in this Operation Manual is subject to change without notice for the purpose of production improvement.
- If you have any question or finding regarding the information contained in this Operation Manual, contact our customer center or our sales office near you.
- Using or copying all or a part of this Operation Manual without permission is prohibited.
- The company names, names of products, and trademarks of each referenced in this document are registered trademarks.
- EtherNet/IP is a trademark used under the license of ODVA.

Table of Contents

Safety Guide

"Safety Guide" has been written to use the machine safely and so prevent personal injury or property damage beforehand. Make sure to read it before the operation of this product.

Safety Precautions for Our Products

The common safety precautions for the use of any of our robots in each operation.

No.	Operation Description	Description
1	Model Selection	● This product has not been planned and designed for the application where high level of safety is required, so the guarantee of the protection of human life is impossible. Accordingly, do not use it in any of the following applications. 1) Medical equipment used to maintain, control or otherwise affect human life or physical health. 2) Mechanisms and machinery designed for the purpose of moving or transporting people (For vehicle, railway facility or air navigation facility) 3) Important safety parts of machinery (Safety device, etc.) ● Do not use the product outside the specifications. Failure to do so may considerably shorten the life of the product. ● Do not use it in any of the following environments. 1) Location where there is any inflammable gas, inflammable object or explosive 2) Place with potential exposure to radiation 3) Location with the ambient temperature or relative humidity exceeding the specification range 4) Location where radiant heat is added from direct sunlight or other large heat source 5) Location where condensation occurs due to abrupt temperature changes 6) Location where there is any corrosive gas (sulfuric acid or hydrochloric acid) 7) Location exposed to significant amount of dust, salt or iron powder 8) Location subject to direct vibration or impact ● For an actuator used in vertical orientation, select a model which is equipped with a brake. If selecting a model with no brake, the moving part may drop when the power is turned OFF and may cause an accident such as an injury or damage on the work piece.

No.	Operation Description	Description
2	Transportation	● When carrying a heavy object, do the work with two or more persons or utilize equipment such as crane. ● When the work is carried out with 2 or more persons, make it clear who is to be the “leader” and who to be the “follower(s)” and communicate well with each other to ensure the safety of the workers. ● When in transportation, consider well about the positions to hold, weight and weight balance and pay special attention to the carried object so it would not get hit or dropped. ● Transport it using an appropriate transportation measure. The actuators available for transportation with a crane have eyebolts attached or there are tapped holes to attach bolts. Follow the instructions in the instruction manual for each model. ● Do not step or sit on the package. ● Do not put any heavy thing that can deform the package, on it. ● When using a crane capable of 1t or more of weight, have an operator who has qualifications for crane operation and sling work. ● When using a crane or equivalent equipments, make sure not to hang a load that weighs more than the equipment’s capability limit. ● Use a hook that is suitable for the load. Consider the safety factor of the hook in such factors as shear strength. ● Do not get on the load that is hung on a crane. ● Do not leave a load hung up with a crane. ● Do not stand under the load that is hung up with a crane.
3	Storage and Preservation	● The storage and preservation environment conforms to the installation environment. However, especially give consideration to the prevention of condensation. ● Store the products with a consideration not to fall them over or drop due to an act of God such as earthquake.
4	Installation and Start	(1) Installation of Robot Main Body and Controller, etc. ● Make sure to securely hold and fix the product (including the work part). A fall, drop or abnormal motion of the product may cause a damage or injury. Also, be equipped for a fall-over or drop due to an act of God such as earthquake. ● Do not get on or put anything on the product. Failure to do so may cause an accidental fall, injury or damage to the product due to a drop of anything, malfunction of the product, performance degradation, or shortening of its life. ● When using the product in any of the places specified below, provide a sufficient shield. 1) Location where electric noise is generated 2) Location where high electrical or magnetic field is present 3) Location with the mains or power lines passing nearby 4) Location where the product may come in contact with water, oil or chemical droplets

No.	Operation Description	Description
4	Installation and Start	(2) Cable Wiring ● Use our company's genuine cables for connecting between the actuator and controller, and for the teaching tool. ● Do not scratch on the cable. Do not bend it forcibly. Do not pull it. Do not coil it around. Do not insert it. Do not put any heavy thing on it. Failure to do so may cause a fire, electric shock or malfunction due to leakage or continuity error. ● Perform the wiring for the product, after turning OFF the power to the unit, so that there is no wiring error. ● When the direct current power (+24V) is connected, take the great care of the directions of positive and negative poles. If the connection direction is not correct, it might cause a fire, product breakdown or malfunction. ● Connect the cable connector securely so that there is no disconnection or looseness. Failure to do so may cause a fire, electric shock or malfunction of the product. ● Never cut and/or reconnect the cables supplied with the product for the purpose of extending or shortening the cable length. Failure to do so may cause the product to malfunction or cause fire.
		(3) Grounding ● The grounding operation should be performed to prevent an electric shock or electrostatic charge, enhance the noise-resistance ability and control the unnecessary electromagnetic radiation. ● For the ground terminal (PE) on the AC power cable of the controller and the grounding plate in the control panel, make sure for grounding work. For security grounding, it is necessary to select an appropriate wire thickness suitable for the load. Perform wiring that satisfies the specifications (electrical equipment standards and criteria). For detail, follow the description in [an instruction manual of each controller or controller built-in actuator]. ● Conduct functional grounding on the FG terminal for a controller supplying 24V DC or a controller built-in type actuator. In order to minimize influence to mechanical operation given by electromagnetic interference (noise) to an electrical device or insulation failure, conduct grounding on a terminal or a conductor that is electrically stable. The reference impedance should be Type D (Former Class 3, ground resistance 100Ω or less).

No.	Operation Description	Description
4	Installation and Start	(4) Safety Measures ● When the work is carried out with 2 or more persons, make it clear who is to be the “leader” and who to be the “follower(s)” and communicate well with each other to ensure the safety of the workers. ● When the product is under operation or in the ready mode, take the safety measures (such as the installation of safety and protection fence) so that nobody can enter the area within the robot’s movable range. When the robot under operation is touched, it may result in death or serious injury. ● Make sure to install the emergency stop circuit so that the unit can be stopped immediately in an emergency during the unit operation. ● Take the safety measure not to start up the unit only with the power turning ON. Failure to do so may start up the machine suddenly and cause an injury or damage to the product. ● Take the safety measure not to start up the machine only with the emergency stop cancellation or recovery after the power failure. Failure to do so may result in an electric shock or injury due to unexpected power input. ● When the installation or adjustment operation is to be performed, give clear warnings such as “Under Operation; Do not turn ON the power!” etc. Sudden power input may cause an electric shock or injury. ● Take the measure so that the work part is not dropped in power failure or emergency stop. ● Wear protection gloves, goggle or safety shoes, as necessary, to secure safety. ● Do not insert a finger or object in the openings in the product. Failure to do so may cause an injury, electric shock, damage to the product or fire. ● When releasing the brake on a vertically oriented actuator, exercise precaution not to pinch your hand or damage the work parts with the actuator dropped by gravity.
5	Teaching	● When the work is carried out with 2 or more persons, make it clear who is to be the “leader” and who to be the “follower(s)” and communicate well with each other to ensure the safety of the workers. ● Perform the teaching operation from outside the safety protection fence, if possible. In the case that the operation is to be performed unavoidably inside the safety protection fence, prepare the “Stipulations for the Operation” and make sure that all the workers acknowledge and understand them well. ● When the operation is to be performed inside the safety protection fence, the worker should have an emergency stop switch at hand with him so that the unit can be stopped any time in an emergency. ● When the operation is to be performed inside the safety protection fence, in addition to the workers, arrange a watchman so that the machine can be stopped any time in an emergency. Also, keep watch on the operation so that any third person can not operate the switches carelessly. ● Place a sign “Under Operation” at the position easy to see. ● When releasing the brake on a vertically oriented actuator, exercise precaution not to pinch your hand or damage the work parts with the actuator dropped by gravity. * Safety protection Fence : In the case that there is no safety protection fence, the movable range should be indicated.

No.	Operation Description	Description
6	Trial Operation	● When the work is carried out with 2 or more persons, make it clear who is to be the “leader” and who to be the “follower(s)” and communicate well with each other to ensure the safety of the workers. ● After the teaching or programming operation, perform the check operation one step by one step and then shift to the automatic operation. ● When the check operation is to be performed inside the safety protection fence, perform the check operation using the previously specified work procedure like the teaching operation. ● Make sure to perform the programmed operation check at the safety speed. Failure to do so may result in an accident due to unexpected motion caused by a program error, etc. ● Do not touch the terminal block or any of the various setting switches in the power ON mode. Failure to do so may result in an electric shock or malfunction.
7	Automatic Operation	● Check before starting the automatic operation or rebooting after operation stop that there is nobody in the safety protection fence. ● Before starting automatic operation, make sure that all peripheral equipment is in an automatic-operation-ready state and there is no alarm indication. ● Make sure to operate automatic operation start from outside of the safety protection fence. ● In the case that there is any abnormal heating, smoke, offensive smell, or abnormal noise in the product, immediately stop the machine and turn OFF the power switch. Failure to do so may result in a fire or damage to the product. ● When a power failure occurs, turn OFF the power switch. Failure to do so may cause an injury or damage to the product, due to a sudden motion of the product in the recovery operation from the power failure.

No.	Operation Description	Description
8	Maintenance and Inspection	● When the work is carried out with 2 or more persons, make it clear who is to be the “leader” and who to be the “follower(s)” and communicate well with each other to ensure the safety of the workers. ● Perform the work out of the safety protection fence, if possible. In the case that the operation is to be performed unavoidably inside the safety protection fence, prepare the “Stipulations for the Operation” and make sure that all the workers acknowledge and understand them well. ● When the work is to be performed inside the safety protection fence, basically turn OFF the power switch. ● When the operation is to be performed inside the safety protection fence, the worker should have an emergency stop switch at hand with him so that the unit can be stopped any time in an emergency. ● When the operation is to be performed inside the safety protection fence, in addition to the workers, arrange a watchman so that the machine can be stopped any time in an emergency. Also, keep watch on the operation so that any third person can not operate the switches carelessly. ● Place a sign “Under Operation” at the position easy to see. ● For the grease for the guide or ball screw, use appropriate grease according to the instruction manual for each model. ● Do not perform the dielectric strength test. Failure to do so may result in a damage to the product. ● When releasing the brake on a vertically oriented actuator, exercise precaution not to pinch your hand or damage the work parts with the actuator dropped by gravity. ● The slider or rod may get misaligned OFF the stop position if the servo is turned OFF. Be careful not to get injured or damaged due to an unnecessary operation. ● Pay attention not to lose the removed cover or screws, and make sure to put the product back to the original condition after maintenance and inspection works. Use in incomplete condition may cause damage to the product or an injury. * Safety protection Fence : In the case that there is no safety protection fence, the movable range should be indicated.
9	Modification and Dismantle	● Do not modify, disassemble, assemble or use of maintenance parts not specified based at your own discretion.
10	Disposal	● When the product becomes no longer usable or necessary, dispose of it properly as an industrial waste. ● When removing the actuator for disposal, pay attention to drop of components when detaching screws. ● Do not put the product in a fire when disposing of it. The product may burst or generate toxic gases.
11	Other	● Do not come close to the product or the harnesses if you are a person who requires a support of medical devices such as a pacemaker. Doing so may affect the performance of your medical device. ● See Overseas Specifications Compliance Manual to check whether complies if necessary. ● For the handling of actuators and controllers, follow the dedicated instruction manual of each unit to ensure the safety.

Alert Indication

The safety precautions are divided into “Danger”, “Warning”, “Caution” and “Notice” according to the warning level, as follows, and described in the instruction manual for each model.

Level	Degree of Danger and Damage	Symbol
Danger	This indicates an imminently hazardous situation which, if the product is not handled correctly, will result in death or serious injury.	 Danger
Warning	This indicates a potentially hazardous situation which, if the product is not handled correctly, could result in death or serious injury.	 Warning
Caution	This indicates a potentially hazardous situation which, if the product is not handled correctly, may result in minor injury or property damage.	 Caution
Notice	This indicates lower possibility for the injury, but should be kept to use this product properly.	 Notice

Caution in Handling

1. It is recommended that the baud rate be set based on auto negotiation.

Make sure the link setting of the EtherNet/IP unit matches the communication mode set for the connected switching hub. If not, the link becomes unstable and communication cannot be performed properly.
It is recommended to enable auto negotiation using an appropriate controller parameter. The table below lists settings for each communication mode of the switching hub:

EtherNet/IP Unit / Switching Hub		Auto negotiation	Fixed to 10M		Fixed to 100M	
			Full-duplex	Half-duplex	Full-duplex	Half-duplex
Auto Negotiation		◎ (recommended)	×	○	×	○
Fixed to 10M	Full-duplex	×	○	×	×	×
	Half-duplex	○	×	○	×	×
Fixed to 100M	Full-duplex	×	×	×	○	×
	Half-duplex	○	×	×	×	○

(◎: Connection possible (recommended), ○: Connection possible, ×: Connection not possible)

2. Use a switching hub.

Build your network using a switching hub, without using a repeater hub. If a repeater hub is used, tag data link operation may become unstable. For details, refer to the operation manual for your master unit.

3. It is applicable for the communication feature for Implicit Messaging, but not applicable for the communication feature for Explicit Messaging.

EtherNet/IP mounted on IAI controllers are applicable for communication with Implicit Messaging (cyclic), but not the communication feature of Explicit Messaging.

4. XSEL-RA/SA/RAX/SAX/RAXD/SAXD Caution for When Using Several Interface Modules Combined

Regarding XSEL-RA/SA, when several interface modules are to be used in combination, Ethernet/IP and CC-Link IE Field cannot be equipped in parallel as shown in the table below.

		Network I/F Module 1 slot	
		EC	EP
Network I/F Module 2 slot	CC	○	○
	DV	○	○
	PR	○	○
	CIE	○	×

※CC：CC-Link, DV：DeviceNet, PR：PROFIBUS-DP, EC：EtherCAT®, EP：EtherNet/IP, CIE：CC-Link IE Field
○：Available for Mount, ×：Not Available for Mount

1. Overview

EtherNet/IP is an open field network. It is a standardized global open network specified by the IEC 61158 series of international standards.
You can connect XSEL, ACON, PCON, SCON-CA, TTA and ASEL, PSEL, SSEL, MSEL (the following controllers) controllers to EtherNet/IP to build a system with minimum wiring.

This operation manual states the explanations for when using the remote I/O communication in EtherNet/IP for XSEL-P*/Q*/R*/S*, TTA, ASEL, PSEL, SSEL and MSEL.
Refer to the following operation manuals for explanations of other controllers.

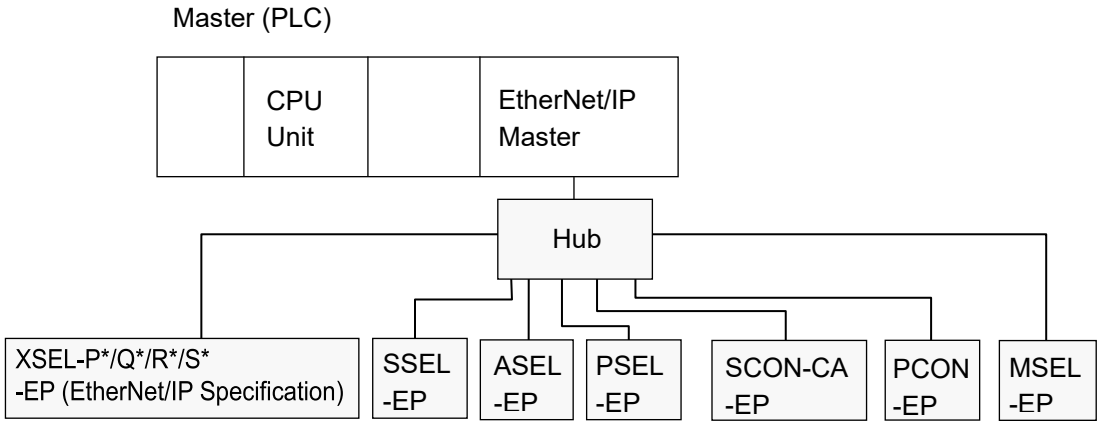
Series	Operation Manual	Manual No.	Models
CON System (Single-Axis) Controllers	EtherNet/IP Operation Manual Positioner Type Controller Edition	ME0278	ACON-C/CG/CA/CB/CGB DCON-CA/CB/CGB PCON-C/CG/CA/CFA/ CB/CFB/CGB/CGFB/ CBP/CGBP SCON-CA/CAL/CGAL/CB/CGB
MSEP	MSEP-C/LC Controller Operation Manual	ME0299	MSEP-C
MSCON	MSCON Controller Operation Manual	ME0306	MSCON-C
MCON	MCON-C/CG Controller Operation Manual	ME0341	MCON-C/CG
RCP6S Gateway	PCP6S Fieldbus Communication Operation Manual	ME0349	RCM-P6GW/P6GWG, RCM-P6PC/P6AC/P6DC
RCON	RCON System Operation Manual	ME0384	RCON-GW/GWG/LC/LCG
RSEL	RSEL System Operation Manual	ME0392	RSEL-G
REC	REC System Operation Manual	ME0394	REC-GW
RCON-NCN	RCON Gateway Unit Driver non-connection specification Operation Manual	ME0456	RCON-GWG-NCN

Refer to the operation manuals listed below which are provided separately when using TCP/IP message communication.

Function	Operation Manual	Manual No.
IAI Protocol B/TCP	X-SEL Ethernet Operation Manual	ME0140
Message Communication with SEL Program		
Vision System I/F Function(Note 1)	XSEL Controller P/Q/R/S/RA/SA Vision System I/F Function Operation Manual	ME0269
Tracking Function Vision System Communication(Note 2)	Visual Tracking System (Cognex Vision System) Operation Manual	ME0239
	Visual Tracking System (OMRON Vision System) Operation Manual	ME0237
	Visual Tracking System (Keyence Vision System) Operation Manual	ME0238

Note 1 The functions related to Vision System are to be applied only for XSEL-P*/Q*/R*/S*.
Note 2 ASEL, PSEL and SSEL are not applicable for Vision System I/F and Tracking Vision System Communication.

[System Configuration Example]



⚠ Cauion
- For detailed explanations of EtherNet/IP, refer to the operation manual for the programmable controller (hereinafter referred to as “PLC”) in which the master unit is installed.
- Use this operation manual along with operation manual of each controller.
- Usage other than the ones described in this operation manual is prohibited.

2. EtherNet/IP Specifications

Item	Description
Applicable Protocols	CIP, TCP/IP
Device Type	Generic Device
IP Address	1.0.0.1 to 255.255.255.254 (Note 2) (Software setting with I/O parameters)
Port No.	2222 (UDP) (Note 1) 44818 (TCP/UDP) (Note 1)
Baud Rate	10/100Mbps (Software setting with I/O parameters)
Communication Mode	10BASE-T/100BASE-TX (Full-duplex/Half-duplex) (Software setting with I/O parameters)
Cable	Category 5 or more (Note 3)
Connector	RJ-45

Note 1 This is the port for the use of EtherNet/IP remote I/O communication.
Note 2 0 and 127 in 1st octet and 0 and 255 in 4th octet cannot be used since they are reserved addresses.
Note 3 STP cable is recommended.

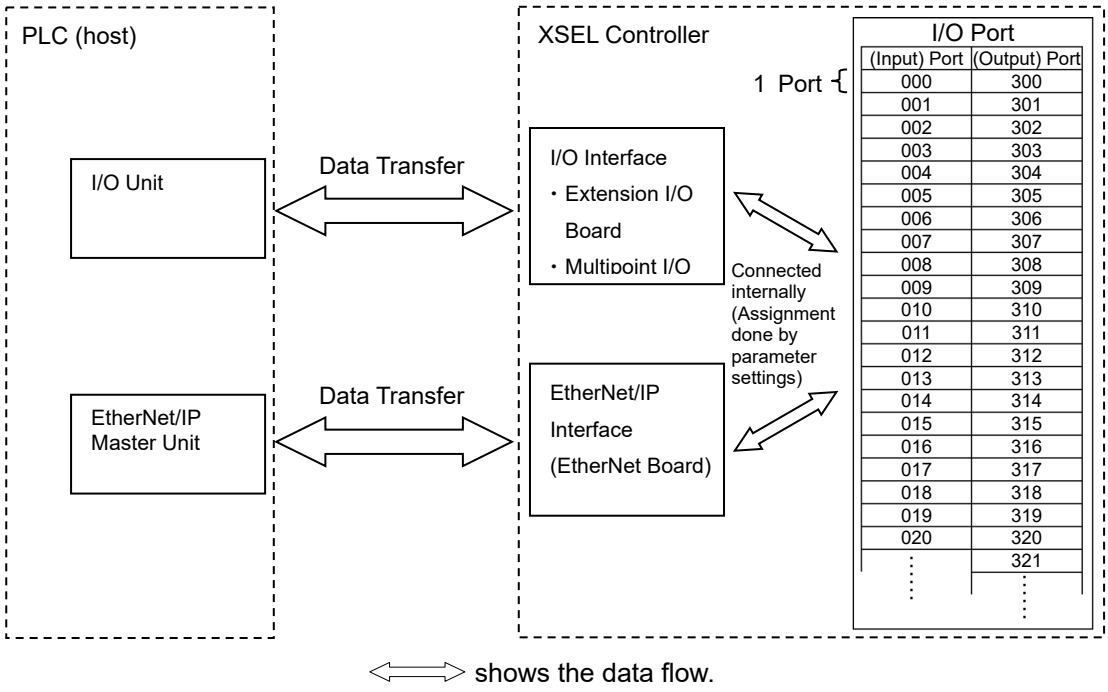
3. XSEL-R(A)/S(A)/R(A)X/S(A)X/R(A)XD/S(A)XD

3.1 Operation Modes and Functions

XSEL Controllers applicable for EtherNet/IP are applicable for the remote I/O control (*1) (256 points max. for each input and output).

*1 Input and output (I/O port) of 24V is controlled in one port unit. I/O port is a point to receive and send data located inside the controller. 1 port can handle data of 1 contact (1 bit).
Data are sent and received via either PIO (24V input and output) or field network. Connection to one port is available from only one of PIO or field network. Set a parameter to determine which of PIO or field network is to be used.

● Operation Image



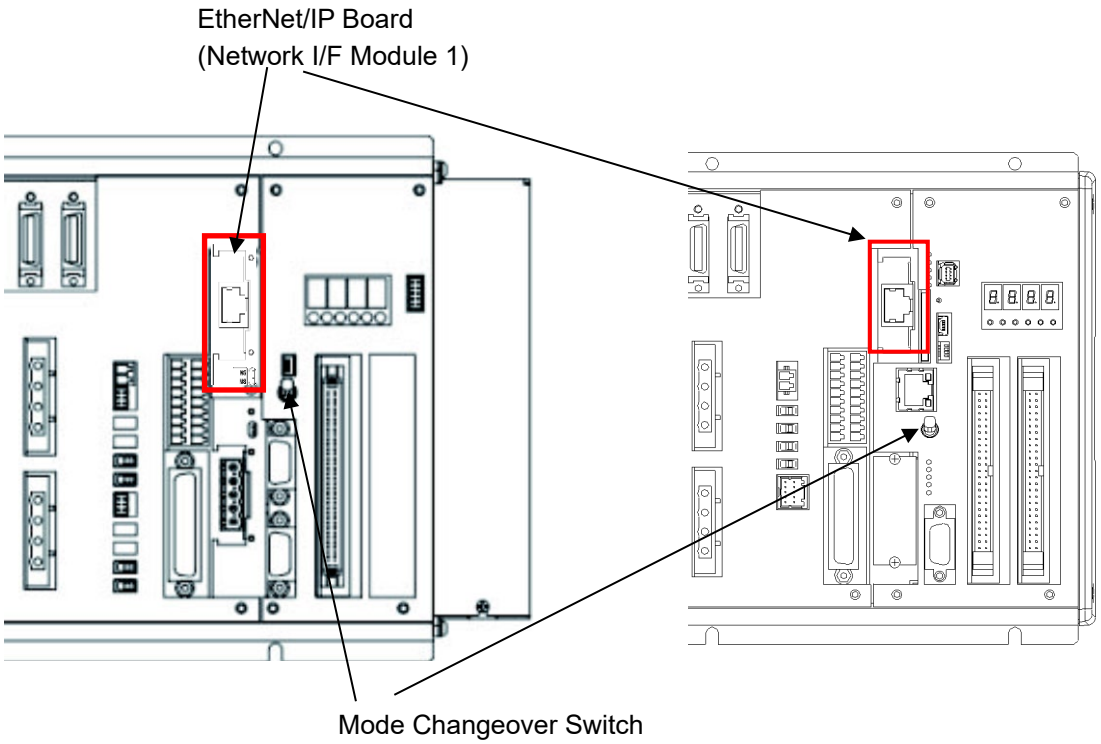
3.2 Model

3.2.1 Expression of Model Codes

The model code of each of XSEL-R(A)/S(A)/R(A)X/S(A)X/R(A)XD/S(A)XD applicable for EtherNet/IP is as shown below.

XSEL-R/S Series
- XSEL-R-□-EP-□
- XSEL-S-□-EP-□
- XSEL-RX-□-EP-□
- XSEL-SX-□-EP-□
- XSEL-RXD-□-EP-□
- XSEL-SXD-□-EP-□

XSEL-RA/SA Series
- XSEL-RA-□-EP-□
- XSEL-RA-□-EP-□
- XSEL-RAX-□-EP-□
- XSEL-RAX-□-EP-□
- XSEL-RAXD-□-EP-□
- XSEL-RAXD-□-EP-□



3.2.2 Caution for Model Code Decision

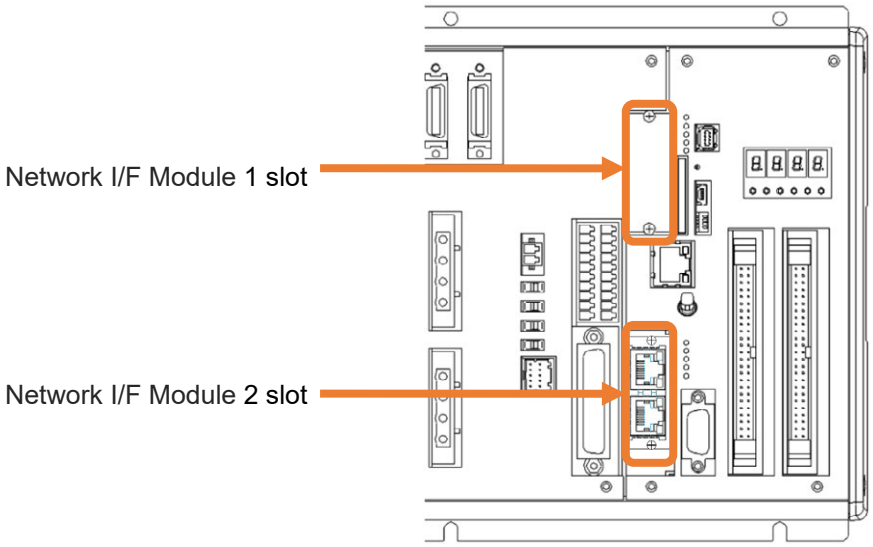
Caution for When Using Several Interface Modules Combined

Regarding XSEL-RA/SA, when several interface modules are to be used in combination, Ethernet/IP and CC-Link IE Field cannot be equipped in parallel as shown in the table below.

		Network I/F Module 1 slot	
		EC	EP
Network I/F Module 2 slot	CC	○	○
	DV	○	○
	PR	○	○
	CIE	○	×

* CC：CC-Link, DV：DeviceNet, PR：PROFIBUS-DP, EC：EtherCAT®, EP：EtherNet/IP, CIE：CC-Link IE Field
○：Available for Moun, ×：Not Available for Mount

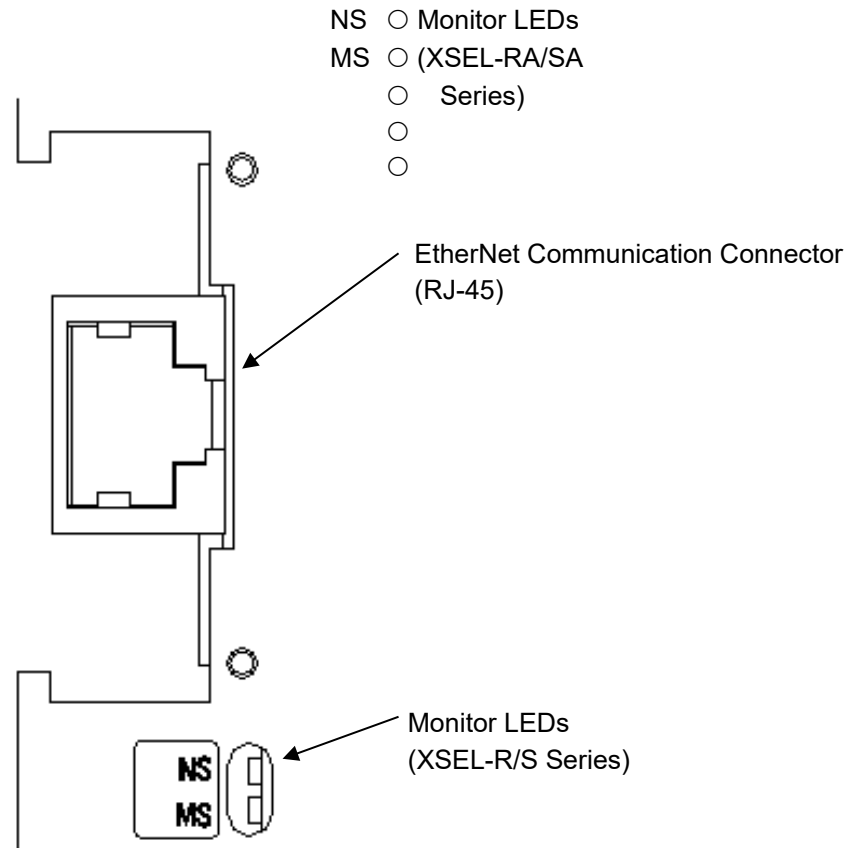
The interface module mount positions on XSEL-RA/SA are as shown below.



The version of the main application part for XSEL-RA/SA/RAX/SAX/RAXD/SAXD applicable for the CC-Link IE Field should be V1.30 or later.

3.3 EtherNet/IP Interface

3.3.1 Names of the Parts



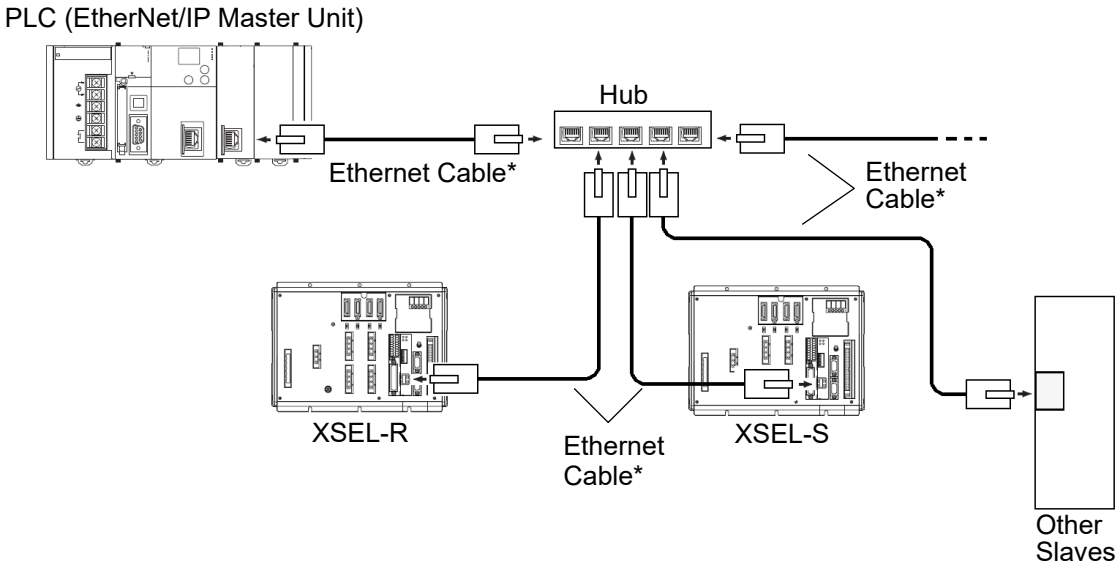
3.3.2 Monitor LED indications

LED	Color	Indication Status	Meaning
NS (Network Status)	Green	Illuminating	Online, Communication in normal condition
		Flashing	Online, No connection established
	Orange	Illuminating	IP address duplication Critical link error
		Flashing	Connection timeout
	-	OFF	No power supply confirmed / IP address not established
MS (Module Status)	Green	Illuminating	Normal Operation
		Flashing	Configuration setting not established or not complete, Test run required
	Orange	Illuminating	An error that cannot be recovered
		Flashing	An error that can be recovered
	-	OFF	No power supply confirmed

* When only TCP/IP messages are used, both NS and MS flash in green.
When NS and MS are turned on in green, it shows the remote I/O communication condition of EtherNet/IP.

3.4 Wiring

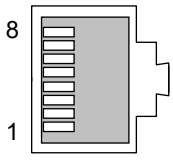
3.4.1 Wiring (example)



* Ethernet Cable: Straight cable of category 5 or more, 100m max.
(Aluminum tape and braided double-shielded cable are recommended.)

(Note) Terminal processing is not required.

3.4.2 Connector Pin Layout



RJ-45 8-pin
Module Connector
(Controller Side)

Pin No.	Signal Name	Signal Abbreviation
1	Data transmitted +	TD+
2	Data transmitted -	TD-
3	Data received +	RD+
4	Not used	
5	Not used	
6	Data received -	RD-
7	Not used	
8	Not used	
Connector hood	Grounding pin for security	FG

3.5 Setting

Set to the I/O parameters in the controller by using a teaching tool. Place the controller's AUTO/MANU switch in the MANU position.
The versions of teaching tool compatible with EtherNet/IP please check the instruction manual of each teaching tool.

3.5.1 Parameter Setting

[1] Check of Network Module Type

● For XSEL-R/S Series

Confirm that the 1st digit of I/O Parameter No.225 Network I/F Module Control setting is showing “7” (EtherNet/IP).

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
225	Network I/F Module Control	*7 Only to reference	0_H to $FFFFFFFF_H$	-	Bits 0 to 3 (First digit) : Network I/F Module 1 type 6: EtherCAT® 7: EtherNet/IP Bits 4 to 7 (2nd digit) : Network I/F Module 2 type 0: Not Mounted 1: CC-Link 2: DeviceNet 3: PROFIBUS-DP

The setting of this parameter is established at the delivery. For EtherNet/IP, it is shown as “7_H”.
The displayed values in the second digit and after (from Bit 4) may differ depending on the structure of the used option board.

● For XSEL-RA/SA Series

Confirm that the 1st digit of I/O Parameter No.225 Network I/F Module Control setting is showing “7” (EtherNet/IP).

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
225	Network I/F Module Control	*07 Only to reference	0_H to $FFFFFFFF_H$	-	Bits 0 to 7 (1st and 2nd digits) : Network I/F Module 1 type 0: Not Mounted 6: EtherCAT® 7: EtherNet/IP Bits 8 to 15 (3rd and 4th digits) : Network I/F Module 2 type 0: Not Mounted 1: CC-Link 2: DeviceNet 3: PROFIBUS-DP 4 to C: System Reservation D: CC-Link IE Field

The setting of this parameter is established at the delivery. For EtherNet/IP, it is shown as “*07h”.
The displayed values in the third digit and after (from Bit 8) may differ depending on the structure of the used option board.

[2] IP Address Setting

Set the IP Address to I/O Parameter No.132 to 135.

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
132	Network I/F Module 1 Self IP Address (H)	192	1 to 255	-	* Prohibited to set to 0 and 127
133	Network I/F Module 1 Self IP Address (MH)	168	0 to 255	-	
134	Network I/F Module 1 Self IP Address (ML)	0	0 to 255	-	
135	Network I/F Module 1 Self IP Address (L)	1	1 to 254	-	* Prohibited to set to 0 and 255

Pay attention to avoid duplication of IP address.

[3] Subnet Mask Setting

Set the subnet mask to I/O Parameter No.136 to 139.

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
136	Network I/F Module 1 Subnet Mask (H)	255	0 to 255	-	
137	Network I/F Module 1 Subnet Mask (MH)	255	0 to 255	-	
138	Network I/F Module 1 Subnet Mask (ML)	255	0 to 255	-	
139	Network I/F Module 1 Subnet Mask (L)	0	0 to 255	-	

[4] Default Gateway Setting

Set the default gateway to I/O Parameter No.140 to 143.

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
140	Network I/F Module 1 Default Gateway (H)	0	0 to 255	-	
141	Network I/F Module 1 Default Gateway (MH)	0	0 to 255	-	
142	Network I/F Module 1 Default Gateway (ML)	0	0 to 255	-	
143	Network I/F Module 1 Default Gateway (L)	0	0 to 255	-	

[5] Baud Rate Setting

Set the baud rate to I/O Parameter No.227.

It is recommended to set to Auto-negotiation for the baud rate setting.

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
227	Network I/F Module 1 Baud Rate	0	0 to 4	-	• At EtherNet/IP: (0: Autonegotiation, 1: 10Mbps (Half-duplex), 2: 10Mbps (Full-duplex), 3: 100Mbps (Half-duplex), 4: 100Mbps (Full-duplex))

Set the baud rate to the value that matches with the baud rate (mode) of such as switching hub.

Operation without matching the setting may lead to unstable communications. In case a value out of the range of EtherNet/IP specifications is set, “D75: Fieldbus Parameter Error” is issued.

[6] I/O Port Assignment Classification Setting

Set the I/O port assignment Classification to I/O Parameter No.1.

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
1	I/O Port Allocation Type	1	0 to 1	-	0: Fixed Allocation 1: Automatic Allocation • Reference 1 Priority of I/O Port Assignment when automatically assigned Port Number (No.0 to 299/No.300 to 599) 1) Network I/F Module1 2) I/O slot 1 (I/O1) Mounting board 3) I/O slot 2 (I/O2) Mounting board * I/O slot 1 (I/O1) Assigned for the continuously mounted range from mounting board • Reference 2 Priority of extension I/O ports at automatic assignment Port Number (No.1000 to 3999/No.4000 to 6999) 1) Network I/F Module 2 2) Expansion I/O unit 3) IA Net * 2) and 3) are for XSEL-R/S Series only

Note If the automatic assignment is selected, the input port is assigned to an input port area (No. 0 to 299).
The output port is assigned to the output port area (No. 300 to 599).
If the fixed assignment is selected, the user will manually assign the input to either of the standard input port area (No. 0 to 299) or extension input port area (No. 1000 to 3999).
For the output port, the user will manually assign the output to either the standard output port area (No. 300 to 599) or the extension output port area (No. 4000 to 6999).

[7] Number of I/O Port Setting

Set the number of ports to be used for I/O Parameters No.14 to 15.
Set a number that is a multiple of 8.

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
14	Network I/F Module 1 Number of Remote Input Ports	0	0 to 256	-	Multiples of 8
15	Network I/F Module 1 Number of Remote Output Ports	0	0 to 256	-	Multiples of 8

[8] I/O Port Top Number Setting

Set the top port number of the port range used in I/O Parameters No.16 to 17.
The values entered into these parameters must be evenly divisible by 8.

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
16	Network I/F Module 1 Fix-Allocated Input Port Start No.	-1	-1 to 299 1000 to 3999	-	0+(Multiples of 8) (0 to 299) 1000+(Multiples of 8) (1000 to 3999) (Unavailable when it is negative figure)
17	Network I/F Module 1 Fix-Allocated Output Port Start No.	-1	-1 300 to 599 4000 to 6999	-	300+(Multiples of 8) (300 to 599) 4000+(Multiples of 8) (4000 to 6999) (Unavailable when it is negative figure)

[9] EtherNet/IP Board Use Setting

Set “1” (Monitoring: use EtherNet board) to I/O Parameter No.18.

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
18	Network I/F Module 1 Error Monitor	1	0 to 5	-	0: No Monitoring 1: Monitoring

[10] Time Setting to Wait for EtherNet/IP Communication Establishment

Set the maximum allowable time for the establishment of EtherNet/IP communication at the startup in bits 16 to 27 of I/O Parameter No.121. Change this setting when XSEL starts faster than the master unit, which results in a generation of “D5D” or “A6B”.

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
121	Network Attribute 2	$C80000_H$	0 to $FFFFFFFF_H$	100 ms	Bits 16 to 27: Value of Link Timeout at initializing of the Fieldbus (Example) The initial value $C80000_H$ is bit 16 to 27 = C8H = 200 (in 100ms unit) 200×100ms = 20s Check in 20s after startup

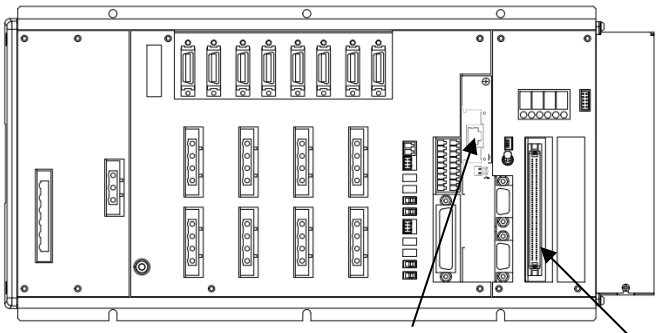
[11] Data Retaining Setting at EtherNet/IP Communication Error

Set whether to clear the input port data with 0 or to retain when an error is generated in bits 28 to 31 of I/O Parameter No.120.

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
120	Network Attribute 1	640001_H	0 to $FFFFFFFF_H$		Bits 28 to 31: Network I/F Module 1 Input port data select for link error (0: Clear, 1: Hold)

3.5.2 Example for Parameter Settings

(1) Example for when using EtherNet/IP
It is how to establish the setting when using EtherNet/IP to 16 ports of each input and output from the top of the standard I/O ports, and no other I/O port (for I/O board, etc.) is to be used.
* The figure shown below is XSEL-R/S series. The setting should be the same for XSEL-RA/SA series.
(Except for I/O Parameter No. 225)



Standard Input Port No.0 to 15
Standard Output Port No.300 to 315
(EtherNet/IP Board)

Not to be used
(I/O Board)

- I/O Parameter

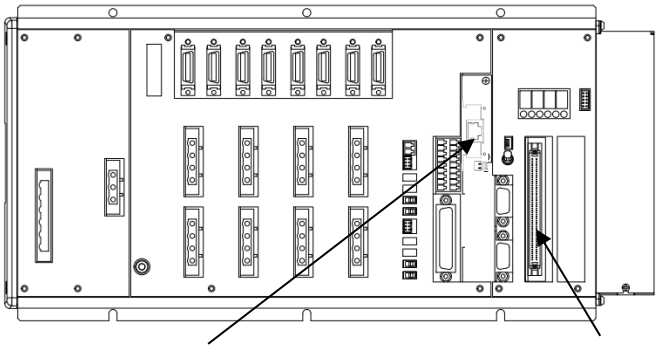
No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
1	I/O Port Allocation Type	1	0 to 1	0	0: Fixed Allocation 1: Automatic Allocation • Reference 1 Priority of I/O Port Assignment when automatically assigned Port Number (No.0 to 299/No.300 to 599) 1) Network I/F Module 1 2) I/O slot 1 (I/O1) Mounting board 3) I/O slot 2 (I/O2) Mounting board * I/O slot 1 (I/O1) Assigned for the continuously mounted range from mounting board • Reference 2 Priority of extension I/O ports at automatic assignment Port Number (No.1000 to 3999/No.4000 to 6999) 1) Network I/F Module 2 2) Expansion I/O unit 3) IA Net * 2) and 3) are for XSEL-R/S Series only
2	Standard I/O Fix-Allocated Input Port Start No.	0	-1 to 599	-1	0+(Multiples of 8) [Ineffective when -1 is selected]
3	Standard I/O Fix-Allocated Output Port Start No.	300	-1 to 599	-1	300+(Multiples of 8) [Ineffective when -1 is selected]
10	Standard I/O Error Monitoring (I/O1)	1	0 to 5	0	0: No Monitoring (Not to use I/O board) 1: Monitoring 2: Monitoring (Not to monitor 24V I/O power related error) 3: Monitoring (To monitor only 24V I/O power related error)
14	Network I/F Module 1 Remote Input Ports	0	0 to 256	16	8 port unit

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
15	Network I/F Module 1 Remote Output Ports	0	0 to 256	16	8 port unit
16	Network I/F Module 1 Fix-Allocated Input Port Start No.	-1	-1 to 299	0	0+(Multiples of 8) [Ineffective when -1 is selected]
17	Network I/F Module 1 Fix-Allocated Output Port Start No.	-1	-1 300 to 599	300	300+(Multiples of 8) [Ineffective when -1 is selected]
18	Network I/F Module 1 Error Monitor	1	0 to 5	1	0: No Monitoring (Not to use Network I/F Module 1) 1: Monitoring
120	Network Attribute 1	640001_H	0_H to $FFFFFFFF_H$	Opti-onal	Bits 28 to 31: Network I/F Module 1 Input port data select for link error (0: Clear, 1: Hold)
121	Network Attribute 2	$C80000_H$	0_H to $FFFFFFFF_H$	Opti-onal	Bits 8 to 11: Network I/F Module 2 Input port data select for link error (0: Clear, 1: Hold) Bits 16 to 27: Value of Link Timeout at initializing of the Fieldbus (100ms)
132	Network I/F Module 1 Self IP Address (H)	192	1 to 255	192	* Prohibited to set to 0 and 127
133	Network I/F Module 1 Self IP Address (MH)	168	0 to 255	168	
134	Network I/F Module 1 Self IP Address (ML)	0	0 to 255	0	
135	Network I/F Module 1 Self IP Address (L)	1	1 to 254	1	* Prohibited to set to 0 and 255
136	Network I/F Module 1 Subnet Mask (H)	255	0 to 255	255	
137	Network I/F Module 1 Subnet Mask (MH)	255	0 to 255	255	
138	Network I/F Module 1 Subnet Mask (ML)	255	0 to 255	255	
139	Network I/F Module 1 Subnet Mask (L)	0	0 to 255	0	
140	Network I/F Module 1 Default Gateway (H)	0	0 to 255	0	
141	Network I/F Module 1 Default Gateway (MH)	0	0 to 255	0	
142	Network I/F Module 1 Default Gateway (ML)	0	0 to 255	0	
143	Network I/F Module 1 Default Gateway (L)	0	0 to 255	0	
225	Network I/F Module Control Those stated in brackets ( ) are for XSEL-RA/SA Series	*7 (*07)	00_H to 37_H (000_H to 307_H) Reference only	07 (007)	Bits 0 to 7 (1st and 2nd digits) : Network I/F Module 1 type 0: Not Mounted 6: EtherCAT® 7: EtherNet/IP Bits 8 to 15 (3rd and 4th digits) : Network I/F Module 2 type 0: Not Mounted 1: CC-Link 2: DeviceNet 3: PROFIBUS-DP 4 to C: System Reservation D: CC-Link IE Field (XSEL-RA/SA only)

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
227	Network I/F Module 1 Baud Rate	0	0 to 4	0	• At EtherNet/IP: (0: Autonegotiation, 1: 10Mbps (Half-duplex), 2: 10Mbps (Full-duplex), 3: 100Mbps (Half-duplex), 4: 100Mbps (Full-duplex))
231	Network I/F Module 2 Remote Input Ports	0	0 to 256	0	8 port unit
232	Network I/F Module 2 Remote Output Ports	0	0 to 256	0	8 port unit
233	(Extension) (Note 1) Input Port Start No. at Network I/F Module 2 Fixed Assignment	-1	-1 to 299 1000 to 3999	-1	0+(Multiples of 8) or 1000+(Multiples of 8) [Ineffective when -1 is selected]
234	(Extension) (Note 1) Output Port Start No. at Network I/F Module 2 Fixed Assignment	-1	-1 300 to 599 4000 to 6999	-1	300+(Multiples of 8) or 4000+(Multiples of 8) [Ineffective when -1 is selected]
235	Network I/F Module 2 Error Monitoring	1	0 to 5	0	0: No Monitoring (Not to monitor condition of link to PLC (master)) 1: Monitoring

Note 1: The commands with “Extended” in the parameter name should only be applied for XSEL-R/S.

(2) Example for when using EtherNet/IP and I/O Board 1 together
It is how to establish the setting when using EtherNet/IP to 256 ports of each input and output from the top of the extended I/O ports and assigning the I/O board (48 ports for each input and output) to the standard I/O ports.
* The figure shown below is XSEL-R/S series. The setting should be the same for XSEL-RA/SA series.
(Except for I/O Parameter No. 225)



Extended Input Ports No.1000 to 1255
Extended Output Ports No.4000 to 4255
(EtherNet/IP Board)

Standard Input Port No.0 to 47
Standard Output Port No.300 to 347
(I/O Board)

● I/O Parameter

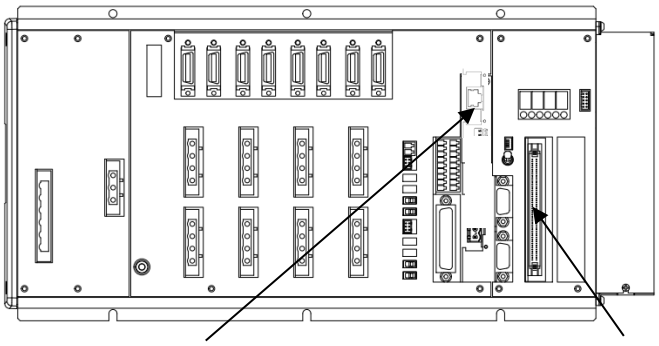
No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
1	I/O Port Allocation Type	1	0 to 1	0	0:Fixed Allocation 1:Automatic Allocation • Reference 1 Priority of I/O Port Assignment when automatically assigned Port Number (No.0 to 299/No.300 to 599) 1) Network I/F Module 1 2) I/O slot 1 (I/O1) Mounting board 3) I/O slot 2 (I/O2) Mounting board * I/O slot 1 (I/O1) Assigned for the continuously mounted range from mounting board • Reference 2 Priority of extension I/O ports at automatic assignment Port Number (No.1000 to 3999/No.4000 to 6999) 1) Network I/F Module 2 2) Expansion I/O unit 3) IA Net * 2) and 3) are for XSEL-R/S Series only
2	Standard I/O Fix-Allocated Input Port Start No.	0	-1 to 599	0	0+(Multiples of 8) [Ineffective when -1 is selected]
3	Standard I/O Fix-Allocated Output Port Start No.	300	-1 to 599	300	300+(Multiples of 8) [Ineffective when -1 is selected]
10	Standard I/O Error Monitoring (I/O1)	1	0 to 5	1	0: No Monitoring (Not to use I/O board) 1: Monitoring 2: Monitoring (Not to monitor 24V I/O power related error) 3: Monitoring (To monitor only 24V I/O power related error)
14	Network I/F Module 1 Remote Input Ports	0	0 to 256	256	8 port unit
15	Network I/F Module 1 Remote Output Ports	0	0 to 256	256	8 port unit

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
16	Network I/F Module 1 Fix-Allocated Input Port Start No.	-1	-1 to 299 1000 to 3999	1000	0+(Multiples of 8)(0 to 299) 1000+(Multiples of 8)(1000 to 3999) [Unavailable when it is negative figure]
17	Network I/F Module 1 Fix-Allocated Output Port Start No.	-1	-1 300 to 599 4000 to 6999	4000	300+(Multiples of 8)(300 to 599) 4000+(Multiples of 8)(4000 to 6999) [Unavailable when it is negative figure]
18	Network I/F Module 1 Error Monitor	1	0 to 5	1	0: No Monitoring (Not to use Network I/F Module 1) 1: Monitoring
120	Network Attribute 1	640001_H	0_H to $FFFFFFFF_H$	Opti-onal	Bits 28 to 31: Network I/F Module 1 Input port data select for link error (0: Clear, 1: Hold)
121	Network Attribute 2	$C80000_H$	0_H to $FFFFFFFF_H$	Opti-onal	Bits 8 to 11: Network I/F Module 2 Input port data select for link error (0: Clear, 1: Hold) Bits 16 to 27: Value of Link Timeout at initializing of the Fieldbus (100ms)
132	Network I/F Module 1 Self IP Address (H)	192	1 to 255	192	* Prohibited to set to 0 and 127
133	Network I/F Module 1 Self IP Address (MH)	168	0 to 255	168	
134	Network I/F Module 1 Self IP Address (ML)	0	0 to 255	0	
135	Network I/F Module 1 Self IP Address (L)	1	1 to 254	1	* Prohibited to set to 0 and 255
136	Network I/F Module 1 Subnet Mask (H)	255	0 to 255	255	
137	Network I/F Module 1 Subnet Mask (MH)	255	0 to 255	255	
138	Network I/F Module 1 Subnet Mask (ML)	255	0 to 255	255	
139	Network I/F Module 1 Subnet Mask (L)	0	0 to 255	0	
140	Network I/F Module 1 Default Gateway (H)	0	0 to 255	0	
141	Network I/F Module 1 Default Gateway (MH)	0	0 to 255	0	
142	Network I/F Module 1 Default Gateway (ML)	0	0 to 255	0	
143	Network I/F Module 1 Default Gateway (L)	0	0 to 255	0	
225	Network I/F Module Control Those stated in brackets ( ) are for XSEL-RA/SA Series	*7 (*07)	00_H to 37_H (000_H to 307_H) Reference only	07 (007)	Bits 0 to 7 (1st and 2nd digits) : Type of Network I/F Module Control 1 0: Not Mounted 6: EtherCAT® 7: EtherNet/IP Bits 8 to 15 (3rd and 4th digits) : Type of Network I/F Module Control 2 0: Not Mounted 1: CC-Link 2: DeviceNet 3: PROFIBUS-DP 4 to C: System Reservation D: CC-Link IE Field (XSEL-RA/SA only)
227	Network I/F Module 1 Baud Rate	0	0 to 4	0	• At EtherNet/IP: (0: Autonegotiation, 1: 10Mbps (Half-duplex), 2: 10Mbps (Full-duplex), 3: 100Mbps (Half-duplex), 4: 100Mbps (Full-duplex))

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
231	Network I/F Module 2 Remote Input Ports	0	0 to 256	0	8 port unit
232	Network I/F Module 2 Remote Output Ports	0	0 to 256	0	8 port unit
233	(Extension) (Note 1) Input Port Start No. at Network I/F Module 2 Fixed Assignment	-1	-1 to 299 1000 to 3999	-1	0+(Multiples of 8) or 1000+(Multiples of 8) [Ineffective when -1 is selected]
234	(Extension) (Note 1) Output Port Start No. at Network I/F Module 2 Fixed Assignment	-1	-1 300 to 599 4000 to 6999	-1	300+(Multiples of 8) or 4000+(Multiples of 8) [Ineffective when -1 is selected]
235	Network I/F Module 2 Error Monitoring	1	0 to 5	0	0: No Monitoring (Not to monitor condition of link to PLC (master)) 1: Monitoring

Note 1: The commands with “Extended” in the parameter name should only be applied for XSEL-R/S.

(3) Example for when using EtherNet/IP and I/O Board 1 together
This is the setting of when using 192 points of each input and output from the top of the standard I/O ports in EtherNet/IP, and also sharing the standard I/O ports with the I/O board (48 points of each input and output).
* The figure shown below is XSEL-R/S series. The setting should be the same for XSEL-RA/SA series.
(Except for I/O Parameter No. 225)



Standard Input Port No.0 to 191
Standard Output Port No.300 to 491
(EtherNet/IP Board)

Standard Input Port No.192 to 239
Standard Output Port No.492 to 539
(I/O Board)

● I/O Parameter

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
1	I/O Port Allocation Type	1	0 to 1	0	0:Fixed Allocation 1:Automatic Allocation • Reference 1 Priority of I/O Port Assignment when automatically assigned Port Number (No.0 to 299/No.300 to 599) 1) Network I/F Module 1 2) I/O slot 1 (I/O1) Mounting board 3) I/O slot 2 (I/O2) Mounting board * I/O slot 1 (I/O1) Assigned for the continuously mounted range from mounting board • Reference 2 Priority of extension I/O ports at automatic assignment Port Number (No.1000 to 3999/No.4000 to 6999) 1) Network I/F Module 2 2) Expansion I/O unit 3) IA Net * 2) and 3) are for XSEL-R/S Series only
2	Standard I/O Fix-Allocated Input Port Start No.	0	-1 to 599	192	0+(Multiples of 8) [Ineffective when -1 is selected]
3	Standard I/O Fix-Allocated Output Port Start No.	300	-1 to 599	492	300+(Multiples of 8) [Ineffective when -1 is selected]
10	Standard I/O Error Monitoring (I/O1)	1	0 to 5	1	0: No Monitoring (Not to use I/O board) 1: Monitoring 2: Monitoring (Not to monitor 24V I/O power related error) 3: Monitoring (To monitor only 24V I/O power related error)
14	Network I/F Module 1 Remote Input Ports	0	0 to 256	192	8 port unit
15	Network I/F Module 1 Remote Output Ports	0	0 to 256	192	8 port unit

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
16	Network I/F Module 1 Fix-Allocated Input Port Start No.	-1	-1 to 299 1000 to 3999	0	0+(Multiples of 8)(0 to 299) 1000+(Multiples of 8)(1000 to 3999) [Unavailable when it is negative figure]
17	Network I/F Module 1 Fix-Allocated Output Port Start No.	-1	-1 300 to 599 4000 to 6999	300	300+(Multiples of 8)(300 to 599) 4000+(Multiples of 8)(4000 to 6999) [Unavailable when it is negative figure]
18	Network I/F Module 1 Error Monitor	1	0 to 5	1	0: No Monitoring (Not to use Network I/F Module 1) 1: Monitoring
120	Network Attribute 1	640001_H	0_H to $FFFFFFFF_H$	Opti-onal	Bits 28 to 31: Network I/F Module 1 Input port data select for link error (0: Clear, 1: Hold)
121	Network Attribute 2	$C80000_H$	0_H to $FFFFFFFF_H$	Opti-onal	Bits 8 to 11: Network I/F Module 2 Input port data select for link error (0: Clear, 1: Hold) Bits 16 to 27: Value of Link Timeout at initializing of the Fieldbus (100ms)
132	Network I/F Module 1 Self IP Address (H)	192	1 to 255	192	* Prohibited to set to 0 and 127
133	Network I/F Module 1 Self IP Address (MH)	168	0 to 255	168	
134	Network I/F Module 1 Self IP Address (ML)	0	0 to 255	0	
135	Network I/F Module 1 Self IP Address (L)	1	1 to 254	1	* Prohibited to set to 0 and 255
136	Network I/F Module 1 Subnet Mask (H)	255	0 to 255	255	
137	Network I/F Module 1 Subnet Mask (MH)	255	0 to 255	255	
138	Network I/F Module 1 Subnet Mask (ML)	255	0 to 255	255	
139	Network I/F Module 1 Subnet Mask (L)	0	0 to 255	0	
140	Network I/F Module 1 Default Gateway (H)	0	0 to 255	0	
141	Network I/F Module 1 Default Gateway (MH)	0	0 to 255	0	
142	Network I/F Module 1 Default Gateway (ML)	0	0 to 255	0	
143	Network I/F Module 1 Default Gateway (L)	0	0 to 255	0	
225	Network I/F Module Control Those stated in brackets ( ) are for XSEL-RA/SA Series	*7 (*07)	00_H to 37_H (000_H to 307_H) Reference only	07 (007)	Bits 0 to 7 (1st and 2nd digits) : Type of Network I/F Module Control 1 0: Not Mounted 6: EtherCAT® 7: EtherNet/IP Bits 8 to 15 (3rd and 4th digits) : Type of Network I/F Module Control 2 0: Not Mounted 1: CC-Link 2: DeviceNet 3: PROFIBUS-DP 4 to C: System Reservation D: CC-Link IE Field (XSEL-RA/SA only)
227	Network I/F Module 1 Baud Rate	0	0 to 4	0	• At EtherNet/IP: (0: Autonegotiation, 1: 10Mbps (Half-duplex), 2: 10Mbps (Full-duplex), 3: 100Mbps (Half-duplex), 4: 100Mbps (Full-duplex))

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
231	Network I/F Module 2 Remote Input Ports	0	0 to 256	0	8 port unit
232	Network I/F Module 2 Remote Output Ports	0	0 to 256	0	8 port unit
233	(Extension) (Note 1) Input Port Start No. at Network I/F Module 2 Fixed Assignment	-1	-1 to 299 1000 to 3999	-1	0+(Multiples of 8) or 1000+(Multiples of 8) [Ineffective when -1 is selected]
234	(Extension) (Note 1) Output Port Start No. at Network I/F Module 2 Fixed Assignment	-1	-1 300 to 599 4000 to 6999	-1	300+(Multiples of 8) or 4000+(Multiples of 8) [Ineffective when -1 is selected]
235	Network I/F Module 2 Error Monitoring	1	0 to 5	0	0: No Monitoring (Not to monitor condition of link to PLC (master)) 1: Monitoring

Note 1: The commands with “Extended” in the parameter name should only be applied for XSEL-R/S.

3.6 Connection to Network

EtherNet/IP occupies EtherNet Port No.44818 and 2222.
The connection of EtherNet/IP is established by indicating the port 44818 in the IP address of XSEL Controllers in EtherNet/IP software.

> ⚠ Caution Please note that Port No.2222 (UDP Port) and 44818 (TCP Port and UDP Port) must be open for use by any firewall configuration.

> ⚠ Caution In case EtherNet/IP Remote IO Communication and TCP/IP Message Communication are being used at the same time, the reset command from the network configurator may not be executed properly.
> If an execution of the reset from the configurator is required, temporarily inactivate TCP/IP Message Communication (by setting 0 to I/O Parameter No. 129 "Network Attribute 10"), and conduct the reset. (Make sure to put back the setting after reset is done.)

3.7 Standard I/O Ports of XSEL Controller

It is available to add special functions beside the general-purposed input and output in the standard I/O ports of XSEL Controllers.
Refer to [XSEL-R/S/RX/SX/RXD/SXD Controller or XSEL-RA/SA/RAX/SAX/RAXD/SAXD controller Operation Manual] for the details.

[Settings of Standard I/O Ports at Delivery]

Input Port			Output Port	
Port No.	Function		Port No.	Function
000	Program Start		300	Alarm Output
001	Universal Input		301	Ready Output
002	Universal Input		302	Emergency Stop Output
003	Universal Input		303	Universal Output
004	Universal Input		304	Universal Output
005	Universal Input		305	Universal Output
006	Universal Input		306	Universal Output
007	Program Specification	(LSB)	307	Universal Output
008	Program Specification	Indicate startup program number with in binary	308	Universal Output
009	Program Specification		309	Universal Output
010	Program Specification		310	Universal Output
011	Program Specification		311	Universal Output
012	Program Specification		312	Universal Output
013	Program Specification	(MSB)	313	Universal Output
014	Universal Input		314	Universal Output
015	Universal Input		315	Universal Output
⋮			⋮	

(Note) Number of standard I/O ports is:
- Input 000 to 299 (300 points max.)
- Output 300 to 599 (300 points max.)

Be careful of the number of I/O ports when using EtherNet/IP and PIO together.

3.8 I/O Port and Data Reading and Writing

The initial setting of SEL language commands for the operation of I/O (input and output) ports of XSEL Controller is set to execute reading and writing without the data being exchanged. Shown below is an example for the assignments on the EtherNet/IP master side and XSEL controller side.

[XSEL side output domain ⇒ EtherNet/IP side master input domain]

Address	Bit 7 (MSB)	6	5	4	3	2	1	0 (LSB)
XSEL Output Port Number	307	306	305	304	303	302	301	300
EtherNet/IP Input word address	0 (lower-order byte)							
XSEL Output Port Number	315	314	313	312	311	310	309	308
EtherNet/IP Input word address	0 (host byte)							
XSEL Output Port Number	323	322	321	320	319	318	317	316
EtherNet/IP Input word address	1 (lower-order byte)							
XSEL Output Port Number	331	330	329	328	327	326	325	324
EtherNet/IP Input word address	1 (host byte)							

⋮

● Example Data (1234_H) from XSEL is changed to 1234_H in EtherNet/IP.

XSEL	HEX	1	2	3	4
	BIN	0001	0010	0011	0100
EtherNet/IP Master	HEX	1	2	3	4
	BIN	0001	0010	0011	0100

[EtherNet/IP master side output domain ⇒ XSEL side input domain]

Address	Bit 7 (MSB)	6	5	4	3	2	1	0 (LSB)
XSEL Input Port Number	7	6	5	4	3	2	1	0
EtherNet/IP Output word address	0 (lower-order byte)							
XSEL Input Port Number	15	14	13	12	11	10	9	8
EtherNet/IP Output word address	0 (host byte)							
XSEL Input Port Number	23	22	21	20	19	18	17	16
EtherNet/IP Output word address	1 (lower-order byte)							
XSEL Input Port Number	31	30	29	28	27	26	25	24
EtherNet/IP Output word address	1 (host byte)							

⋮

● Example Data (1234_H) from EtherNet/IP master is changed to 1234_H in XSEL.

EtherNet/IP Master	HEX	1	2	3	4
	BIN	0001	0010	0011	0100
XSEL	HEX	1	2	3	4
	BIN	0001	0010	0011	0100

●Reference How to Read and Write with Swapping Host 8 Bits with Lower 8 Bits for Every 16-Bit Data

When conducting reading and writing with swapping the host 8 bits with lower 8 bits for every 16-bit data, set Format Type to 1 (Swap host 8 bits with lower 8 bits for every 16-bit data) with FMIO Command before executing an input and output port operation command such as IN Command and OUT Command in XSEL Controller.
For details, refer to [SEL Programming Manual (ME0224)].
Shown below is an example for the assignments on EtherNet/IP master side and XSEL controller side.

[EtherNet/IP master side output domain ⇒ XSEL side input domain]

Address	Bit 7 (MSB)	6	5	4	3	2	1	0 (LSB)
XSEL Input Port Number	307	306	305	304	303	302	301	300
EtherNet/IP Output bit address	15	14	13	12	11	10	9	8
EtherNet/IP Output word address	0 (host byte)							
XSEL Input Port Number	315	314	313	312	311	310	309	308
EtherNet/IP Output bit address	7	6	5	4	3	2	1	0
EtherNet/IP Output word address	0 (lower-order byte)							
XSEL Input Port Number	323	322	321	320	319	318	317	316
EtherNet/IP Output bit address	31	30	29	28	27	26	25	24
EtherNet/IP Output word address	1 (host byte)							
XSEL Input Port Number	331	330	329	328	327	326	325	324
EtherNet/IP Output bit address	23	22	21	20	19	18	17	16
EtherNet/IP Output word address	1 (lower-order byte)							

⋮

● Example Data (1234_H) from EtherNet/IP master is changed to 1234_H in XSEL.

EtherNet/IP Master	HEX	1	2	3	4
	BIN	0001	0010	0011	0100

XSEL	HEX	3	4	1	2
	BIN	0011	0100	0001	0010

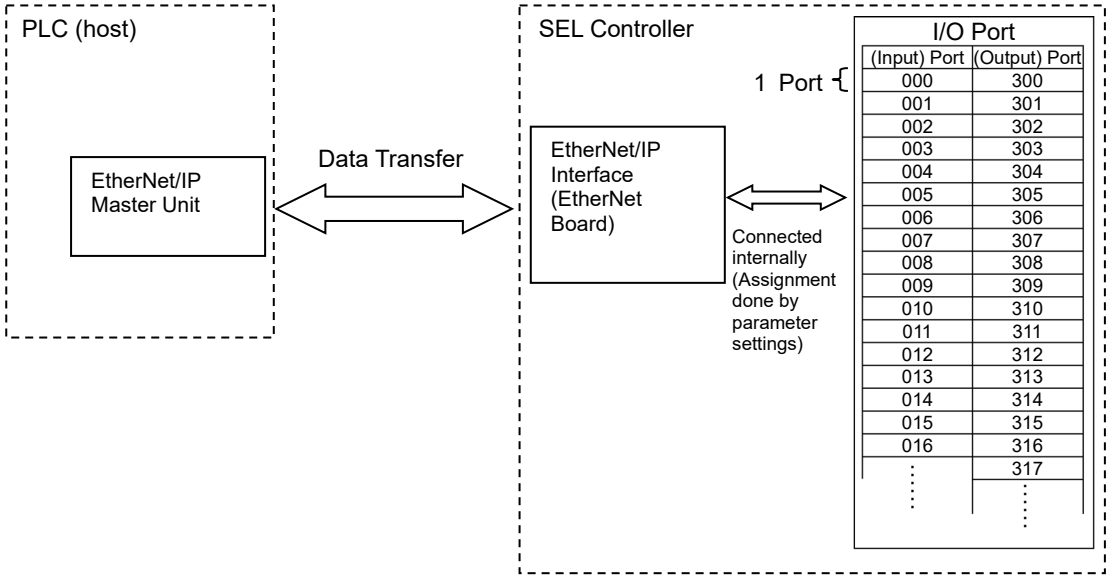
4. ASEL, PSEL, SSEL

4.1 Operation Modes and Functions

ASEL, PSEL, SSEL Controllers applicable for EtherNet/IP are applicable for the remote I/O control (*1) (256 points max. for each input and output).

*1 Input and output (I/O port) of 24V is controlled in one port unit. I/O port is a point to receive and send data located inside the SEL controller. 1 port can handle data of 1 contact (1 bit).
Data are sent and received via either field network.

● Operation Image



Tip:
In case you require to have a control with connection to the PC software or in Format B by the TCP/IP messaging communication, refer to [X-SEL Ethernet Operation Manual (ME0140)].

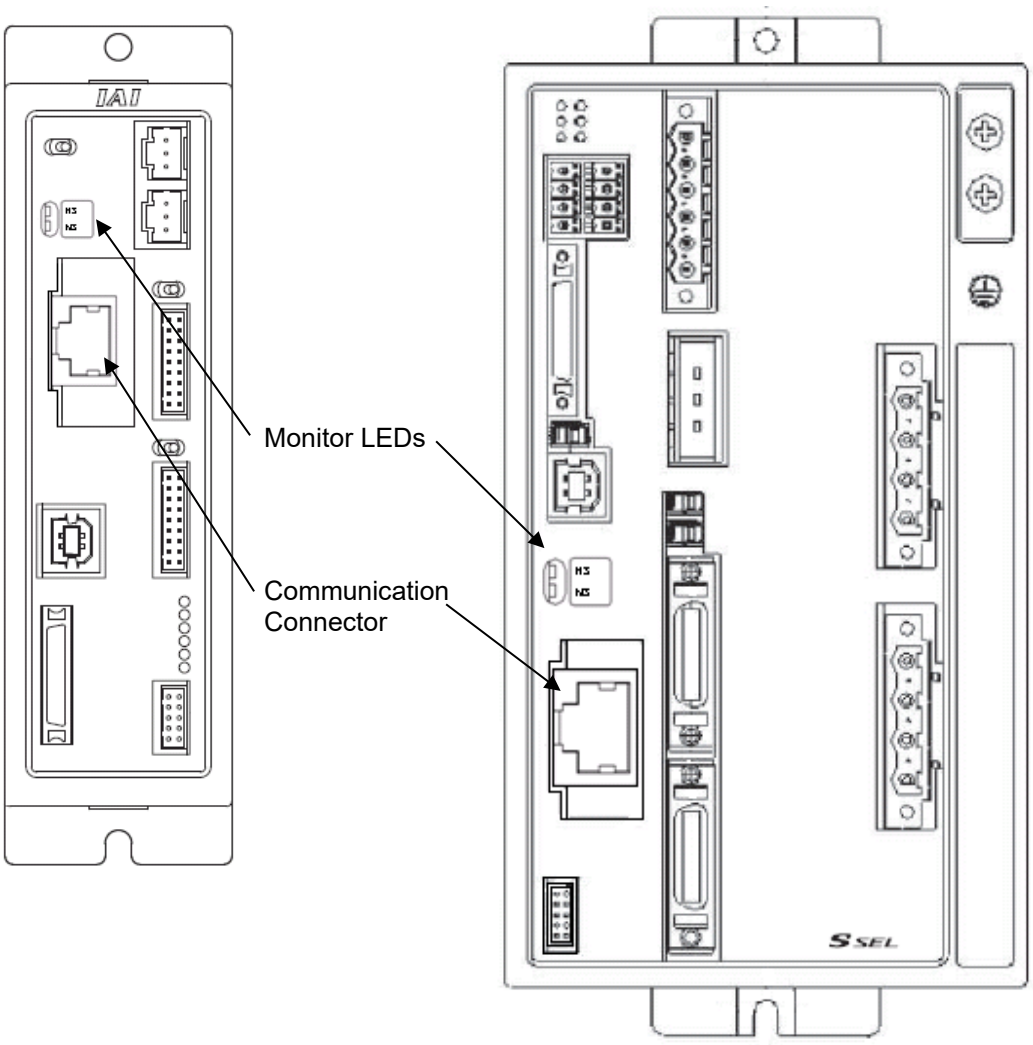
4.2 Model

The model code of each of SEL Controller applicable for EtherNet/IP is as shown below.

1 axis
ASEL-CS-1-□-EP-□
PSEL-CS-1-□-EP-□
2 axes
ASEL-CS-2-□-EP-□
PSEL-CS-2-□-EP-□

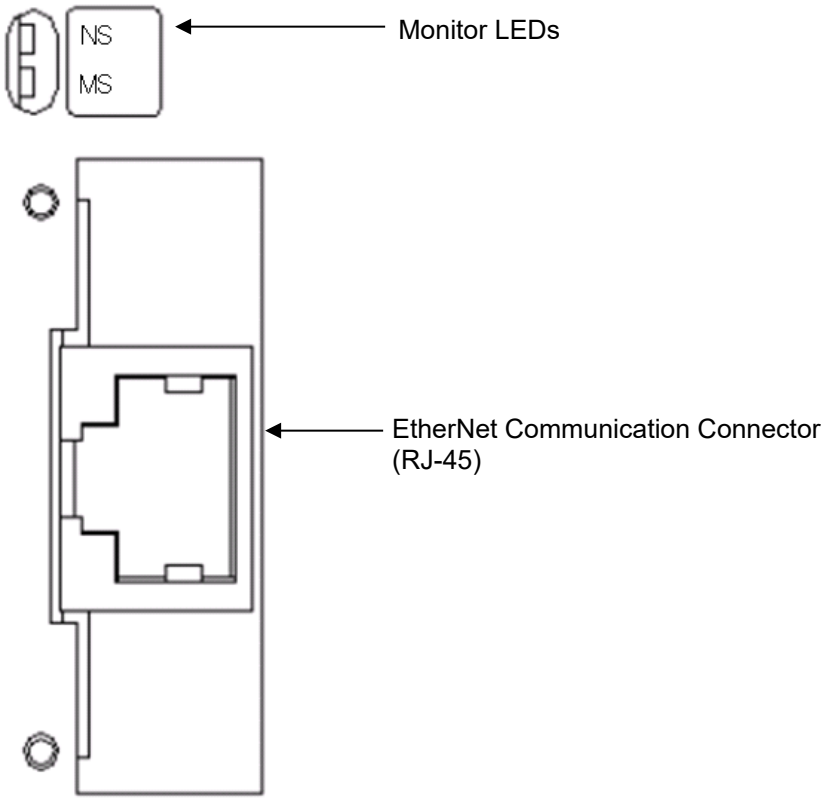
1 axis
SSEL-CS-1-□-EP-□

2 axes
SSEL-CS-2-□-EP-□



4.3 EtherNet/IP Interface

4.3.1 Names of the Parts



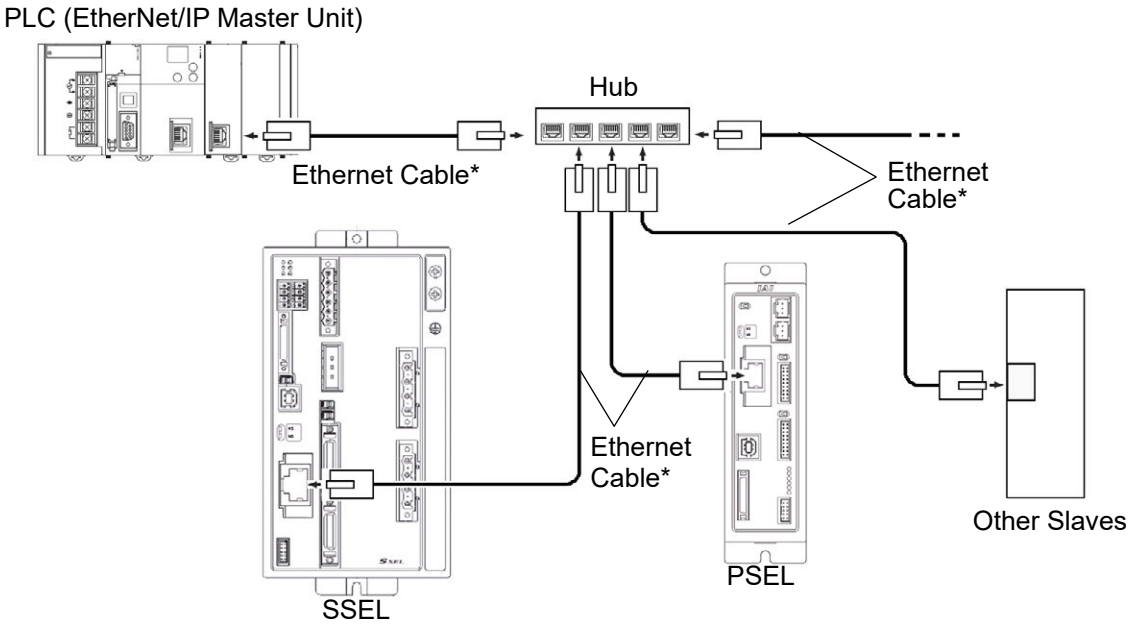
4.3.2 Monitor LED indications

LED	Color	Indication Status	Meaning
NS (Network Status)	Green	Illuminating	Online, Communication in normal condition
		Flashing	Online, No connection established
	Orange	Illuminating	IP address duplication Critical link error
		Flashing	Connection timeout
	-	OFF	No power supply confirmed / IP address not established
MS (Module Status)	Green	Illuminating	Normal Operation
		Flashing	Configuration setting not established or not complete, Test run required
	Orange	Illuminating	An error that cannot be recovered
		Flashing	An error that can be recovered
	-	OFF	No power supply confirmed

* When only TCP/IP messages are used, both NS and MS flash in green.
When NS and MS are turned on in green, it shows the remote I/O communication condition of EtherNet/IP.

4.4 Wiring

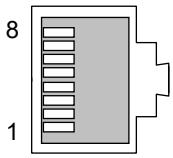
4.4.1 Wiring (example)



* Ethernet Cable: Straight cable of category 5 or more, 100m max.
(Aluminum tape and braided double-shielded cable are recommended.)

(Note) Terminal processing is not required.

4.4.2 Connector Pin Layout



RJ-45 8-pin
Module Connector
(Controller Side)

Pin No.	Signal Name	Signal Abbreviation
1	Data transmitted +	TD+
2	Data transmitted -	TD-
3	Data received +	RD+
4	Not used	
5	Not used	
6	Data received -	RD-
7	Not used	
8	Not used	
Connector hood	Grounding pin for security	FG

4.5 Setting

Set to the I/O parameters in the controller by using a teaching tool. Place the controller's AUTO/MANU switch in the MANU position. The versions of teaching tool compatible with EtherNet/IP are as follows:

- XSEL PC software : from V10.00.00.00
- TB-01/TB-02 : from V1.00
- TB-03 : from V1.80

4.5.1 Parameter Setting

[1] Check of Network Module Type

Confirm that the 1st digit of I/O Parameter No.225 Network I/F Module Control setting is showing "7" (EtherNet/IP).

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
225	Network I/F Module Control	7 (Only to reference)	0 to $FFFFFFFF_H$	-	Bits 0 to 3: Type of Network I/F Module Control 1 0: Not Mounted, 1: CC-Link, 2: DeviceNet, 3: PROFIBUS, 4 to 5: System Reservation, 6: EtherCAT®, 7: EtherNet/IP

The setting of this parameter is established at the delivery. For EtherNet/IP, it is shown as "7_H". The value to be shown may differ depending on the construction of used option board.

[2] IP Address Setting

Set the IP Address to I/O Parameter No.132 to 135.

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
132	Network I/F Module Self IP Address (H)	192	1 to 255	-	* Prohibited to set to 0 and 127
133	Network I/F Module Self IP Address (MH)	168	0 to 255	-	
134	Network I/F Module Self IP Address (ML)	0	0 to 255	-	
135	Network I/F Module Self IP Address (L)	1	1 to 254	-	* Prohibited to set to 0 and 255

Pay attention to avoid duplication of IP address.

[3] Subnet Mask Setting

Set the subnet mask to I/O Parameter No.136 to 139.

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
136	Network I/F Module Subnet Mask (H)	255	0 to 255	-	
137	Network I/F Module Subnet Mask (MH)	255	0 to 255	-	
138	Network I/F Module Subnet Mask (ML)	255	0 to 255	-	
139	Network I/F Module Subnet Mask (L)	0	0 to 255	-	

[4] Default Gateway Setting

Set the default gateway to I/O Parameter No.140 to 143.

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
140	Network I/F Module Default Gateway (H)	0	0 to 255	-	
141	Network I/F Module Default Gateway (MH)	0	0 to 255	-	
142	Network I/F Module Default Gateway (ML)	0	0 to 255	-	
143	Network I/F Module Default Gateway (L)	0	0 to 255	-	

[5] Baud Rate Setting

Set the baud rate to I/O Parameter No.227.

It is recommended to set to Auto-negotiation for the baud rate setting.

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
227	Network I/F Module Baud Rate	0	0 to 4	-	(0: Autonegotiation, 1: 10Mbps (Half-duplex), 2: 10Mbps (Full-duplex), 3: 100Mbps (Half-duplex), 4: 100Mbps (Full-duplex))

Set the baud rate to the value that matches with the baud rate (mode) of such as switching hub.

Operation without matching the setting may lead to unstable communications. In case a value out of the range of EtherNet/IP specifications is set, “D75: Fieldbus Parameter Error” is issued.

[6] I/O Port Assignment Classification Setting

Set the I/O port assignment Classification to I/O Parameter No.1.

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
1	I/O Port Allocation Type	1	0 to 1	-	0: Fixed Allocation 1: Automatic Allocation

Note If the automatic assignment “1” is selected, the input port is assigned to an input port area (input: No. 0 to 299).
The output port is assigned to the output port area (output: No. 300 to 599).
If the fixed assignment “0” is selected, the user will manually assign the input to either of the standard input port area (No. 0 to 299) or extension input port area (output: No. 300 to 599).

[7] Number of I/O Port Setting

Set the number of ports to be used for I/O Parameters No.14 to 15.

Set a number that is a multiple of 8.

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
14	Network I/F Module Number of Remote Input Ports	0	0 to 256	-	Multiples of 8
15	Network I/F Module Number of Remote Output Ports	0	0 to 256	-	Multiples of 8

[8] I/O Port Top Number Setting

Set the top port number of the port range used in I/O Parameters No.16 to 17.
The values entered into these parameters must be evenly divisible by 8.

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
16	Network I/F Module Fix-Allocated Input Port Start No.	-1	-1 to 299	-	0+(Multiples of 8)(0 to 299) (Unavailable when it is negative figure)
17	Network I/F Module Fix-Allocated Output Port Start No.	-1	-1 300 to 599	-	300+(Multiples of 8)(300 to 599) (Unavailable when it is negative figure)

[9] EtherNet/IP Board Use Setting

Set “1” (Monitoring: use EtherNet board) to I/O Parameter No.18.

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
18	Network I/F Module Error Monitor	1	0 to 5	-	0: No Monitoring 1: Monitoring

[10] EtherNet/IP Error Confirmation Time Setting

In I/O Parameter No. 120, establish setting to determine if generating an error immediately or generating an error after the final checking after waiting for a certain time that is set in Bit 4 to 11 when a failure is occurred to the network.

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
120	Network Attribute 1	1_H	0_H to $FFFFFFFF_H$	10 ms	Bits 0 to 3: Set to 0. Bits 4 to 11: Value of Link Timeout at initializing (Example) The initial value 0_H = The generates system error immediately at network link error occurrence. Bits 12 to 31: Set to 0.

[11] Time Adjustment to Wait for Link Establishment

Standby time to wait for the link to the master at the controller startup is available to adjust.
When the setting value is C8H for example, it waits for 20s at the maximum for the establishment of the link with the master since the network I/F initialization.
Change this setting when controller starts faster than the network master, which results in a generation of “A6B/D5D: Fieldbus Error (FBRS Link Error)” etc. can be used in time adjustment.

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
121	Network Attribute 2	$C80000_H$	0_H to $FFFFFFFF_H$	100 ms	Bits 16 to 27: Value of Link Timeout at initializing of the Fieldbus (100ms) (ASEL/PSEL: Main application of Ver.0.36 or later SSEL: Main application of Ver.0.42 or later) (Example) The initial value C80000H is bit 16 to 27 = C8H = 200 (in 100ms unit) 200 × 100ms = 20s It waits for communication to be established for 20s at the maximum from the startup.

4.5.2 Example for Parameter Settings

It is the setting when using EtherNet/IP at 256 points of each input and output from the top of the standard I/O port.

- I/O Parameter

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
1	I/O Port Allocation Type	1	0 to 1	0	0: Fixed Allocation 1: Automatic Allocation
2	Standard I/O Fix-Allocated Input Port Start No.	0	-1 to 599	-1	0+(Multiples of 8) [Ineffective when -1 is selected]
3	Standard I/O Fix-Allocated Output Port Start No.	300	-1 to 599	-1	300+(Multiples of 8) [Ineffective when -1 is selected]
10	Standard I/O Error Monitoring (I/O1)	1	0 to 5	0	0: No Monitoring (Not to use I/O board) 1: Monitoring 2: Monitoring (Not to monitor 24V I/O power related error) 3: Monitoring (To monitor only 24V I/O power related error)
14	Network I/F Module Remote Input Ports	0	0 to 256	256	8 port unit
15	Network I/F Module Remote Output Ports	0	0 to 256	256	8 port unit
16	Network I/F Module Fix-Allocated Input Port Start No.	-1	-1 to 299	0	0+(Multiples of 8) [Ineffective when -1 is selected]
17	Network I/F Module Fix-Allocated Output Port Start No.	-1	-1 300 to 599	300	300+(Multiples of 8) [Ineffective when -1 is selected]
18	Network I/F Module Error Monitor	1	0 to 5	1	0: No Monitoring (Not to use Network I/F Module 1) 1: Monitoring
120	Network Attribute 1	1_H	0_H to FFFFFFFF$_H$	Opti-onal	Bits 0 to 3: Set to 0. Bits 4 to 11: Value of Link Timeout at initializing (Example) The initial value 64_H = 1s Bits 12 to 27: Set to 0.
121	Network Attribute 2	C80000$_H$	0_H to FFFFFFFF$_H$	Opti-onal	Bits 16 to 27: Value of Link Timeout at initializing of the Fieldbus (100ms) (ASEL/PSEL: Main application of Ver.0.36 or later, SSEL: Main application of Ver.0.42 or later) (Example) The initial value C80000H is bit 16 to 27 = C8H = 200 (in 100ms unit) 200 × 100ms = 20s It waits for communication to be established for 20s at the maximum from the startup.
122	Network Attribute 3	10_H	0_H to FFFFFFFF$_H$	Opti-onal	Bits 0 to 11: "PC/TP Reconnection Latency at Software Reset" added time (s) when fieldbus in use * Valid Values from 0 to 500 (s) (ASEL/PSEL: Main application of Ver.0.36 or later, SSEL: Main application of Ver.0.42 or later)
132	Network I/F Module Self IP Address (H)	192	1 to 255	192	* Prohibited to set to 0 and 127
133	Network I/F Module Self IP Address (MH)	168	0 to 255	168	
134	Network I/F Module Self IP Address (ML)	0	0 to 255	0	
135	Network I/F Module Self IP Address (L)	1	1 to 254	1	* Prohibited to set to 0 and 255
136	Network I/F Module Subnet Mask (H)	255	0 to 255	255	

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
137	Network I/F Module Subnet Mask (MH)	255	0 to 255	255	
138	Network I/F Module Subnet Mask (ML)	255	0 to 255	255	
139	Network I/F Module Subnet Mask (L)	0	0 to 255	0	
140	Network I/F Module Default Gateway (H)	0	0 to 255	0	
141	Network I/F Module Default Gateway (MH)	0	0 to 255	0	
142	Network I/F Module Default Gateway (ML)	0	0 to 255	0	
143	Network I/F Module Default Gateway (L)	0	0 to 255	0	
225	Network I/F Module Control	(Only to reference)	0 to 7_H	7	Bits 0 to 3: Type of Network I/F Module Control 1 0: Not Mounted 1: CC-Link, 2: DeviceNet, 3: PROFIBUS, 4 to 5: System Reservation, 6: EtherCAT® 7: EtherNet/IP
227	Network I/F Module 1 Baud Rate	0	0 to 4	0	(0: Autonegotiation, 1: 10Mbps (Half-duplex), 2: 10Mbps (Full-duplex), 3: 100Mbps (Half-duplex), 4: 100Mbps (Full-duplex))

4.6 Connection to Network

EtherNet/IP occupies EtherNet Port No.44818 and 2222.
The connection of EtherNet/IP is established by indicating the port 44818 in the IP address of XSEL Controllers in EtherNet/IP software.

> ⚠ Caution Please note that Port No.2222 (UDP Port) and 44818 (TCP Port and UDP Port) must be open for use by any firewall configuration of the EtherNet/IP the remote I/O communication .

> ⚠ Caution In case EtherNet/IP Remote IO Communication and TCP/IP Message Communication are being used at the same time, the reset command from the network configurator may not be executed properly.
> If an execution of the reset from the configurator is required, temporarily inactivate TCP/IP Message Communication (by setting 0 to I/O Parameter No. 129 “Network Attribute 10”), and conduct the reset. (Make sure to put back the setting after reset is done.)

4.7 Standard I/O Ports of SEL Controller

It is available to add special functions beside the general-purposed input and output in the standard I/O ports of SEL Controllers.
Refer to [each controllers operation manual (ASEL, PSEL, SSEL)] for the details.

[Settings of Standard I/O Ports at Delivery: Program Mode・・Refer to the next page for positioner mode.]

Input Port		Output Port	
Port No.	Function	Port No.	Function
000	Universal Input/Program Start	300	Universal Output/Alarm Output
001	Universal Input/Specified function select	301	Universal Output/Ready Output
002	Universal Input/Specified function select	302	Universal Output/Specified function select
003	Universal Input/Specified function select	303	Universal Output/Specified function select
004	Universal Input/Specified function select	304	Universal Output/Specified function select
005	Universal Input/Specified function select	305	Universal Output/Specified function select
006	Universal Input/Specified function select	306	Universal Output/Specified function select
007	Universal Input/Specified function select	307	Universal Output/Specified function select
008	Universal Input/Specified function select	308	Universal Output/Specified function select
009	Universal Input/Specified function select	309	Universal Output/Specified function select
010	Universal Input/Specified function select	310	Universal Output/Specified function select
011	Universal Input/Specified function select	311	Universal Output/Specified function select
012	Universal Input/Specified function select	312	Universal Output/Specified function select
013	Universal Input/Specified function select	313	Universal Output/Specified function select
014	Universal Input/Specified function select	314	Universal Output/Specified function select
015	Universal Input/Specified function select	315	Universal Output/Specified function select
⋮		⋮	

(Note) Number of standard I/O ports is:
- Input 000 to 299 (300 points max.)
- Output 300 to 599 (300 points max.)

Input and Output Signal List for each PIO Pattern in Positioner Mode

Pin No.	Class	Port No.	Positioner mode					Cable Color
			Standard mode	Model switching mode	2 Axes independent mode	Teaching mode	DS-S-C1 compatible mode	
1A	P24		24V Input					1-Brown
1B	Input	16	Position input 10	Input 10	Position input 7	1-axis jog -	Position No.1000 input	1-Red
2A		17	Position input 11	Input 11	Position input 8	2-axis jog +	–	1-Orange
2B		18	Position input 12	Input 12	Position input 9	2-axis jog -	–	1-Yellow
3A		19	Position input 13	Input 13	Position input 10	Inching (0.01mm)	–	1-Green
3B		20	–	Input 14	Position input 11	Inching (0.1mm)	–	1-Blue
4A		21	–	Input 15	Position input 12	Inching (0.5mm)	–	1-Purple
4B		22	–	Input 16	Position input 13	Inching (1mm)	–	1-Gray
5A		23	Error reset	Error reset	Error reset	Error reset	CPU reset	1-White
5B		0	Start	Start	1-axis start	Start	Start	1-Black
6A		1	Home return	Home return	Home return	Servo ON	Pause	2-Brown
6B		2	Servo ON	Servo ON	1-axis Servo ON	* Pause	Cancel	2-Red
7A		3	Pressing	Pressing	* 1-axis pause	Position input 1	Interpolation setting	2-Orange
7B		4	* Pause	* Pause	* 1-axis cancel	Position input 2	Position No.1 input	2-Yellow
8A		5	* Cancel	* Cancel	2-axis start	Position input 3	Position No.2 input	2-Green
8B		6	Interpolation	Interpolation	2-axis Home return	Position input 4	Position No.4 input	2-Blue
9A		7	Position input 1	Input 1	2-axis Servo ON	Position input 5	Position No.8 input	2-Purple
9B		8	Position input 2	Input 2	* 2-axis pause	Position input 6	Position No.10 input	2-Gray
10A		9	Position input 3	Input 3	* 2-axis cancel	Position input 7	Position No.20 input	2-White
10B		10	Position input 4	Input 4	Position input 1	Position input 8	Position No.40 input	2-Black
11A		11	Position input 5	Input 5	Position input 2	Position input 9	Position No.80 input	3-Brown
11B		12	Position input 6	Input 6	Position input 3	Position input 10	Position No.100 input	3-Red
12A		13	Position input 7	Input 7	Position input 4	Position input 11	Position No.200 input	3-Orange
12B		14	Position input 8	Input 8	Position input 5	Teaching mode specification	Position No.400 input	3-Yellow
13A		15	Position input 9	Input 9	Position input 6	1-axis jog +	Position No.800 input	3-Green
13B	Output	300	* Alarm	* Alarm	* Alarm	* Alarm	Alarm	3-Blue
14A		301	Ready	Ready	Ready	Ready	Ready	3-Purple
14B		302	Positioning completion	Positioning completion	1-axis positioning completion	Positioning completion	Positioning completion	3-Gray
15A		303	Home return completion	Home return completion	1-axis home return completion	Home return completion	–	3-White
15B		304	Servo ON output	Servo ON output	1-axis servo ON	Servo ON output	–	3-Black
16A		305	Pressing completion	Pressing completion	2-axis positioning completion		–	4-Brown
16B		306	System battery error	System battery error	2-axis home return completion	System battery error	System battery error	4-Red
17A		307	–	–	2-axis servo ON	–	–	4-Orange
17B	N		0V input					4-Yellow

*: Break Contact (always ON)

4.8 I/O Port and Data Reading and Writing

The initial setting of SEL language commands for the operation of I/O (input and output) ports of SEL Controller is set to execute reading and writing without the data being exchanged. Shown below is an example for the assignments on the EtherNet/IP master side and SEL controller side.

[SEL side output domain ⇒ EtherNet/IP side master input domain]

Address	Bit 7 (MSB)	6	5	4	3	2	1	0 (LSB)
SEL Controller Output Port Number	307	306	305	304	303	302	301	300
EtherNet/IP Input word address	0 (lower-order byte)							
SEL Controller Output Port Number	315	314	313	312	311	310	309	308
EtherNet/IP Input word address	0 (host byte)							
SEL Controller Output Port Number	323	322	321	320	319	318	317	316
EtherNet/IP Input word address	1 (lower-order byte)							
SEL Controller Output Port Number	331	330	329	328	327	326	325	324
EtherNet/IP Input word address	1 (host byte)							

⋮

● Example Data (1234_H) from SEL is changed to 1234_H in EtherNet/IP.

SEL Controller	HEX	1	2	3	4
	BIN	0001	0010	0011	0100
EtherNet/IP Master	HEX	1	2	3	4
	BIN	0001	0010	0011	0100

[EtherNet/IP master side output domain ⇒ SEL side input domain]

Address	Bit 7 (MSB)	6	5	4	3	2	1	0 (LSB)
SEL Controller Intput Port Number	7	6	5	4	3	2	1	0
EtherNet/IP Output word address	0 (lower-order byte)							
SEL Controller Intput Port Number	15	14	13	12	11	10	9	8
EtherNet/IP Output word address	0 (host byte)							
SEL Controller Intput Port Number	23	22	21	20	19	18	17	16
EtherNet/IP Output word address	1 (lower-order byte)							
SEL Controller Intput Port Number	31	30	29	28	27	26	25	24
EtherNet/IP Output word address	1 (host byte)							

⋮

● Example Data (1234_H) from EtherNet/IP master is changed to 1234_H in SEL.

EtherNet/IP Master	HEX	1	2	3	4
	BIN	0001	0010	0011	0100
SEL Controller	HEX	1	2	3	4
	BIN	0001	0010	0011	0100

●Reference How to Read and Write with Swapping Host 8 Bits with Lower 8 Bits for Every 16-Bit Data

When conducting reading and writing with swapping the host 8 bits with lower 8 bits for every 16-bit data, set Format Type to 1 (Swap host 8 bits with lower 8 bits for every 16-bit data) with FMIO Command before executing an input and output port operation command such as IN Command and OUT Command in SEL Controller.
Refer to [each controller operation manual (ASEL, PSEL, SSEL)].
Shown below is an example for the assignments on EtherNet/IP master side and SEL controller side.

[EtherNet/IP master side output domain ⇒ SEL side input domain]

Address	Bit 7 (MSB)	6	5	4	3	2	1	0 (LSB)
SEL Controller Intput Port Number	307	306	305	304	303	302	301	300
EtherNet/IP Output bit address	15	14	13	12	11	10	9	8
EtherNet/IP Output word address	0 (host byte)							
SEL Controller Intput Port Number	315	314	313	312	311	310	309	308
EtherNet/IP Output bit address	7	6	5	4	3	2	1	0
EtherNet/IP Output word address	0 (lower-order byte)							
SEL Controller Intput Port Number	323	322	321	320	319	318	317	316
EtherNet/IP Output bit address	31	30	29	28	27	26	25	24
EtherNet/IP Output word address	1 (host byte)							
SEL Controller Intput Port Number	331	330	329	328	327	326	325	324
EtherNet/IP Output bit address	23	22	21	20	19	18	17	16
EtherNet/IP Output word address	1 (lower-order byte)							

⋮

● Example Data (1234_H) from EtherNet/IP master is changed to 1234_H in SEL.

EtherNet/IP Master	HEX	1	2	3	4
	BIN	0001	0010	0011	0100
SEL Controller	HEX	3	4	1	2
	BIN	0011	0100	0001	0010

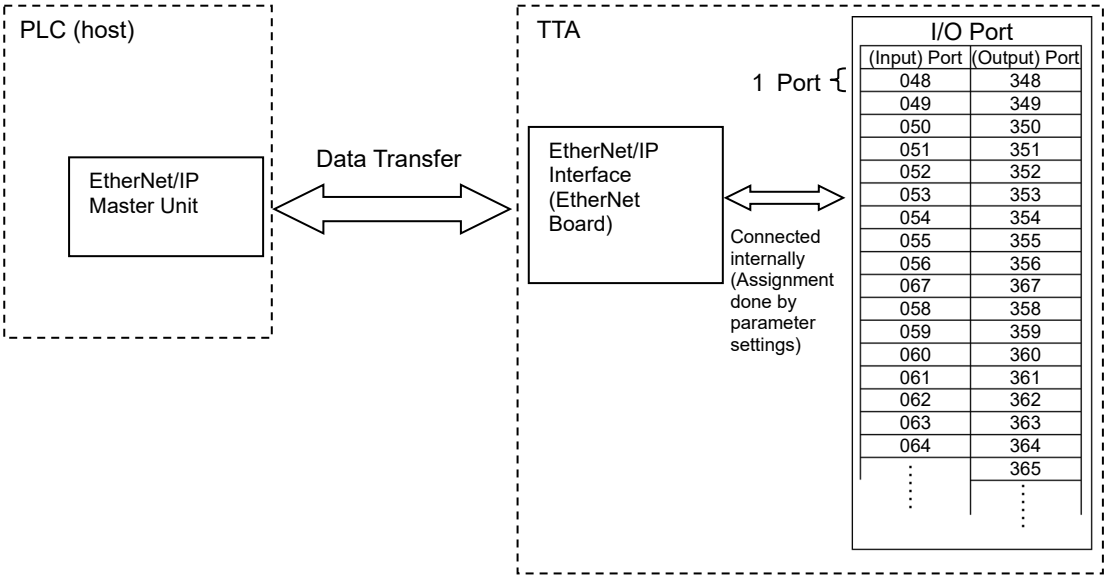
5. Table-top Robot TTA

5.1 Operation Modes and Functions

Tabletop Robot (TTA) applicable for EtherNet/IP are applicable for the remote I/O control (*1) (240 points max. for each input and output).

*1 Input and output (I/O port) of 24V is controlled in one port unit. I/O port is a point to receive and send data located inside the TTA. 1 port can handle data of 1 contact (1bit). Data are sent and received via either field network.

● Operation Image



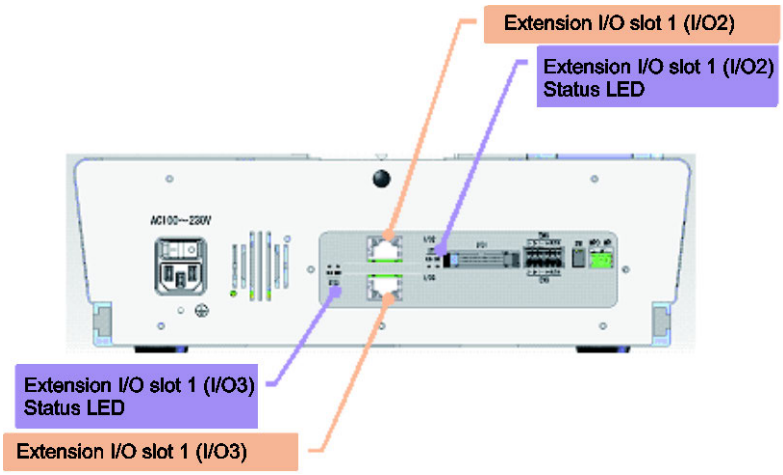
Tip:
In case you require to have a control with connection to the PC software or in Format B by the TCP/IP messaging communication, refer to [X-SEL Ethernet Operation Manual (ME0140)].

5.2 Model

The model code of each of TTA applicable for EtherNet/IP is as shown below.

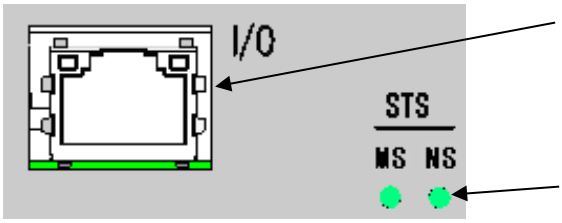
- TTA-A□(SL/SH) (G)-WA-□-□-□-□-EP
- TTA-C□(SL/SH) (G)-WA-□-□-□-□-EP
- TTA-A□(SL/SH) (G)-WA-□-□-□-□-□-EP
- TTA-C□(SL/SH) (G)-WA-□-□-□-□-□-EP
- TTA-A□(SL/SH) (G)-WA-□-□-□-□-EP-EP
- TTA-C□(SL/SH) (G)-WA-□-□-□-□-EP-EP

(Note) One piece of EtherNet/IP Board is available to mount either in Extension I/O Slot 1 or 2.



5.3 EtherNet/IP Interface

5.3.1 Names of the Parts



5.3.2 Monitor LED indications

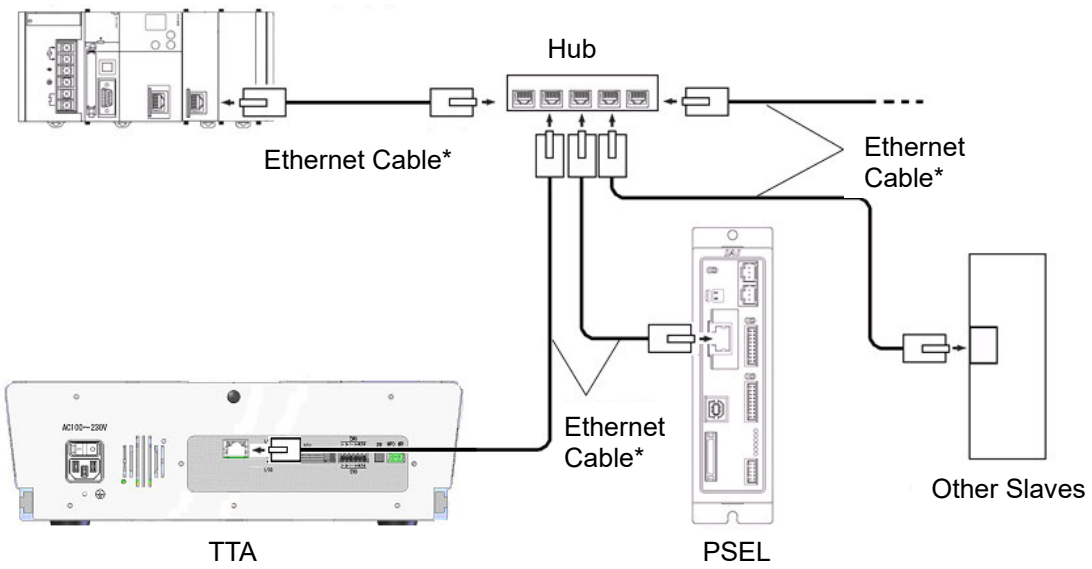
LED	Color	Indication Status	Meaning
NS (Network Status)	Green	Illuminating	Online, Communication in normal condition
		Flashing	Online, No connection established
	Orange	Illuminating	IP address duplication Critical link error
		Flashing	Connection timeout
	-	OFF	No power supply confirmed / IP address not established
MS (Module Status)	Green	Illuminating	Normal Operation
		Flashing	Configuration setting not established or not complete, Test run required
	Orange	Illuminating	An error that cannot be recovered
		Flashing	An error that can be recovered
	-	OFF	No power supply confirmed

* When only TCP/IP messages are used, both NS and MS flash in green.
When NS and MS are turned on in green, it shows the remote I/O communication condition of EtherNet/IP.

5.4 Wiring

5.4.1 Wiring (example)

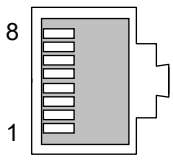
PLC (EtherNet/IP Master Unit)



* Ethernet Cable: Straight cable of category 5 or more, 100m max. (Aluminum tape and braided double-shielded cable are recommended.)

(Note) Terminal processing is not required.

5.4.2 Connector Pin Layout



RJ-45 8-pin
Module Connector
(Controller Side)

Pin No.	Signal Name	Signal Abbreviation
1	Data transmitted +	TD+
2	Data transmitted -	TD-
3	Data received +	RD+
4	Not used	
5	Not used	
6	Data received -	RD-
7	Not used	
8	Not used	
Connector hood	Grounding pin for security	FG

5.5 Setting

Set to the I/O parameters in the TTA by using a teaching tool. Place the front panel AUTO/MANU switch in the MANU position. The versions of teaching tool compatible with EtherNet/IP are as follows:

- XSEL PC software : from V10.00.00.00
- TB-01/TB-02 : from V1.00
- TB-03 : from V1.80

5.5.1 Parameter Setting

[1] Check of Network Module Type

Confirm that of I/O Parameter No.225 Network I/F Module Control setting is showing “7” (EtherNet/IP).

Note The digit to check will differ depending on the position to mount EtherNet/IP (Mounted on I/O2: 1st digit, mounted on I/O3: 2nd digit · · · However, mounting 2 pieces at the same time is not accepted.)

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
225	Extension I/O Control	*7 7* (Only to reference)	0 to FFFFFFFF$_H$	-	Bits 0 to 7: Type of Network I/F Module 0: Not Mounted, 1: CC-Link, 2: DeviceNet, 3: PROFIBUS, 4 to 6: System Reservation, 7: EtherNet/IP

The setting of this parameter is established at the delivery. For EtherNet/IP, it is shown as “7$_H$”. The value to be shown may differ depending on the construction of used option board.

[2] IP Address Setting

Set the IP Address to I/O Parameter No.132 to 135.

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
132	Network I/F Module Self IP Address (H)	192	1 to 255	-	* Prohibited to set to 0 and 127
133	Network I/F Module Self IP Address (MH)	168	0 to 255	-	
134	Network I/F Module Self IP Address (ML)	0	0 to 255	-	
135	Network I/F Module Self IP Address (L)	1	1 to 254	-	* Prohibited to set to 0 and 255

Pay attention to avoid duplication of IP address.

[3] Subnet Mask Setting

Set the subnet mask to I/O Parameter No.136 to 139.

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
136	Network I/F Module Subnet Mask (H)	255	0 to 255	-	
137	Network I/F Module Subnet Mask (MH)	255	0 to 255	-	
138	Network I/F Module Subnet Mask (ML)	255	0 to 255	-	
139	Network I/F Module Subnet Mask (L)	0	0 to 255	-	

[4] Default Gateway Setting

Set the default gateway to I/O Parameter No.140 to 143.

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
140	Network I/F Module Default Gateway (H)	0	0 to 255	-	
141	Network I/F Module Default Gateway (MH)	0	0 to 255	-	
142	Network I/F Module Default Gateway (ML)	0	0 to 255	-	
143	Network I/F Module Default Gateway (L)	0	0 to 255	-	

[5] Communication Speed Setting

Have the baud rate set in I/O Parameter No. 227 and 238 in accordance with the position to mount EtherNet/IP board. It is recommended to set to Auto-negotiation for the baud rate setting.

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
227	I/O2 Fieldbus Baud Rate	0	0 to 4	-	(0: Auto-negotiation, 1: 10Mbps (Half-duplex), 2: 10Mbps (Full-duplex), 3: 100Mbps (Half-duplex), 4: 100Mbps (Full-duplex))
238	I/O3 Fieldbus Baud Rate				

Set the baud rate to the value that matches with the baud rate (mode) of such as switching hub. Operation without matching the setting may lead to unstable communications. In case a value out of the range of EtherNet/IP specifications is set, “D75: Fieldbus Parameter Error” is issued.

[6] Number of I/O Port Setting

Have the port numbers to be used set in I/O Parameter No. 14, 15, 231 and 232 in accordance with the position to mount EtherNet/IP board.
Set a number that is a multiple of 8.

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
14	I/O2 Fieldbus Remote Input Ports	0	0 to 240	-	8 port unit
15	I/O2 Fieldbus Remote Output Ports	0	0 to 240	-	8 port unit
231	I/O3 Fieldbus Remote Input Ports	0	0 to 240	-	8 port unit
232	I/O3 Fieldbus Remote Output Ports	0	0 to 240	-	8 port unit

[7] I/O Port Top Number Setting

Have the top port number in the port range to be used set in I/O Parameter No. 16, 17, 233 and 234 in accordance with the position to mount EtherNet/IP board.
The values entered into these parameters must be evenly divisible by 8.

No.	Parameter name	Default (Reference)	Input Range	Unit	Remarks
16	I/O2 Fixed Assignment Input Port Start Number	-1	-1 to 299	-	0+(Multiples of 8) [Ineffective when -1 is selected]
17	I/O2 Fixed Assignment Output Port Start Number	-1	-1 300 to 599	-	300+(Multiples of 8) [Ineffective when -1 is selected]
233	I/O3 Fixed Assignment Input Port Start Number	-1	-1 to 299	-	0+(Multiples of 8) [Ineffective when -1 is selected]
234	I/O3 Fixed Assignment Output Port Start Number	-1	-1 300 to 599	-	300+(Multiples of 8) [Ineffective when -1 is selected]

[8] EtherNet/IP Board Use Setting

Have I/O Parameter No. 18 and 235 set to “1” (Monitor: use EtherNet/IP board) in accordance with the position to mount EtherNet/IP board.

No.	Parameter name	Default (Reference)	Input Range	Unit	Remarks
18	I/O2 Error Monitoring	1	0 to 5	-	0: No Monitoring (Not to use EtherNet/IP board) 1: Monitoring
235	I/O3 Error Monitoring	1	0 to 5	-	0: No Monitoring (Not to use EtherNet/IP board) 1: Monitoring

[9] Time Setting to Wait for EtherNet/IP Communication Establishment

In I/O Parameter No. 121, set the time until check is to be held to see if the EtherNet/IP communication is established at the startup. Change the parameter in case “D5D” or “A6B” error occurs due to a faster startup of TTA than the master unit.

No.	Parameter name	Default (Reference)	Input Range	Unit	Remarks
121	Network Attribute 2	$C80000_H$	0 to $FFFFFFFF_H$	100ms	Bits 16 to 27: Value of Link Timeout at initializing of the Fieldbus (Example) The initial value $C80000_H$ is bit 16 to 27 = $C8_H$ = 200 (in 100ms unit) 200×100ms = 20s Check in 20s after startup

[10] Data Retaining Setting at EtherNet/IP Communication Error

Have the setting established in I/O Parameter No. 120, 121 whether to clear the input port data at 0 or to remain the data when a communication error is occurred in accordance with the position to mount EtherNet/IP.

No.	Parameter name	Default (Reference)	Input Range	Unit	Remarks
120	Network Attribute 1	640001_H	0 to $FFFFFFFF_H$	-	Bits 28 to 31: Input port data selected at I/O2 Fieldbus link error 0: Input port data clear 1: Input port data retained
121	Network Attribute 2	$C80000_H$	0 to $FFFFFFFF_H$	-	Bits 8 to 11: Input port data selected at I/O3 Fieldbus link error 0: Input port data clear 1: Input port data retained

5.5.2 Example for Parameter Settings

Example for when using EtherNet/IP (I/O2)
It is the setting when EtherNet/IP (I/O2) is used on 240 points each for input and output from the top of the I/O ports, and other input and output ports are not to be used (for such as I/O boards).

- I/O Parameter

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
1	I/O Port Allocation Type	1	0 to 1	0	0: Fixed Allocation 1: Automatic Allocation
2	I/O Fix-Allocated Input Port Start No.	0	-1 to 599	0	0+(Multiples of 8) [Not used I/01 when -1 is selected]
3	I/O Fix-Allocated Output Port Start No.	300	-1 to 599	300	300+(Multiples of 8) [Not used I/01 when -1 is selected]
10	I/O Error Monitoring	1	0 to 5	0	0: No Monitoring (Not to use I/O board) 1: Monitoring 2: Monitoring (Not to monitor 24V I/O power related error) 3: Monitoring (To monitor only 24V I/O power related error)
14	I/O2 Fieldbus Remote Input Ports	0	0 to 240	240	8 port unit
15	I/O2 Fieldbus Remote Output Ports	0	0 to 240	240	8 port unit
16	I/O2 Fieldbus Fixed Assignment Input Port Start Number	-1	-1 to 299	48	0+(Multiples of 8) [Ineffective when -1 is selected]
17	I/O2 Fieldbus Fixed Assignment Output Port Start Number	-1	-1 300 to 599	348	300+(Multiples of 8) [Ineffective when -1 is selected]
18	I/O2 Error Monitoring	1	0 to 5	-	0: No Monitoring (Not to use I/O2) 1: Monitoring
120	Network Attribute 1	1_H	0 to FFFFFFFF$_H$	Optional	Bits 28 to 31: Input port data selected at I/O2 Fieldbus link error 0: Input port data clear 1: Input port data retained
121	Network Attribute 2	0_H	0 to FFFFFFFF$_H$	Optional	Bits 8 to 11: Input port data selected at I/O3 Fieldbus link error 0: Input port data clear 1: Input port data retained Bits 16 to 27: Value of Link Timeout at initializing of the Fieldbus (100ms)
132	Network I/F Module Self IP Address (H)	192	1 to 255	192	* Prohibited to set to 0 and 127
133	Network I/F Module Self IP Address (MH)	168	0 to 255	168	
134	Network I/F Module Self IP Address (ML)	0	0 to 255	0	
135	Network I/F Module Self IP Address (L)	1	1 to 254	1	* Prohibited to set to 0 and 255
136	Network I/F Module Subnet Mask (H)	255	0 to 255	255	
137	Network I/F Module Subnet Mask (MH)	255	0 to 255	255	

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
138	Network I/F Module Subnet Mask (ML)	255	0 to 255	255	
139	Network I/F Module Subnet Mask (L)	0	0 to 255	0	
140	Network I/F Module Default Gateway (H)	0	0 to 255	0	
141	Network I/F Module Default Gateway (MH)	0	0 to 255	0	
142	Network I/F Module Default Gateway (ML)	0	0 to 255	0	
143	Network I/F Module Default Gateway (L)	0	0 to 255	0	
225	Extension I/O Control	*7 7* (Only to reference)	0 to 7^*_H	-	Bits 0 to 7: Type of Network I/F Module 0: Not Mounted, 1: CC-Link, 2: DeviceNet, 3: PROFIBUS, 4 to 6: System Reservation, 7: EtherNet/IP
227	I/O2 Fieldbus Baud Rate	0	0 to 4	-	(0: Auto-negotiation, 1: 10Mbps (Half-duplex), 2: 10Mbps (Full-duplex), 3: 100Mbps (Half-duplex), 4: 100Mbps (Full-duplex))
235	I/O3 Error Monitoring	1	0 to 5	-	0: No Monitoring (Not to use EtherNet/IP board) 1: Monitoring

5.6 Connection to Network

EtherNet/IP occupies EtherNet/IP Port No.44818 and 2222.
The connection of EtherNet/IP is established by indicating the port 44818 in the IP address of XSEL Controllers in EtherNet/IP software.

⚠ Caution	Please note that Port No.2222 (UDP Port) and 44818 (TCP Port and UDP Port) must be open for use by any firewall configuration of the EtherNet/IP the remote I/O communication .

⚠ Caution	In case EtherNet/IP Remote IO Communication and TCP/IP Message Communication are being used at the same time, the reset command from the network configurator may not be executed properly. If an execution of the reset from the configurator is required, temporarily inactivate TCP/IP Message Communication (by setting 0 to I/O Parameter No. 129 “Network Attribute 10”), and conduct the reset. (Make sure to put back the setting after reset is done.)

5.7 I/O Ports of TTA

It is available to add special functions beside the general-purposed input and output in the I/O ports.
Refer to [TTA Controller Operation Manual 4.6 How to Use Internal DIO, Chapter 5 Parameter] for the details.

- I/O Port Setting at Delivery
  Those features described in brackets [ ] are not established at the delivery.

Type	Port No.	Function	Type	Port No.	Function
Internal DI (I/O1)	000	Start	Internal DO (I/O1)	300	ALM (LED on the front panel)
	001	Switch No.1 (Additional Switch)		301	RDY (LED on the front panel)
	002	For future expansion		302	EMG (LED on the front panel)
	003			303	Automatic operation mode (start switch LED)
	004			304	HPS (LED on the front panel)
	005	Switch No.2 (Additional Switch)		305	For future expansion
	006	Switch No.3 (Additional Switch)		306	
	007	Program number specification Ones place of the digital switch		307	
	008			308	Internal DI No. 001 ON/OFF
	009			309	Internal DI No. 002 ON/OFF
	010			310	Internal DI No. 003 ON/OFF
	011	Program number specification Tens place of the digital switch		311	Internal DI No. 004 ON/OFF
	012			312	Internal DI No. 005 ON/OFF
	013			313	Internal DI No. 006 ON/OFF
	014			314	For future expansion
	015	Switch No.4 (Additional Switch)		315	Internal DI No. 015 ON/OFF
External DI (I/O1)	016 to 031	General-purpose input (I/O connector on the rear panel)	External DO (I/O1)	316 to 331	General-purpose output (I/O connector on the rear panel)
Internal DI (I/O1)	032	For future expansion	Internal DO (I/O1)	332	7-segment user display digit specification
	033			333	7-segment user display digit specification
	034			334	For future expansion
	035			335	
	036			336	
	037			337	7-segment display refresh
	038			338	7-segment user/system alternate display
	039			339	7-segment user display specification
	040			340	DT0 (7-segment user display bit)
	041			341	DT1 (7-segment user display bit)
	042			342	DT2 (7-segment user display bit)
	043			343	DT3 (7-segment user display bit)
	044			344	DT4 (7-segment user display bit)
	045			345	DT5 (7-segment user display bit)
	046			346	DT6 (7-segment user display bit)
	047			347	Reserved by the system
External DI (Ether Net/IP)	048	General-purpose input	External DO (Ether Net/IP)	348	Alarm output
	049	[Software reset]		349	Ready output
	050	[Servo ON]		350	Emergency stop output
	051	[Auto program start]		351	General-purpose output
	052	[Software interlock]		352	
	053	[Pause reset]		353	
	054	[Pause]		354	
	055	General-purpose input		355	
	056			356	
	057			357	
	058			358	
	059			359	
	060			360	
	061			361	
	062			362	
	063	[Home return, etc.]		363	
	064 to 287	General-purpose input		364 to 587	General-purpose output

In this table, shows the settings when EtherNet/IP Connection Board is installed in “I/O2”.
For when the board is installed in “I/O3”, refer to [Operation Manual of TTA].

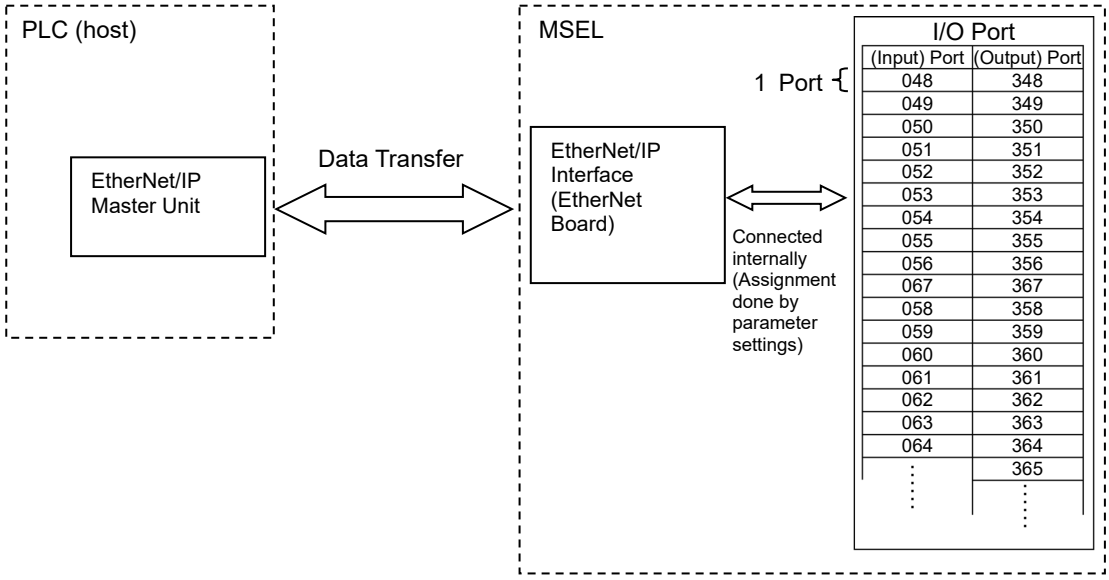
6. MSEL

6.1 Operation Modes and Functions

MSEL applicable for EtherNet/IP are applicable for the remote I/O control (*1) (240 points max. for each input and output).

*1 Input and output (I/O port) of 24V is controlled in one port unit. I/O port is a point to receive and send data located inside the MSEL. 1 port can handle data of 1 contact (1bit). Data are sent and received via either field network.

● Operation Image

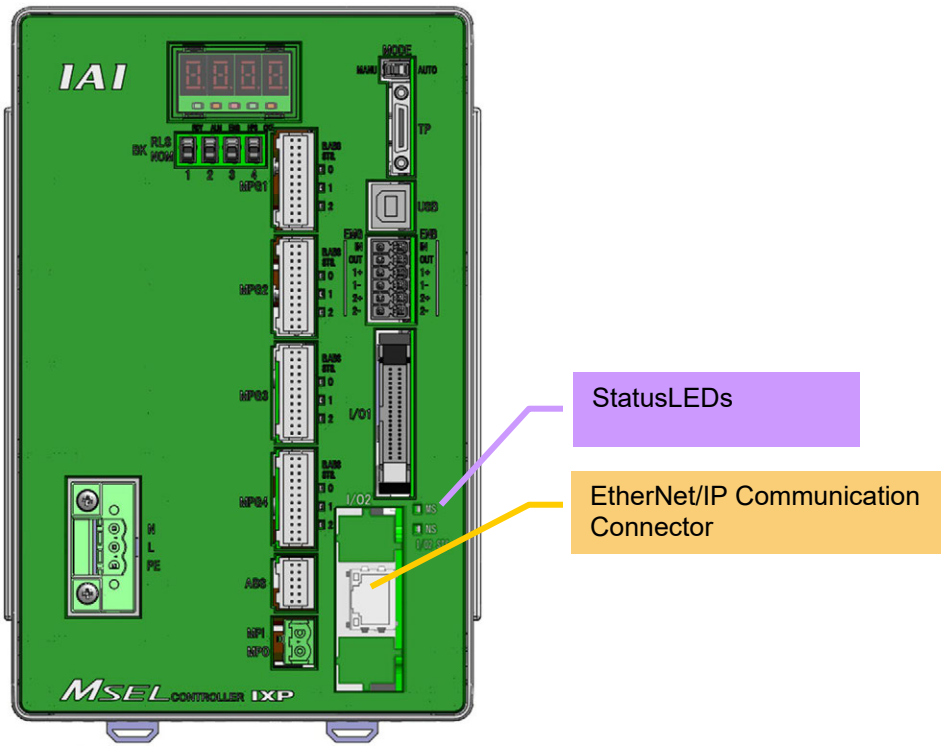


Tip:
In case you require to have a control with connection to the PC software or in Format B by the TCP/IP messaging communication, refer to [X-SEL Ethernet Operation Manual (ME0140)].

6.2 Model

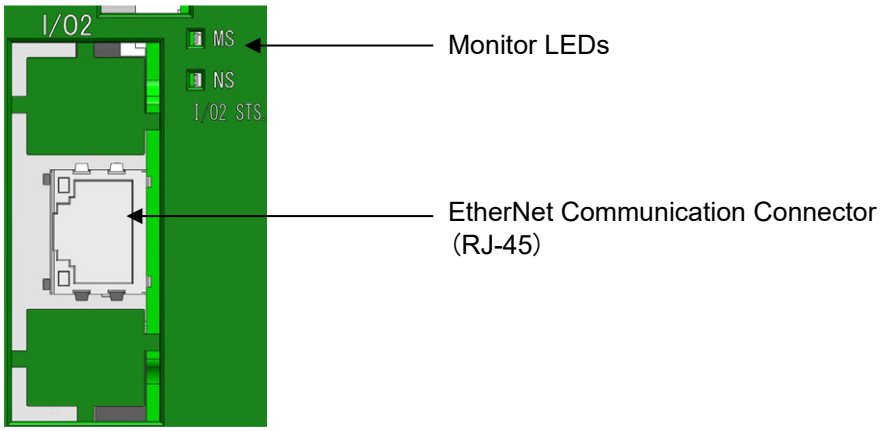
The model code is as shown below.

- MSEL-PC(F)-□-□-□-□-EP
- MSEL-PG(F)-□-□-□-□-EP
- MSEL-PCX-□-□-□-□-EP
- MSEL-PGX-□-□-□-□-EP



6.3 EtherNet/IP Interface

6.3.1 Names of the Parts



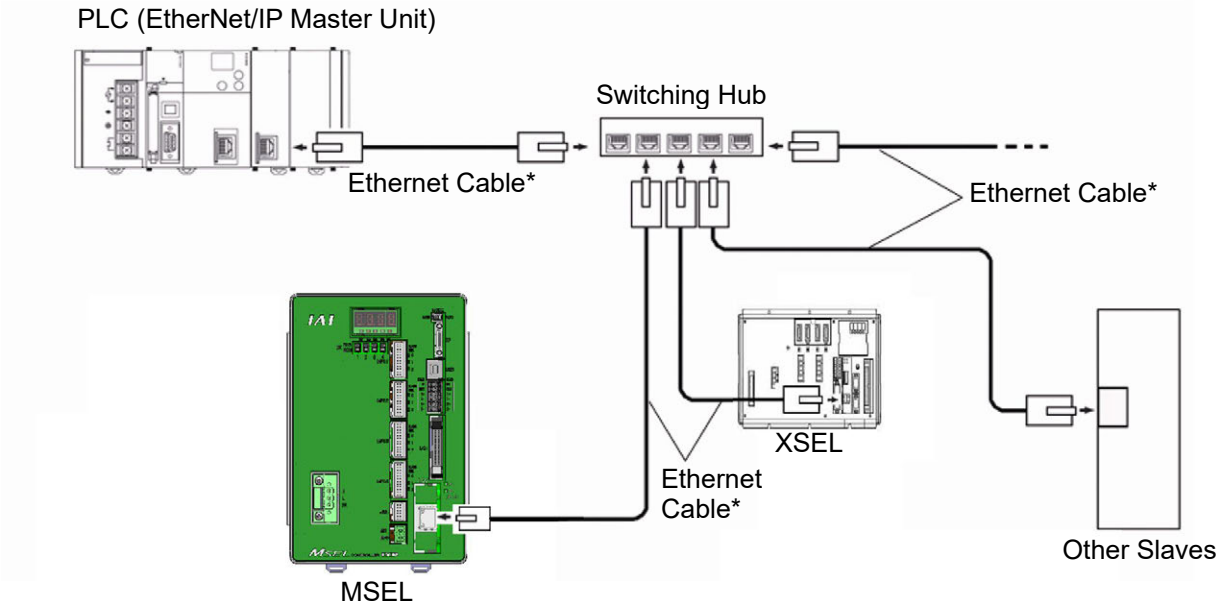
6.3.2 Monitor LED indications

LED	Color	Indication Status	Meaning
MS (Module Status)	Green	Illuminating	In normal operation and under control of scanner (master)
		Flashing	Configuration setting not established or not complete, Test run required Scanner (master) in idol condition
	Orange	Illuminating	An error that cannot be recovered
		Flashing	An error that can be recovered
	-	OFF	No power supply confirmed
NS (Network Status)	Green	Illuminating	Online, Communication in normal condition
		Flashing	Online, No connection established
	Orange	Illuminating	IP address duplication Critical link error
		Flashing	Connection timeout
	-	OFF	No power supply confirmed / IP address not established

* When only TCP/IP messages are used, both NS and MS flash in green.
When NS and MS are turned on in green, it shows the remote I/O communication condition of EtherNet/IP.

6.4 Wiring

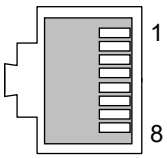
6.4.1 Wiring (example)



* Ethernet Cable: Straight cable of category 5 or more, 100m max.
(Aluminum tape and
braided double-shielded cable are recommended.)

(Note) Terminal processing is not required.

6.4.2 Connector Pin Layout



RJ-45 8-pin
Module Connector
(Controller Side)

Pin No.	Signal Name	Signal Abbreviation
1	Data transmitted +	TD+
2	Data transmitted -	TD-
3	Data received +	RD+
4	Not used	
5	Not used	
6	Data received -	RD-
7	Not used	
8	Not used	
Connector hood	Grounding pin for security	FG

6.5 Setting

Set to the I/O parameters in the MSEL by using a teaching tool. Place the front panel AUTO/MANU switch in the MANU position.
Refer to the operation manual of each teaching tool for the latest version of the teaching tool applicable for EtherNet/IP.

- XSEL PC software : from V12.00.01.00
- TB-01 [MSEL-PCX/PGX] : from V1.02
- TB-01 [MSEL-PC(F)/PG(F)] : from V1.10
- TB-02 : from V1.00
- TB-03 : from V1.80

6.5.1 Parameter Setting

[1] Check of Network Module Type
Confirm that of I/O Parameter No.225 Network I/F Module Control setting is showing “7” (EtherNet/IP).

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
225	Extension I/O Control	7 (Only to reference)	0 to $FFFFFFFF_H$	-	Bits 0 to 3: Type of Network I/F Module 0: Not Mounted, 1: CC-Link, 2: DeviceNet, 3: PROFIBUS, 4 to 6: System Reservation, 7: EtherNet/IP

The setting of this parameter is established at the delivery. For EtherNet/IP, it is shown as “7_H”.

[2] IP Address Setting
Set the IP Address of MSEL to I/O Parameter No.132 to 135.

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
132	Network I/F Module Self IP Address (H)	192	1 to 255	-	* Prohibited to set to 0 and 127
133	Network I/F Module Self IP Address (MH)	168	0 to 255	-	
134	Network I/F Module Self IP Address (ML)	0	0 to 255	-	
135	Network I/F Module Self IP Address (L)	1	1 to 254	-	* Prohibited to set to 0 and 255

Pay attention to avoid duplication of IP address.

[3] Subnet Mask Setting
Set the subnet mask to I/O Parameter No.136 to 139.

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
136	Network I/F Module Subnet Mask (H)	255	0 to 255	-	
137	Network I/F Module Subnet Mask (MH)	255	0 to 255	-	
138	Network I/F Module Subnet Mask (ML)	255	0 to 255	-	
139	Network I/F Module Subnet Mask (L)	0	0 to 255	-	

[4] Default Gateway Setting
Set the default gateway to I/O Parameter No.140 to 143.

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
140	Network I/F Module Default Gateway (H)	0	0 to 255	-	
141	Network I/F Module Default Gateway (MH)	0	0 to 255	-	
142	Network I/F Module Default Gateway (ML)	0	0 to 255	-	
143	Network I/F Module Default Gateway (L)	0	0 to 255	-	

[5] Communication Speed Setting
Have the baud rate set in I/O Parameter No. 227. It is recommended to set to Auto-negotiation for the baud rate setting.

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
227	I/O2 Fieldbus Baud Rate	0	0 to 4	-	0: Auto-negotiation, 1: 10Mbps (Half-duplex), 2: 10Mbps (Full-duplex), 3: 100Mbps (Half-duplex), 4: 100Mbps (Full-duplex)

Set the baud rate to the value that matches with the baud rate (mode) of such as switching hub. Operation without matching the setting may lead to unstable communications. In case a value out of the range of EtherNet/IP specifications is set, “D75: Fieldbus Parameter Error” is issued.

[6] Number of I/O Port Setting

Have the port numbers to be used set in I/O Parameter No. 14 and 15.
Set a number that is a multiple of 8.

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
14	I/O2 Fieldbus Remote Input Ports	0	0 to 240	-	8 port unit
15	I/O2 Fieldbus Remote Output Ports	0	0 to 240	-	8 port unit

[7] I/O Port Top Number Setting

Have the top port number in the port range to be used set in I/O Parameter No. 16 and 17.
The values entered into these parameters must be evenly divisible by 8.

No.	Parameter name	Default (Reference)	Input Range	Unit	Remarks
16	I/O2 Fixed Assignment Input Port Start Number	48	-1 to 299	-	0+(Multiples of 8) [Ineffective when -1 is selected]
17	I/O2 Fixed Assignment Output Port Start Number	348	-1 300 to 599	-	300+(Multiples of 8) [Ineffective when -1 is selected]

[8] EtherNet/IP Board Use Setting

Have I/O Parameter No. 18 set to “1” (Monitor: use EtherNet/IP board).

No.	Parameter name	Default (Reference)	Input Range	Unit	Remarks
18	I/O2 Error Monitoring	1	0 to 5	-	0: No Monitoring (Not to use EtherNet/IP board) 1: Monitoring

[9] Time Setting to Wait for EtherNet/IP Communication Establishment

In I/O Parameter No. 121, set the time until check is to be held to see if the EtherNet/IP communication is established at the startup. Change the parameter in case “D5D” or “A6B” error occurs due to a faster startup of MSEL than the master unit.

No.	Parameter name	Default (Reference)	Input Range	Unit	Remarks
121	Network Attribute 2	$C80000_H$	0 to $FFFFFFFF_H$	100ms	Bits 16 to 27: Value of Link Timeout at initializing of the Fieldbus (Example) The initial value $C80000_H$ is bit 16 to 27 = $C8_H$ = 200 (in 100ms unit) 200×100ms = 20s Check in 20s after startup

[10] Data Retaining Setting at EtherNet/IP Communication Error

Have the setting established in I/O Parameter No. 120 whether to clear the input port data at 0 or to remain the data when a communication error is occurred.

No.	Parameter name	Default (Reference)	Input Range	Unit	Remarks
120	Network Attribute 1	640001_H	0 to $FFFFFFFF_H$	-	Bits 28 to 31: Input port data selected at I/O2 Fieldbus link error 0: Input port data clear 1: Input port data retained

6.5.2 Example for Parameter Settings

Example for when using EtherNet/IP (I/O2)
It is the setting when EtherNet/IP (I/O2) is used on 240 points each for input and output from the top of the I/O ports, and other input and output ports are not to be used (for such as I/O boards).

- I/O Parameter

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
1	I/O Port Allocation Type	0	0 to 1	0	0: Fixed Allocation (Change Prohibited)
2	I/O Fix-Allocated Input Port Start No.	0	-1 to 299	0	0+(Multiples of 8) [Ineffective when -1 is selected]
3	I/O Fix-Allocated Output Port Start No.	300	-1 300 to 599	300	300+(Multiples of 8) [Ineffective when -1 is selected]
10	I/O Error Monitoring	1	0 to 5	0	0: No Monitoring (Not to use I/O board) 1: Monitoring 2: Monitoring (Not to monitor 24V I/O power related error) 3: Monitoring (To monitor only 24V I/O power related error)
14	I/O2 Fieldbus Remote Input Ports	0	0 to 240	240	8 port unit
15	I/O2 Fieldbus Remote Output Ports	0	0 to 240	240	8 port unit
16	I/O2 Fieldbus Fixed Assignment Input Port Start Number	48	-1 to 299	48	0+(Multiples of 8) [Ineffective when -1 is selected]
17	I/O2 Fieldbus Fixed Assignment Output Port Start Number	348	-1 300 to 599	348	300+(Multiples of 8) [Ineffective when -1 is selected]
18	I/O2 Error Monitoring	1	0 to 5	-	0: No Monitoring (Not to use I/O2) 1: Monitoring
120	Network Attribute 1	1_H	0 to $FFFFFFFF_H$	Opti-onal	Bits 28 to 31: Input port data selected at I/O2 Fieldbus link error 0: Input port data clear 1: Input port data retained
121	Network Attribute 2	0_H	0 to $FFFFFFFF_H$	Opti-onal	Bits 16 to 27: Value of Link Timeout at initializing of the Fieldbus
132	Network I/F Module Self IP Address (H)	192	1 to 255	192	* Prohibited to set to 0 and 127
133	Network I/F Module Self IP Address (MH)	168	0 to 255	168	
134	Network I/F Module Self IP Address (ML)	0	0 to 255	0	
135	Network I/F Module Self IP Address (L)	1	1 to 254	1	* Prohibited to set to 0 and 255
136	Network I/F Module Subnet Mask (H)	255	0 to 255	255	
137	Network I/F Module Subnet Mask (MH)	255	0 to 255	255	
138	Network I/F Module Subnet Mask (ML)	255	0 to 255	255	

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
139	Network I/F Module Subnet Mask (L)	0	0 to 255	0	
140	Network I/F Module Default Gateway (H)	0	0 to 255	0	
141	Network I/F Module Default Gateway (MH)	0	0 to 255	0	
142	Network I/F Module Default Gateway (ML)	0	0 to 255	0	
143	Network I/F Module Default Gateway (L)	0	0 to 255	0	
225	Extension I/O Control	7 (Only to reference)	0 to 7_H	-	Bits 0 to 3: Type of Network I/F Module 0: Not Mounted, 1: CC-Link, 2: DeviceNet, 3: PROFIBUS, 4 to 6: System Reservation, 7: EtherNet/IP
227	I/O2 Fieldbus Baud Rate	0	0 to 4	-	0: Auto-negotiation, 1: 10Mbps (Half-duplex), 2: 10Mbps (Full-duplex), 3: 100Mbps (Half-duplex), 4: 100Mbps (Full-duplex)

6.6 Connection to Network

EtherNet/IP occupies EtherNet/IP Port No.44818 and 2222.
The connection of EtherNet/IP is established by indicating the port 44818 in the IP address of MSEL Controllers in EtherNet/IP software.

⚠ Caution	Please note that Port No.2222 (UDP Port) and 44818 (TCP Port and UDP Port) must be open for use by any firewall configuration of the EtherNet/IP the remote I/O communication .

⚠ Caution	In case EtherNet/IP Remote IO Communication and TCP/IP Message Communication are being used at the same time, the reset command from the network configurator may not be executed properly. If an execution of the reset from the configurator is required, temporarily inactivate TCP/IP Message Communication (by setting 0 to I/O Parameter No. 129 “Network Attribute 10”), and conduct the reset. (Make sure to put back the setting after reset is done.)

6.7 I/O Ports of MSEL

It is available to add special functions beside the general-purposed input and output in the I/O ports.
Refer to [MSEL Controller Operation Manual 2.2.5 PIO Circuit, Chapter 5 Parameter] for the details.

● I/O Port Setting at Delivery

Type	Port No.	Function	Type	Port No.	Function
Internal DI (I/O1)	000	For future expansion	Internal DO (I/O1)	300	ALM (LED on the front panel)
	001			301	RDY (LED on the front panel)
	002			302	EMG (LED on the front panel)
	003			303	For future expansion
	004			304	HPS (LED on the front panel)
	005			305	For future expansion
	006			306	
	007			307	
	008			308	
	009			309	
	010			310	
	011			311	
	012			312	
	013			313	
	014			314	
	015			315	
External DI (I/O1)	016 to 031	General-purpose input	External DO (I/O1)	316 to 331	General-purpose output
Internal DI (I/O1)	032	For future expansion	Internal DO (I/O1)	332	7-segment user display digit specification
	033			333	7-segment user display digit specification
	034			334	For future expansion
	035			335	
	036			336	
	037			337	7-segment display refresh
	038			338	7-segment user/system alternate display
	039			339	7-segment user display specification
	040			340	DT0 (7-segment user display bit)
	041			341	DT1 (7-segment user display bit)
	042			342	DT2 (7-segment user display bit)
	043			343	DT3 (7-segment user display bit)
	044			344	DT4 (7-segment user display bit)
	045			345	DT5 (7-segment user display bit)
	046			346	DT6 (7-segment user display bit)
	047			347	For future expansion

	Port No.	Function		Port No.	Function
External DI (Ether Net/IP)	048	Program start	External DO (Ether Net/IP)	348	Alarm output
	049	General-purpose input		349	Ready output
	050			350	Emergency stop output
	051			351	General-purpose output
	052			352	
	053			353	
	054			354	
	055	Program number specification (BCD:1/BIN:1)*		355	
	056	Program number specification (BCD:2/BIN:2)*		356	
	057	Program number specification (BCD:4/BIN:4)*		357	
	058	Program number specification (BCD:8/BIN:8)*		358	
	059	Program number specification (BCD:10/BIN:16)*		359	
	060	Program number specification (BCD:20/BIN:32)*		360	
	061	Program number specification (BCD:40/BIN:64)*		361	
	062	General-purpose input		362	
	063			363	
	064 to 287	General-purpose input		364 to 587	General-purpose output

* Switching over between BCD and BIN in Program Number Indication should be conducted in IO Parameter No. 30 Input Function Select 000.
(1: Program Start BCD, 2: Program Start Binary (BIN))

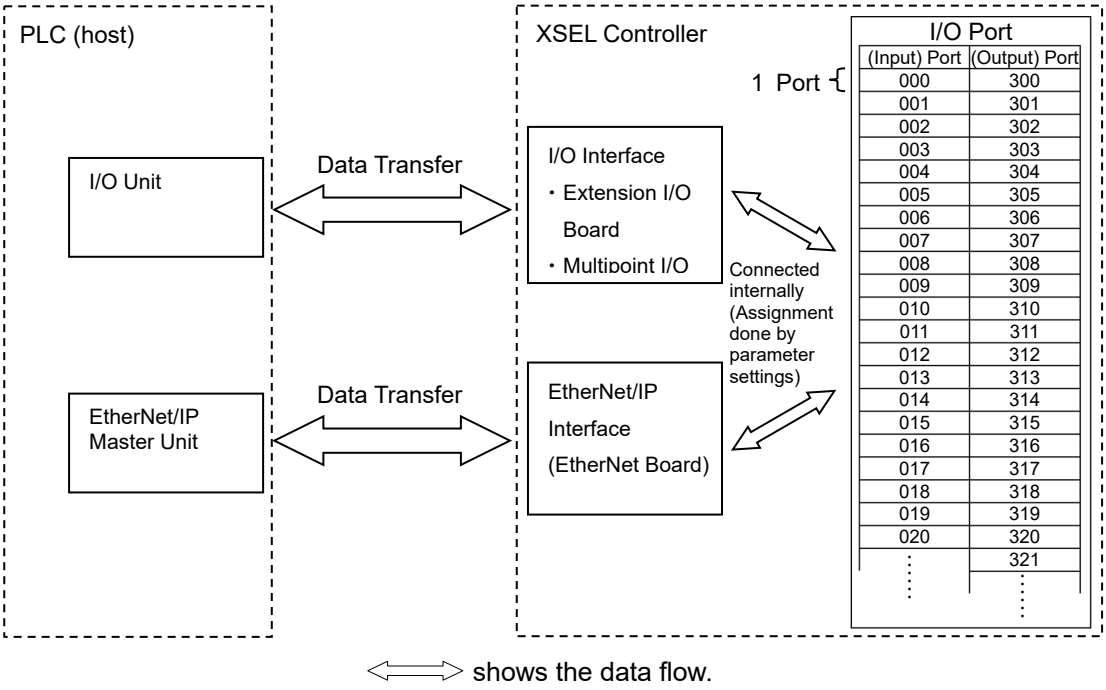
7. XSEL-P/Q/PX/QX

7.1 Operation Modes and Functions

XSEL Controllers applicable for EtherNet/IP are applicable for the remote I/O control (*1) (256 points max. for each input and output).

*1 Input and output (I/O port) of 24V is controlled in one port unit. I/O port is a point to receive and send data located inside the controller. 1 port can handle data of 1 contact (1 bit).
Data are sent and received via either PIO (24V input and output) or field network. Connection to one port is available from only one of PIO or field network. Set a parameter to determine which of PIO or field network is to be used.

● Operation Image



7.2 Model

7.2.1 Expression of Model Codes

The model code of XSEL-P/Q/PX/QX applicable for EtherNet/IP is as shown below.

XSEL-P/Q Series
- XSEL-P-□-EP-□
- XSEL-Q-□-EP-□
- XSEL-PX-□-EP-□
- XSEL-QX-□-EP-□

7.2.2 Caution for Model Code Decision

Select the EP (EtherNet/IP) type for the interface module.

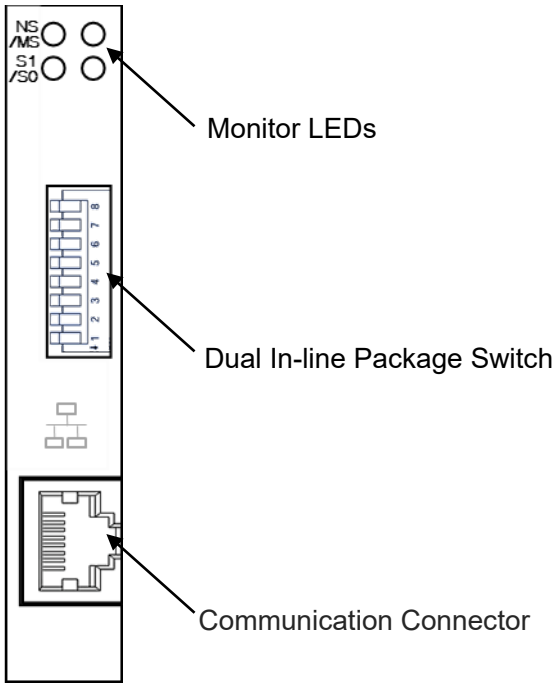
Select ET (Ethernet) type, and it would not be used as EtherNet/IP.

* P/Q Types (Main application of Ver.1.05 or later) and PX/QX Types (Main application of Ver.0.51 or later) are applicable for EtherNet/IP.

7.3 EtherNet/IP Interface

7.3.1 Names of the Parts

XSEL-P/Q/PX/QX



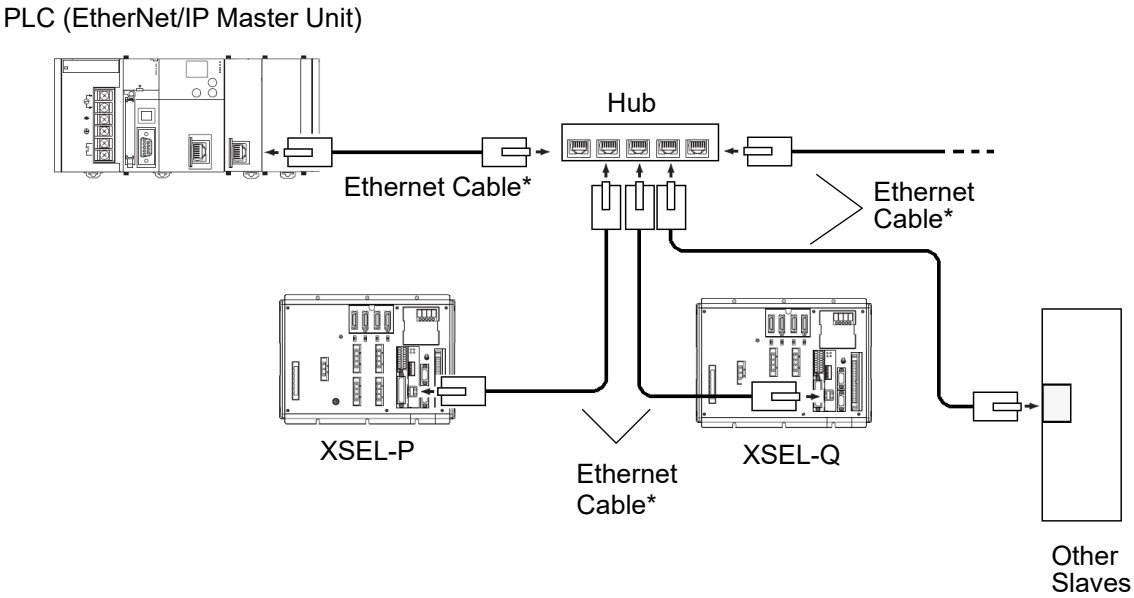
7.3.2 Monitor LED indications

LED	Color	Indication Status	Meaning
NS (Network Status)	Green	Illuminating	Online, Communication in normal condition
		Flashing	Online, No connection established
	Orange	Illuminating	IP address duplication Critical link error
		Flashing	Connection timeout
	-	OFF	No power supply confirmed / IP address not established
MS (Module Status)	Green	Illuminating	Normal Operation
		Flashing	Configuration setting not established or not complete, Test run required
	Orange	Illuminating	An error that cannot be recovered
		Flashing	An error that can be recovered
	-	OFF	No power supply confirmed

* When only TCP/IP messages are used, both NS and MS flash in green.
When NS and MS are turned on in green, it shows the remote I/O communication condition of EtherNet/IP.

7.4 Wiring

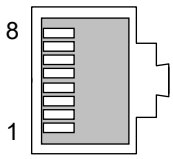
7.4.1 Wiring (example)



* Ethernet Cable: Straight cable of category 5 or more, 100m max.
(Aluminum tape and braided double-shielded cable are recommended.)

(Note) Terminal processing is not required.

7.4.2 Connector Pin Layout



RJ-45 8-pin
Module Connector
(Controller Side)

Pin No.	Signal Name	Signal Abbreviation
1	Data transmitted +	TD+
2	Data transmitted -	TD-
3	Data received +	RD+
4	Not used	
5	Not used	
6	Data received -	RD-
7	Not used	
8	Not used	
Connector hood	Grounding pin for security	FG

7.5 Setting

Set to the I/O parameters in the controller by using a teaching tool. Place the controller's AUTO/MANU switch in the MANU position.
The versions of teaching tool compatible with EtherNet/IP please check the instruction manual of each teaching tool.

7.5.1 Parameter Setting

[1] Setting of EtherNet Operation Specifications

Set the first line in I/O Parameter No. 129 "Network Attribute" to "3".

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
129	Network Attribute	*7 Only to reference	0_H to $FFFFFFFF_H$	-	EtherNet Operation Specifications ・Bits 0 to 3: Remote I/O 0: Not to be used 1: Modbus/TCP use (EXCEPTION status invalid) 2: Modbus/TCP use (EXCEPTION*1 status valid) 3: EtherNet/IP use*1 ・Bits 4 to 7：TCP/IP Message Communication 0: Not to be used、1: use ・Bits 8 to 31：Not used

*1 The model applicable for EtherNet/IP should be XSEL-P/Q/PX/QX types (applicable version: Main application of Ver.1.05 or later). Also, when EtherNet/IP is to be used, it is necessary to use an interface board applicable for EtherNet/IP. Refer to the [Ethernet Operation Manual (ME0140)] which are provided separately when using TCP/IP message communication.

[2] IP Address Setting

Set the IP Address to I/O Parameter No.132 to 135.

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
132	Self IP Address (H)	192	1 to 255	-	Prohibited to set to 0 and 127
133	Self IP Address (MH)	168	0 to 255	-	
134	Self IP Address (ML)	0	0 to 255	-	
135	Self IP Address (L)	1	1 to 254	-	* Prohibited to set to 0 and 255

Pay attention to avoid duplication of IP address.

[3] Subnet Mask Setting

Set the subnet mask to I/O Parameter No.136 to 139.

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
136	Subnet Mask (H)	255	0 to 255	-	
137	Subnet Mask (MH)	255	0 to 255	-	
138	Subnet Mask (ML)	255	0 to 255	-	
139	Subnet Mask (L)	0	0 to 255	-	

[4] Default Gateway Setting

Set the default gateway to I/O Parameter No.140 to 143.

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
140	Default Gateway (H)	0	0 to 255	-	
141	Default Gateway (MH)	0	0 to 255	-	
142	Default Gateway (ML)	0	0 to 255	-	
143	Default Gateway (L)	0	0 to 255	-	

[5] Baud Rate Setting

There is no setting as it is 10BASE-T/100BASE-T (Auto-negotiation).

[6] I/O Port Assignment Classification Setting

Set the I/O port assignment Classification to I/O Parameter No.1.

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
1	I/O Port Allocation Type	1	0 to 1	—	0: Fixed Allocation 1: Automatic Allocation (Priority: Network I/F Module→Slot 1 (Standard I/O), * I/O slot 1 Assigned for the continuously mounted range from mounting board = For safety

[7] Number of I/O Port Setting

Set the number of ports to be used for I/O Parameters No.14 to 15.
Set a number that is a multiple of 8.

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
14	Network I/F Card Number of Remote Input Ports	0	0 to 256	-	Indicate input port count with a multiple of 8 (8≦n≦256) * n should be input port count to be set
15	Network I/F Card Number of Remote Output Ports	0	0 to 256	-	Indicate output port count with a multiple of 8 (8≦m≦256) * m should be output port count to be set

[8] I/O Port Top Number Setting

Set the top port number of the port range used in I/O Parameters No.16 to 17.
The values entered into these parameters must be evenly divisible by 8.

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
16	Network I/F Module Fix-Allocated Input Port Start No.	-1	-1 to 299	-	0+(Multiples of 8) (0 to 299) (Unavailable when it is negative figure)
17	Network I/F Module Fix-Allocated Output Port Start No.	-1	-1 300 to 599	-	300+(Multiples of 8) (300 to 599) (Unavailable when it is negative figure)

[9] EtherNet/IP Board Use Setting

Set “1” (Monitoring: use EtherNet board) to I/O Parameter No.18.

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
18	Network I/F Module Error Monitor	1	0 to 5	-	0: No Monitoring 1: Monitoring

[10] Time Setting to Wait for EtherNet/IP Communication Establishment

Set the maximum allowable time for the establishment of EtherNet/IP communication at the startup in bits 16 to 27 of I/O Parameter No.121. Change this setting when XSEL starts faster than the master unit, which results in a generation of “D5D” or “A6B”.

* XSEL-P/Q should be applicable with the main application in Ver. 1.28 and later (from 32Mbit version only), and XSEL-PX/QX should be applicable from the main application in Ver.0.60 and later.

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
121	Network Attribute 2	$C80000_H$	0 to $FFFFFFFF_H$	100 ms	Bits 16 to 27: Value of Link Timeout at initializing of the Fieldbus (Example) The initial value $C80000_H$ is bit 16 to 27 = C8H = 200 (in 100ms unit) 200×100ms = 20s Check in 20s after startup

7.5.2 Example for Parameter Settings

(1) Example for when using EtherNet/IP

The system is to be established only with EtherNet/IP remote I/O. It is the setting when the standard I/O port is assigned to EtherNet/IP and connection of external devices by the I/O board is not to be conducted at all.

- I/O Parameter

No.	Parameter name	Set value	Input Range	Remarks
1	I/O Port Allocation Type	0	0 to 20	0 : Fixed Allocation The I/O port number to be indicated with a parameter. 1 : Automatic Allocation (Priority: From Slot 1)
2	Standard I/O Fix-Allocated Input Port Start No. (I/O1)	-1	-1～599	0+(Multiples of 8) (Unavailable when it is negative figure)
3	Standard I/O Fix-Allocated Output Port Start No. (I/O1)	-1	-1～599	300+(Multiples of 8) (Unavailable when it is negative figure)
4	Extension I/O1 Fix-Allocated Input Port Start No. (I/O2)	-1	-1～599	0+(Multiples of 8) (Unavailable when it is negative figure) -1 : Extension I/O1 DO None
5	Extension I/O1 Fix-Allocated Output Port Start No.(I/O2)	-1	-1～599	300+(Multiples of 8) (Unavailable when it is negative figure) -1 : Extension I/O1 DO None
6	Extension I/O2 Fix-Allocated Input Port Start No. (I/O3)	-1	-1～599	0+(Multiples of 8) (Unavailable when it is negative figure) -1 : Extension I/O2 DO None
7	Extension I/O2 Fix-Allocated Output Port Start No. (I/O3)	-1	-1～599	300+(Multiples of 8) (Unavailable when it is negative figure) -1 : Extension I/O2 DO None
8	Extension I/O3 Fix-Allocated Input Port Start No. (I/O4)	-1	-1～599	0+(Multiples of 8) (Unavailable when it is negative figure) -1 : Extension I/O3 DO None
9	Extension I/O3 Fix-Allocated Output Port Start No. (I/O4)	-1	-1～599	300+(Multiples of 8) (Unavailable when it is negative figure) -1 : Extension I/O3 DO None
10	Standard I/O Error Monitoring (I/O1)	0	0 to 5	0 : No Monitoring 1 : Monitoring 2 : Monitoring (Not to monitor 24V I/O power related error) 3 : Monitoring (To monitor only 24V I/O power related error)
11	Extension I/O1 Error Monitoring (I/O2)	0	0 to 5	
12	Extension I/O2 Error Monitoring (I/O3)	0	0 to 5	
13	Extension I/O3 Error Monitoring (I/O4)	0	0 to 5	
14	Network I/F Card Remote Input Ports	n	0 to 256	Indicate input port count with a multiple of 8 (8<=n<=256)
15	Network I/F Card Remote Output Ports	m	0 to 256	Indicate output port count with a multiple of 8 (8<=n<=256)
16	Network I/F Module Fix-Allocated Input Port Start No.	0	-1 to 599	0+(Multiples of 8) (Unavailable when it is negative figure)
17	Network I/F Module Fix-Allocated Output Port Start No.	300	-1 to 599	300+(Multiples of 8) (Unavailable when it is negative figure)
18	Network I/F Module Error Monitor	1	0 to 5	0 : No Monitoring 1 : Monitoring

(2) Example for when using EtherNet/IP and I/O Board 1 together
Assign the standard I/O port to EtherNet/IP (Input Port Start No. 0, Output Port Start No. 300).
It is an example of setting when in use with the I/O board is assigned with Input Port Start No. 200 and Output Port Start No. 500.

- I/O Parameter

No.	Parameter name	Set value	Input Range	Remarks
1	I/O Port Allocation Type	0	0 to 20	0 : Fixed Allocation The I/O port number to be indicated with a parameter. 1 : Automatic Allocation (Priority: From Slot 1)
2	Standard I/O Fix-Allocated Input Port Start No. (I/O1)	200	-1 to 599	0+(Multiples of 8) (Unavailable when it is negative figure)
3	Standard I/O Fix-Allocated Output Port Start No. (I/O1)	500	-1 to 599	300+(Multiples of 8) (Unavailable when it is negative figure)
4	Extension I/O1 Fix-Allocated Input Port Start No. (I/O2)	-1	-1 to 599	0+(Multiples of 8) (Unavailable when it is negative figure) -1 : Extension I/O1 DO None
5	Extension I/O1 Fix-Allocated Output Port Start No. (I/O2)	-1	-1 to 599	300+(Multiples of 8) (Unavailable when it is negative figure) -1 : Extension I/O1 DO None
6	Extension I/O2 Fix-Allocated Input Port Start No. (I/O3)	-1	-1 to 599	0+(Multiples of 8) (Unavailable when it is negative figure) -1 : Extension I/O2 DO None
7	Extension I/O2 Fix-Allocated Output Port Start No. (I/O3)	-1	-1 to 599	300+(Multiples of 8) (Unavailable when it is negative figure) -1 : Extension I/O2 DO None
8	Extension I/O3 Fix-Allocated Input Port Start No. (I/O4)	-1	-1 to 599	0+(Multiples of 8) (Unavailable when it is negative figure) -1 : Extension I/O3 DO None
9	Extension I/O3 Fix-Allocated Output Port Start No. (I/O4)	-1	-1 to 599	300+(Multiples of 8) (Unavailable when it is negative figure) -1 : Extension I/O3 DO None
10	Standard I/O Error Monitoring (I/O1)	1	0 to 5	0 : No Monitoring 1 : Monitoring 2 : Monitoring (Not to monitor 24V I/O power related error) 3 : Monitoring (To monitor only 24V I/O power related error)
11	Extension I/O1 Error Monitoring (I/O2)	0	0 to 5	
12	Extension I/O2 Error Monitoring (I/O3)	0	0 to 5	
13	Extension I/O3 Error Monitoring (I/O4)	0	0 to 5	
14	Network I/F Card Remote Input Ports	n	0 to 256	Indicate input port count with a multiple of (8<=n<=256)
15	Network I/F Card Remote Output Ports	m	0 to 256	Indicate output port count with a multiple of 8 (8<=n<=256)
16	Network I/F Module Fix-AllocatedInput Port Start No.	0	-1 to 599	0+(Multiples of 8) (Unavailable when it is negative figure)
17	Network I/F Module Fix-Allocated Output Port Start No.	300	-1 to 599	300+(Multiples of 8) (Unavailable when it is negative figure)
18	Network I/F Module Error Monitor	1	0 to 5	0 : No Monitoring 1 : Monitoring

7.6 Connection to Network

EtherNet/IP occupies EtherNet Port No.44818 and 2222.
The connection of EtherNet/IP is established by indicating the port 44818 in the IP address of XSEL Controllers in EtherNet/IP software.
Also, the setting file (EDS) can be downloaded in IAI homepage.

> ⚠ Caution Please note that Port No.2222 (UDP Port) and 44818 (TCP Port and UDP Port) must be open for use by any firewall configuration.

> ⚠ Caution In case EtherNet/IP Remote IO Communication and TCP/IP Message Communication are being used at the same time, the reset command from the network configurator may not be executed properly.
> If an execution of the reset from the configurator is required, temporarily inactivate TCP/IP Message Communication (by setting 0 to I/O Parameter No. 129 "Network Attribute 10"), and conduct the reset. (Make sure to put back the setting after reset is done.)

7.7 Standard I/O Ports of XSEL Controller

It is available to add special functions beside the general-purposed input and output in the standard I/O ports of XSEL Controllers.
Refer to [XSEL-P/Q Controller] or [XSEL-PX/QX controller Operation Manual] for the details.

[Settings of Standard I/O Ports at Delivery]

Input Port			Output Port	
Port No.	Function		Port No.	Function
000	Program Start		300	Alarm Output
001	Universal Input		301	Ready Output
002	Universal Input		302	Emergency Stop Output
003	Universal Input		303	Universal Output
004	Universal Input		304	Universal Output
005	Universal Input		305	Universal Output
006	Universal Input		306	Universal Output
007	Program Specification	(LSB)	307	Universal Output
008	Program Specification	Indicate startup	308	Universal Output
009	Program Specification	program	309	Universal Output
010	Program Specification	number with in	310	Universal Output
011	Program Specification	binary	311	Universal Output
012	Program Specification		312	Universal Output
013	Program Specification	(MSB)	313	Universal Output
014	Universal Input		314	Universal Output
015	Universal Input		315	Universal Output
⋮			⋮	

(Note) Number of standard I/O ports is:
- Input 000 to 299 (300 points max.)
- Output 300 to 599 (300 points max.)

Be careful of the number of I/O ports when using EtherNet/IP and PIO together.

7.8 I/O Port and Data Reading and Writing

The initial setting of SEL language commands for the operation of I/O (input and output) ports of XSEL Controller is set to execute reading and writing without the data being exchanged. Shown below is an example for the assignments on the EtherNet/IP master side and XSEL controller side.

[XSEL side output domain ⇒ EtherNet/IP side master input domain]

Address	Bit 7 (MSB)	6	5	4	3	2	1	0 (LSB)
XSEL Output Port Number	307	306	305	304	303	302	301	300
EtherNet/IP Input word address	0 (lower-order byte)							
XSEL Output Port Number	315	314	313	312	311	310	309	308
EtherNet/IP Input word address	0 (host byte)							
XSEL Output Port Number	323	322	321	320	319	318	317	316
EtherNet/IP Input word address	1 (lower-order byte)							
XSEL Output Port Number	331	330	329	328	327	326	325	324
EtherNet/IP Input word address	1 (host byte)							

⋮

● Example Data (1234_H) from XSEL is changed to 1234_H in EtherNet/IP.

XSEL	HEX	1	2	3	4
	BIN	0001	0010	0011	0100
EtherNet/IP Master	HEX	1	2	3	4
	BIN	0001	0010	0011	0100

[EtherNet/IP master side output domain ⇒ XSEL side input domain]

Address	Bit 7 (MSB)	6	5	4	3	2	1	0 (LSB)
XSEL Input Port Number	7	6	5	4	3	2	1	0
EtherNet/IP Output word address	0 (lower-order byte)							
XSEL Input Port Number	15	14	13	12	11	10	9	8
EtherNet/IP Output word address	0 (host byte)							
XSEL Input Port Number	23	22	21	20	19	18	17	16
EtherNet/IP Output word address	1 (lower-order byte)							
XSEL Input Port Number	31	30	29	28	27	26	25	24
EtherNet/IP Output word address	1 (host byte)							

⋮

● Example Data (1234_H) from EtherNet/IP master is changed to 1234_H in XSEL.

EtherNet/IP Master	HEX	1	2	3	4
	BIN	0001	0010	0011	0100
XSEL	HEX	1	2	3	4
	BIN	0001	0010	0011	0100

●Reference How to Read and Write with Swapping Host 8 Bits with Lower 8 Bits for Every 16-Bit Data

When conducting reading and writing with swapping the host 8 bits with lower 8 bits for every 16-bit data, set Format Type to 1 (Swap host 8 bits with lower 8 bits for every 16-bit data) with FMIO Command before executing an input and output port operation command such as IN Command and OUT Command in XSEL Controller.
For details, refer to [SEL Programming Manual (ME0224)].
Shown below is an example for the assignments on EtherNet/IP master side and XSEL controller side.

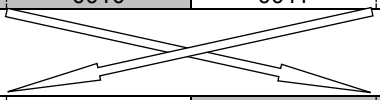
[EtherNet/IP master side output domain ⇒ XSEL side input domain]

Address	Bit 7 (MSB)	6	5	4	3	2	1	0 (LSB)
XSEL Input Port Number	307	306	305	304	303	302	301	300
EtherNet/IP Output bit address	15	14	13	12	11	10	9	8
EtherNet/IP Output word address	0 (host byte)							
XSEL Input Port Number	315	314	313	312	311	310	309	308
EtherNet/IP Output bit address	7	6	5	4	3	2	1	0
EtherNet/IP Output word address	0 (lower-order byte)							
XSEL Input Port Number	323	322	321	320	319	318	317	316
EtherNet/IP Output bit address	31	30	29	28	27	26	25	24
EtherNet/IP Output word address	1 (host byte)							
XSEL Input Port Number	331	330	329	328	327	326	325	324
EtherNet/IP Output bit address	23	22	21	20	19	18	17	16
EtherNet/IP Output word address	1 (lower-order byte)							

⋮

● Example Data (1234_H) from EtherNet/IP master is changed to 1234_H in XSEL.

EtherNet/IP Master	HEX	1	2	3	4
	BIN	0001	0010	0011	0100



XSEL	HEX	3	4	1	2
	BIN	0011	0100	0001	0010

8. Appendix

8.1 Troubleshooting

(1) In case it is not possible to connect the network, check the current condition on the display of monitoring LEDs of EtherNet/IP Board. Refer to [Section 3.3.2., 4.3.2., 5.3.2., 6.3.2. and 7.3.2]
Check the settings of the controller and the settings of the master unit referring to the operation manuals of the master unit.

(2) When an alarm is issued, an alarm code gets output to the panel window of the XSEL, MSEL controller and TTA. (ASEL, PSEL and SSEL controllers need to connect the panel unit (option) and PC software to read out the alarms.)
1) Based on the read alarm code, search the alarm description list in the operation manual for the each controller.
2) Deal with it based on the description for the alarm code in question.
The alarm codes listed below are those you will often see in the startup process.

◎ Alarm Codes in Common

Monitor LED	Contents	Cause and Remedy
ErG	Emergency Stop	It is not an alarm. • This occurs when the emergency stop switch of a teaching tool such as the PC software is not released. • It is generated when the personal computer cable is not connected to the emergency stop switch box. • Check the emergency stop circuit.
Enb	Safety Gate Remains Opening Deadman Switch OFF	It is not an alarm. • It is generated when the system I/O ENB signal is opened. Check the ENB signal. (It is generated when the safety gate is open. Close the safety gate.) • This occurs when AUTO/MANU switch is on MANU and no teaching tool such as a PC is connected. Connect the teaching pendant or set the AUTO/MANU switch to “AUTO”. • When the actuator is to be started up, hold the deadman switch on the teaching pendant to turn it ON.
ACF	AC Power Interruption Momentary Power Failure Power Voltage Drop	The power voltage is not supplied properly. Check the power supply.
E914	Absolute Data Backup Battery Voltage Error	It will be generated in the case that the battery has not been attached, or the battery voltage is dropped. In the case of the actuator for the single-axis robots or orthogonal robots with the absolute data specifications, it is generated when the power is connected for the first time. Perform the absolute reset.
ED12	Encoder Disconnection Error	It is generated when the cable is broken or the encode cable is not connected to the controller. Check the wiring.
ED19	Encoder Reception Time Out	It is generated when the encoder is broken down, the cable is broken or the encoder cable is not connected to the controller.

Monitor LED	Contents	Cause and Remedy
EE69 EE6C	24V I/O Error DO Output Current Error	It is generated when the +24V power for I/O is not supplied. Check the power supply. (How to start up the controller without connecting the I/O 24V power) Set the I/O parameter No.10 to 13 corresponding to the standard or extended I/O board to “0”. (Note) I/O cannot be used.
ED5D	Fieldbus Error	This occurs when the network connection is not established. Check the parameters on SEL and the parameters on PLC. (Way to boot the controller without connecting to EtherNet/IP) Set both the I/O parameter No.18 or No.235 to “0”.

◎ Other Alarm Codes Related to EtherNet/IP

- Message Level Error

No.	Error name	Contents / Counteractions
A6B	Fieldbus Error (FBRS Link Error)	FBRS Link Error was detected.

- Operation Cancel Level Errors

No.	Error name	Contents / Counteractions
B1B	EtherNet Non-Closed Socket Open Error	Without closing the socket, it tried to get open again.
B1C	Error of EtherNet Being Used by Other Task	The channel already open in another task tried to get open again.
B1D	EtherNet Non-Open Error	The channel that is not open in its own task tried to be used.
B1E	EtherNet WRIT Execution Duplicated Error	WRIT Command was executed by multiple tasks at the same time to the same channel, or WRIT Command was executed again without CLOS Command → OPEN Command not being executed after WRIT was failed (due to communication error, etc.).
B1F	EtherNet Job Busy Error	A new task tried to be started while the EtherNet mail box control job is busy.
B20	EtherNet Initializing Device Used Error	EtherNet system tried to be used while the initializing of EtherNet devices is not completed. Check I/O Parameters such as No.123 to 159, 14, 15, and so on depending on the purpose of use.
B21	EtherNet IP Address Error	An error occurs in conditions stated below in a standard use. Assuming the IP address (H) (1st Octet) to IP address (L) (4th Octet) are expressed as IP_H, IP_MH, IP_ML and IP_L, the conditions to be defined as error are; IP_H ≤ 0 or IP_H = 127 or IP_H > 255 or IP_MH < 0 or IP_MH > 255 or IP_ML < 0 or IP_ML > 255 or IP_L ≤ 0 or IP_L ≥ 255 Check I/O Parameters No.132 to 135, 149 to 152, 154 to 157 or the integer variable connected IP address indicated in IPCN Command.
B22	EtherNet Port No. Error	Self-Port Number [1025 or Self-Port Number] 65535 or Duplication of self-port number or Connected port number at client ≤ 0 or Connected port number at client > 65535 or Connected port number at server [0 or Connected port number at server] 65535 will cause an error. Check I/O Parameters No.144 to 148, 159, 153, 158 or the integer variable connected Port Number indicated in IPCN Command.

- Cold Start Level Errors

No.	Error name	Contents / Counteractions
678	Extension I/O Port Assignment Parameter Error	There is an error in a parameter related to the extended I/O port assignment.
679	Extended I/O Port Assignment Number Overflow Error	The number of extended I/O port assignment exceeded the specification range.
67A	Extended I/O Port Duplicated Assignment Error	Extended I/O port assignment has duplicated.
D56	Fieldbus Error (MinACK Timeout)	The Min ACK Timeout was detected. Check the status of the monitoring LED. Refer to [Sections 3.3.2, 4.3.2, 5.3.2 and 6.3.2]
D59	Fieldbus Error (DPRAM Writing and Reading)	The DPRAM writing and reading error was detected. Check the status of the monitoring LED. Refer to [Sections 3.3.2, 4.3.2, 5.3.2 and 6.3.2]
D5A	Fieldbus Error (TOGGLE Timeout)	The TOGGLE Timeout was detected. Check the status of the monitoring LED. Refer to [Sections 3.3.2, 4.3.2, 5.3.2 and 6.3.2]
D5B	Fieldbus Error (Access Right Retry Over)	The Access Right Retry Over Error was detected. Check the status of the monitoring LED. Refer to [Sections 3.3.2, 4.3.2, 5.3.2 and 6.3.2]
D5D	Fieldbus Error (FBRS Link Error)	The FBRS Link Error was detected. Check the status of the monitoring LED. Refer to [Sections 3.3.2, 4.3.2, 5.3.2 and 6.3.2]
D5E	Fieldbus Error (Mail BOX Response)	The Mail BOX Response Error was detected. Check the status of the monitoring LED. Refer to [Sections 3.3.2, 4.3.2, 5.3.2 and 6.3.2]
D5F	Network I/F Module Class Mismatch Error	The network type actually mounted does not match with the network type set in I/O Parameter No. 225. Check the setting in I/O Parameter No.225 and the combination of network I/F module actually mounted.
D75	Fieldbus Parameter Error	There is a failure in the Fieldbus Parameter. Check in I/O Parameters No.226 to 227, No.237 to 238 and No. 132 to 135 and other considerable numbers. Example) • A node address out of the range was set. • A communication speed out of the range is set. • Own IP address in the system reservation was set. etc.
D76	Fieldbus Module Unmounted Error	EtherNet/IP board is not mounted.
D77	Fieldbus Error (Exception)	The Exception Error was detected. Refer to the operation manual of the field network board and check the conditions of monitoring LEDs on the Fieldbus.
E1F	I/O Assignment Parameter Error	It can be concurred that a value other than the input and output port number (-1 is acceptable) or a value other than Input and Output Board Top No. + [a multiple of 8] is input in I/O Parameter No.2 to 9, or a value other than [a multiple of 8] is input in I/O Parameter No.14 to 17 or No.231 to 234.
E20	I/O Duplication Assignment Error	I/O assignment is duplicated. Check I/O Parameter No.2 to 9, 14 to 17, 231 to 234 card model code (input and output number) in the slot and so on.
E21	I/O Assignment Number Overflow Error	I/O assignment has exceeded the specified range. Check the setting in I/O Parameter No. 2 to 9, 14 to 17 and 231 to 234, and also the card model type (such as number of input and output) of the I/O slots.
E8F	Fieldbus Logic Error	It is a logic error at the Fieldbus initializing.

8.2 List of EtherNet/IP Related Parameters

[1] I/O Parameters of the XSEL, ASEL, PSEL and SSEL

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
1	I/O Port Allocation Type	1	0 to 20	-	0 : Fixed Allocation 1 : Automatic Allocation * Priority of I/O Port Assignment (No.0 to 299/No.300 to 599) (Network I/F Module 1 → I/O slot 1 (I/O1) Mounting board * Assigned for the range of continuous mounting from I/O slot 1 (I/O1) Mounting board = for safety) * Priority of XSEL extension I/O ports assignment (No.1000 to 3999/No.4000 to 6999) (Network I/F Module 2 → Extension I/O unit → Communication between IA Net Controllers)
14	Network I/F Module 1 Remote Input Ports	0	0 to 256	-	Multiples of 8
15	Network I/F Module 1 Remote Output Ports	0	0 to 256	-	Multiples of 8
16	Network I/F Module 1 Fix-Aoolcated Input Port Start No.	-1	-1 to 3999	-	0+(Multiples of 8)(0 to 299) 1000+(Multiples of 8)(1000 to 3999) (XSEL only) (Unavailable when it is negative figure)
17	Network I/F Module 1 Fix-Aoolcated Output Port Start No.	-1	-1 to 6999	-	300+(Multiples of 8)(300 to 599) 4000+(Multiples of 8)(4000 to 6999) (XSEL only) (Unavailable when it is negative figure)
18	Network I/F Module 1 Error Monitor	1	0 to 5	-	0 : No Monitoring 1 : Monitoring * There are some exceptions
120	Network attribute 1	640001_H	0_H to $FFFFFFFF_H$	-	Bit 0 to 3 : System Reservation Bit 4 to 11 : Network I/F Module 1 Link Error Check Timer Value (10ms) Bit 12 to 15 : For future extension Bit 16 to 27 : System Reservation Bit 28 to 31 : Network I/F Module 1 Input port data select for link error (0: Clear, 1: Hold) (XSEL only)
121	Network attribute 2	$C80000_H$	0_H to $FFFFFFFF_H$	Opti-onal	Bits 8 to 11: Input port data selected at Network I/F Module 2 link error (0: Clear, 1: Hold) Bits 16 to 27: Value of Link Timeout at initializing of the Fieldbus (100ms)
123	Network attribute 4	0_H	0_H to $FFFFFFFF_H$	-	Bit 0 to 3 : EtherNet TCP/IP Message Communication Connected IP address at server 0.0.0.0 (Indication of connected destination IP address not to be asked) allowance selesct (0: Not to Accept 1: Accept (not recommended)) * Note: Number of connectable clients per channel of server port at the same time = 1

- I/O Parameters of the XSEL, ASEL, PSEL and SSEL

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
124	Network attribute 5	0H	0_H to FFFFFFFF$_H$	-	EtherNet TCP/IP Message Communication Attribute EtherNet Client/Server Classification (0 : Disable 1 : Client (Self-Port Number Automatic Assignment) (2 : Client (Self-Port Number Indication) → It is not recommended since there are some device restrictions such like when close response cannot be confirmed due to such a reason as the power supply cutoff of the connected, and then keep open for approximately 10 minutes after that, it may cause an error.) 3 : Server (Self-Port Number Automatic Assignment)) *Note: Number of connectable clients per channel of server port at the same time = 1 Bit 0 to 3 : IAI Protocol B/TCP (MANU Mode) * PC software connection available when set to Client Bit 4 to 7 : IAI Protocol B/TCP (AUTO Mode) * PC software connection available when set to Client Bit 8 to 11 : Free-for-User Channel 31 Bit 12 to 15 : Free-for-User Channel 32 Bit 16 to 19 : Free-for-User Channel 33 Bit 20 to 23 : Free-for-User Channel 34 * The connection is transiently cut at the switchover of MANU/AUTO mode when the self-port number, client-server type connected IP address or connected port number parameter setting of each mode are not completely matched.
125	Network attribute 6	31E32H	0_H to FFFFFFFF$_H$	-	Bit 0 to 7 : System Reservation Bit 8 to 15 : System Reservation Bit 16 to 23 : Added value (s) of “software reset, PC/TP re-connection delay time” when EtherNet is used
126	Network attribute 7	7D007D0H	0_H to FFFFFFFF$_H$	-	Bit 0 to 15 : System Reservation Bit 16 to 31 : System Reservation
127	Network attribute 8	5050214H	0_H to FFFFFFFF$_H$	-	EtherNet TCP/IP Message Communication Attribute Bit 0 to 7 : CONNECT_TIMEOUT (Change Prohibited) (0 Prohibited) (s) Bit 8 to 15 : Connection Retry Interval (IAI Protocol B/TCP) (s) Bit 16 to 23 : Send Timeout Value (s) Bit 24 to 31 : IAI Protocol B-SIO non-communication check timer value (s) (IAI Protocol B/TCP Connection Trigger)
128	Network attribute 9	10000H	0_H to FFFFFFFF$_H$	-	EtherNet TCP/IP Message Communication Attribute Bit 0 to 15 : SEL Server Open Timeout Value (s) (No timeout check when set to “0”) Bit 16 to 23 : Connection Retry Interval (Tracking Vision System I/F) (s)

- I/O Parameters of the XSEL, ASEL, PSEL and SSEL

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
129	Network attribute 10	0H	0_H to $FFFFFFFF_H$	-	EtherNet Operation Prescription Bit 0 to 3 : System Reservation Bit 4 to 7 : TCP/IP Message Communication (0: Not to use 1: Used) Bit 8 to 31 : Reserved (Operation Prescription)
130	Network I/F Module 1 Self MAC Address (H)	0H	Only referring (HEX)	-	Last 2 bites are valid
131	Network I/F Module 1 Self MAC Address (L)	0H	Only referring (HEX)	-	
132	Network I/F Module 1 Self IP Address (H)	192	1 to 255	-	* Prohibited to set to 0 and 127
133	Network I/F Module 1 Self IP Address (MH)	168	0 to 255	-	
134	Network I/F Module 1 Self IP Address (ML)	0	0 to 255	-	
135	Network I/F Module 1 Self IP Address (L)	1	1 to 254	-	* Prohibited to set to 0 and 255
136	Network I/F Module 1 Subnet Mask (H)	255	0 to 255	-	
137	Network I/F Module 1 Subnet Mask (MH)	255	0 to 255	-	
138	Network I/F Module 1 Subnet Mask (ML)	255	0 to 255	-	
139	Network I/F Module 1 Subnet Mask (L)	0	0 to 255	-	
140	Network I/F Module 1 Default Gateway (H)	0	0 to 255	-	
141	Network I/F Module 1 Default Gateway (MH)	0	0 to 255	-	
142	Network I/F Module 1 Default Gateway (ML)	0	0 to 255	-	
143	Network I/F Module 1 Default Gateway (L)	0	0 to 255	-	
144	IAI Protocol B/TCP Self-Port No. (MANU Mode)	64511	1025 to 65535	-	* Caution: Set different numbers to each self-port number. (Sharing of the same number is allowed only in IAI Protocol B/TCP self-port number and MANU Mode/AUTO Mode.)
145	Free-for-User Channel 31 (TCP/IP) Self-Port No.	64512	1025 to 65535	-	
146	Free-for-User Channel 32 (TCP/IP) Self-Port No.	64513	1025 to 65535	-	
147	Free-for-User Channel 33 (TCP/IP) Self-Port No.	64514	1025 to 65535	-	
148	Free-for-User Channel 34 (TCP/IP) Self-Port No.	64515	1025 to 65535	-	

- I/O Parameters of the XSEL, ASEL, PSEL and SSEL

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
149	IAI Protocol B/TCP connected destination IP Address (MANU Mode)(H)	192	0 to 255	-	* Prohibited to set to 0 and 127
150	IAI Protocol B/TCP connected destination IP Address (MANU Mode) (MH)	168	0 to 255	-	
151	IAI Protocol B/TCP connected destination IP Address (MANU Mode) (ML)	0	0 to 255	-	
152	IAI Protocol B/TCP connected destination IP Address (MANU Mode) (L)	100	0 to 254	-	* Prohibited to set to 0 and 255
153	IAI Protocol B/TCP connected destination Port No. (MANU Mode)	64611	0 to 65535	-	* Setting of 0 available when server 0 = connected port number not to be subject (Only IP address is checked) * Setting of 0 not available when client
154	IAI Protocol B/TCP connected destination IP Address (AUTO Mode)(H)	192	0 to 255	-	* Prohibited to set to 0 and 127
155	IAI Protocol B/TCP connected destination IP Address (AUTO Mode) (MH)	168	0 to 255	-	
156	IAI Protocol B/TCP connected destination IP Address (AUTO Mode) (ML)	0	0 to 255	-	
157	IAI Protocol B/TCP connected destination IP Address (AUTO Mode) (L)	100	0 to 254	-	* Prohibited to set to 0 and 255
158	IAI Protocol B/TCP connected destination Port No. (AUTO Mode)	64611	0 to 65535	-	* Setting of 0 available when server 0 = connected port number not to be subject (Only IP address is checked) * Setting of 0 not available when client
159	IAI Protocol B/TCP Self-Port No. (AUTO Mode)	64516	1025 to 65535	-	* Caution: Set different numbers to each self-port number. (Sharing of the same number is allowed only in IAI Protocol B/TCP self-port number and MANU Mode/AUTO Mode.)
160	Vision System I/F connected destination IP Address (H)	192	0 to 255	-	* Prohibited to set to 0 and 127
161	Vision System I/F connected destination IP Address (MH)	168	0 to 255	-	
162	Vision System I/F connected destination IP Address (ML)	0	0 to 255	-	
163	Vision System I/F connected destination IP Address (L)	102	0 to 254	-	* Prohibited to set to 0 and 255
164	Vision System I/F connected destination Port No.	64613	0 to 65535	-	* Vision System I/F is dedicated for the specifications of the client on IAI controller side (Self-Port Number Automatic Assignment) * 0 Setting of 0 forbidden

- I/O Parameters of the XSEL, ASEL, PSEL and SSEL

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
225	Network I/F Module Control Those stated in brackets ( ) are for XSEL-RA/SA Series	*7 (*07)	00_H to 37_H (000_H to 307_H) Only referring	07 (007)	Bit 0 to 3: (Bit 0 to 7:) Type of Network I/F Module Control 1 6 : EtherCAT® 7 : EtherNet/IP Bit 4 to 7: (Bit 8 to 15:) Type of Network I/F Module Control 2 0 : Not Mounted 1 : CC-Link 2 : DeviceNet 3 : PROFIBUS
226	Network I/F Module 1 Node Address	0	0 to 999	-	• At CC-Link : 1 to 64 • At DeviceNet : 0 to 63 • At Profibus : 0 to 125 • At EtherCAT : 0 to 127
227	Network I/F Module 1 Baud Rate	0	0 to 9	-	• At CC-Link: (0 : 156kbps, 1 : 625kbps, 2 : 2.5Mbps, 3 : 5Mbps, 4 : 10Mbps) • At DeviceNet : (0 : 125kbps, 1 : 250kbps, 2 : 500kbps) • At EtherNet/IP: (0 : Autonegotiation, 1 : 10Mbps (Half-Duplex), 2 : 10Mbps (Full duplex), 3 : 100Mbps (Half-Duplex), 4 : 100Mbps (Full duplex)) * Setting establishment not necessary for Profibus and EtherCAT®

*The the actual default value may differ depending on the construction of used option board.

[2] I/O Parameters of the TTA and MSEL

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
1	I/O Port Allocation Type	0	Only to reference	-	0:Fixed Allocation
14	I/O2 Fieldbus Remote Input Ports	0	0 to 240	-	Multiples of 8
15	I/O2 Fieldbus Remote Output Ports	0	0 to 240	-	Multiples of 8
16	I/O2 Fix-Aoolcated Input Port Start No.	-1(TTA) 48(MSEL)	-1 to 299	-	0+(Multiples of 8) (Unavailable when it is negative figure)
17	I/O2 Fix-Aoolcated Output Port Start No.	-1(TTA) 348(MSEL)	-1 300 to 599	-	300+(Multiples of 8) (Unavailable when it is negative figure)
18	I/O2 Error Monitor	1	0 to 5	-	0 : No Monitoring 1 : Monitoring * There are some exceptions
120	Network attribute 1	640001H	0H to FFFFFFFFH	-	Bit 0 to 3 : System Reservation Bit 4 to 11 : Network I/F Module 1 Link Error Check Timer Value (10ms) Bit 12 to 15 : For future extension Bit 16 to 27 : System Reservation Bit 28 to 31 : I/O2 Fieldbus Input port data select for link error (0: Clear, 1: Hold)
121	Network attribute 2	C80000H	0H to FFFFFFFFH		Bit 0 to 7 : I/O3 Fieldbus Link Error Check Timer Value (10ms) Bit 8 to 11 : I/O3 Fieldbus Input port data select for link error (0: Clear, 1: Hold) Bit 12 to 15 : For future extension Bit 16 to 27 : Link Timeout Value at Network Initialization (100msec)
123	Network attribute 4	0H	0H to FFFFFFFFH		Bit 0 to 3 : EtherNet TCP/IP Message Communication Connected IP address at server 0.0.0.0 (Indication of connected destination IP address not to be asked) allowance selesct (0: Not to Accept 1: Accept (not recommended)) * Note: Number of connectable clients per channel of server port at the same time = 1 Bit 4 to 7 : EtherNet IAI Protocol B/TCP (MANU mode) Existence check function select (0: Not use, 1: KeepAlive use) Bit 8 to 11 : EtherNet IAI Protocol B/TCP (AUTO mode) Existence check function select (0: Not use, 1: KeepAlive use) Bit 12 to 15 : EtherNet Free-for-User Channel 31 Existence check function select (0: Not use, 1: KeepAlive use) Bit 16 to 19 : EtherNet Free-for-User Channel 32 Existence check function select (0: Not use, 1: KeepAlive use) Bit 20 to 23 : EtherNet Free-for-User Channel 33 Existence check function select (0: Not use, 1: KeepAlive use) Bit 24 to 27 : EtherNet Free-for-User Channel 34 Existence check function select (0: Not use, 1: KeepAlive use) * The connection may get cut in case the mating device is not applicable for TCP KeepAlive function.

- I/O Parameters of the TTA and MSEL

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
124	Network attribute 5	0H	0H to FFFFFFFFH	-	EtherNet TCP/IP Message Communication Attribute EtherNet Client/Server Classification (0 : Disable 1 : Client (Self-Port Number Automatic Assignment) 2 : System Reservation 3 : Server (Self-Port Number Automatic Assignment)) *Note: Number of connectable clients per channel of server port at the same time = 1 Bit 0 to 3 : IAI Protocol B/TCP (MANU Mode) * PC software connection available when set to Client Bit 4 to 7 : IAI Protocol B/TCP (AUTO Mode) * PC software connection available when set to Client Bit 8 to 11 : Free-for-User Channel 31 Bit 12 to 15 : Free-for-User Channel 32 Bit 16 to 19 : Free-for-User Channel 33 Bit 20 to 23 : Free-for-User Channel 34 * The connection is transiently cut at the switchover of MANU/AUTO mode when the self-port number, client-server type connected IP address or connected port number parameter setting of each mode are not completely matched.
125	Network attribute 6	31E32H	0H to FFFFFFFFH	-	Bit 0 to 23 : System Reservation
126	Network attribute 7	7D007D0H	0H to FFFFFFFFH	-	Bit 0 to 31 : System Reservation
127	Network attribute 8	5050214H	0H to FFFFFFFFH	-	EtherNet TCP/IP Message Communication Attribute Bit 0 to 7 : CONNECT_TIMEOUT (Change Prohibited) (0 Prohibited) (s) Bit 8 to 15 : Connection Retry Interval (IAI Protocol B/TCP) (s) Bit 16 to 23 : Send Timeout Value (s) Bit 24 to 31 : IAI Protocol B-SIO non-communication check timer value (s) (IAI Protocol B/TCP Connection Trigger)
128	Network attribute 9	10000H	0H to FFFFFFFFH	-	EtherNet TCP/IP Message Communication Attribute Bit 0 to 15 : SEL Server Open Timeout Value (s) (No timeout check when set to “0”) Bit 16 to 23 : System Reservation
129	Network attribute 10	0H	0H to FFFFFFFFH	-	EtherNet Operation Prescription Bit 0 to 3 : System Reservation Bit 4 to 7 : TCP/IP Message Communication (0: Not to use 1: Used) Bit 8 to 31 : Reserved (Operation Prescription)

- I/O Parameters of the TTA and MSEL

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
130	Self MAC Address (H)	0H	Only referring (HEX)	-	Last 2 bites are valid
131	Self MAC Address (L)	0H	Only referring (HEX)	-	
132	Self MAC Address (H)	192	1 to 255	-	* Prohibited to set to 0 and 127
133	Self MAC Address (MH)	168	0 to 255	-	
134	Self MAC Address (ML)	0	0 to 255	-	
135	Self MAC Address (L)	1	1 to 254	-	* Prohibited to set to 0 and 255
136	Subnet Mask (H)	255	0 to 255	-	
137	Subnet Mask (MH)	255	0 to 255	-	
138	Subnet Mask (ML)	255	0 to 255	-	
139	Subnet Mask (L)	0	0 to 255	-	
140	Default Gateway (H)	0	0 to 255	-	
141	Default Gateway (MH)	0	0 to 255	-	
142	Default Gateway (ML)	0	0 to 255	-	
143	Default Gateway (L)	0	0 to 255	-	
144	IAI Protocol B/TCP Self-Port No. (MANU Mode)	64511	1025 to 65535	-	* Caution : Set different numbers to each self-port number. (Sharing of the same number is allowed only in IAI Protocol B/TCP self-port number and MANU Mode/AUTO Mode.)
145	Free-for-User Channel 31 (TCP/IP) Self-Port No.	64512	1025 to 65535	-	
146	Free-for-User Channel 32 (TCP/IP) Self-Port No.	64513	1025 to 65535	-	
147	Free-for-User Channel 33 (TCP/IP) Self-Port No.	64514	1025 to 65535	-	
148	Free-for-User Channel 34 (TCP/IP) Self-Port No.	64515	1025 to 65535	-	

- I/O Parameters of the TTA and MSEL

No.	Parameter name	Default (reference)	Input Range	Unit	Remarks
149	IAI Protocol B/TCP connected destination IP Address (MANU Mode) (H)	192	0 to 255	-	* Prohibited to set to 0 and 127
150	IAI Protocol B/TCP connected destination IP Address (MANU Mode) (MH)	168	0 to 255	-	
151	IAI Protocol B/TCP connected destination IP Address (MANU Mode) (ML)	0	0 to 255	-	
152	IAI Protocol B/TCP connected destination IP Address (MANU Mode) (L)	100	0 to 254	-	* Prohibited to set to 0 and 255
153	IAI Protocol B/TCP connected destination Port No. (MANU Mode)	64611	0 to 65535	-	* Setting of 0 available when server 0 = connected port number not to be subject (Only IP address is checked) * Setting of 0 not available when client
154	IAI Protocol B/TCP connected destination IP Address (AUTO Mode) (H)	192	0 to 255	-	* Prohibited to set to 0 and 127
155	IAI Protocol B/TCP connected destination IP Address (AUTO Mode) (MH)	168	0 to 255	-	
156	IAI Protocol B/TCP connected destination IP Address (AUTO Mode) (ML)	0	0 to 255	-	
157	IAI Protocol B/TCP connected destination IP Address (AUTO Mode) (L)	100	0 to 254	-	* Prohibited to set to 0 and 255
158	IAI Protocol B/TCP connected destination Port No. (AUTO Mode)	64611	0 to 65535	-	* Setting of 0 available when server 0 = connected port number not to be subject (Only IP address is checked) * Setting of 0 not available when client
159	IAI Protocol B/TCP Self-Port No. (AUTO Mode)	64516	1025 to 65535	-	* Caution: Set different numbers to each self-port number. (Sharing of the same number is allowed only in IAI Protocol B/TCP self-port number and MANU Mode/AUTO Mode.)
225	Extension I/O Controller	Only referring (HEX)			Bit 0 to 3 : Type of Module I/O2 (0 : Not Mounted 1 : CC-Link, 2 : DeviceNet, 3 : Profibus, 4 to 6 : System Reservation, 7 : EtherNet/IP, 9 : PIO) TTA: Bit 4 to 7 : Type of Module I/O3 (0 : Not Mounted 1 : CC-Link, 2 : DeviceNet, 3 : Profibus, 4 to 6 : System Reservation, 7 : EtherNet/IP, 9 : PIO) * EtherNet/IP is not applicable for mounting two pieces at the same time MSEL: Bit 4 to 7 : System Reservation
226	I/O2 Fieldbus Note Address	0	0 to 99999999		• At CC-Link : 1 to 64 • At DeviceNet : 0 to 63 • At Profibus : 0 to 125

- I/O Parameters of the TTA and MSEL

No.	Parameter name		Default (reference)	Input Range	Unit	Remarks
227	I/O2 Fieldbus Baud Rate		0	0 to 9		• At CC-Link: (0 : 156kbps, 1 : 625kbps, 2 : 2.5Mbps, 3 : 5Mbps, 4 : 10Mbps) • At DeviceNet : (0 : 125kbps, 1 : 250kbps, 2 : 500kbps, 3 : Automatic) • At EtherNet/IP: (0 : Autonegotiation, 1 : 10Mbps (Half-Duplex), 2 : 10Mbps (Full duplex), 3 : 100Mbps (Half-Duplex), 4 : 100Mbps (Full duplex)) * Setting establishment not necessary for Profibus
231	TTA	I/O3 Fieldbus Remote Input Ports	0	0 to 240	-	Multiples of 8
	MSEL	System Reservation (Forbidden to use)				
232	TTA	I/O3 Fieldbus Remote Output Ports	0	0 to 240	-	Multiples of 8
	MSEL	System Reservation (Forbidden to use)				
233	TTA	I/O3 Fix-Aoolcated Input Port Start No.	-1	-1 to 299	-	0+(Multiples of 8) (0 to 299) (Unavailable when it is negative figure)
	MSEL	System Reservation (Forbidden to use)				
234	TTA	I/O3 Fix-Aoolcated Output Port Start No.	-1	-1 300 to 599	-	300+(Multiples of 8) (300 to 599) (Unavailable when it is negative figure)
	MSEL	System Reservation (Forbidden to use)				
235	TTA	I/O3 Error Monitor	1	0 to 5	-	0 : No Monitoring 1 : Monitoring * There are some exceptions
	MSEL	System Reservation (Forbidden to use)	0			
237	TTA	I/O3 Fieldbus Note Address	0	0 to 99999999		• At CC-Link : 1 to 64 • At DeviceNet : 0 to 63 • At Profibus : 0 to 125
	MSEL	System Reservation (Forbidden to use)				
238	TTA	I/O3 Fieldbus Baud Rate	0	0 to 9		• At CC-Link: (0 : 156kbps, 1 : 625kbps, 2 : 2.5Mbps, 3 : 5Mbps, 4 : 10Mbps) • At DeviceNet : (0 : 125kbps, 1 : 250kbps, 2 : 500kbps, 3 : Automatic) • At EtherNet/IP: (0 : Autonegotiation, 1 : 10Mbps (Half-Duplex), 2 : 10Mbps (Full duplex), 3 : 100Mbps (Half-Duplex), 4 : 100Mbps (Full duplex)) * Setting establishment not necessary for Profibus
	MSEL	System Reservation (Forbidden to use)				

8.3 Network Setting File

It is necessary to use a network setting file dedicated for each model. Download the file shown below from IAI homepage.

Download page URL:
https://www.intelligentactuator.com/field-network-configuration-files-2/

Network type	Controller, other	File name		Content	Number of ports used (I/O points)
		Uncompressed file	ZIP compressed file		*Other notes
EtherNet/IP	PCON-C/CG/CF	368-952-EDS_ABCC_EIP_V_2_2.eds	368-9523-EDS_ABCC_EIP_V_2_2.zip	EDS file for EtherNet/IP	Refer to the [instruction manual]
	ACON-C/CG				
	SCON-CA				
	MSEP-C				
	PCON-CA/CFA				
	MSCON				
	XSEL-R/S				
	ERC3 gateway				
	XSEL-P/Q	005A000C000E0200.eds	005A000C000E0200.zip		
	XSEL-RA/SA	IANP3802-EP0_V_2_1.eds	IANP3802-EP0_V_2_1.zip		
	MSEP-LC				
	MSEL				
	TTA				
	SCON-CAL/CGAL				
	ACON-CA				
	DCON-CA				
	SSEL-CS				
	PSEL-CS				
	ASEL-CS				
	ACON-CB/CGB				
	SCON-CB/CGB				
	DCON-CB/CGB				
	MCON-C/CG				
	PCON-CB/CGB/CFB /CGFB/CBP				
	RCP6S gateway				
	RCON				
	RSEL				
	REC				

Change History

Revision Date	Description of Revision
2012.09	First edition
2013.03	Second edition Note added for the case EtherNet/IP and TCP/IP are used at the same time
2013.08	Third edition The controllers applicable added (ASEL, PSEL, SSEL)
2013.12	Fourth edition The controllers applicable added (TTA)
2014.03	Edition 4B Note added to refer to separate manual for XSEL-P/Q
2014.06	Fifth edition The controllers applicable added (MSEL)
2016.07	Sixth edition XSEL-RA/SA Series added
2018.05	Edition 6B 5.7, 6.7 Contents revised in delivery setting table for I/O ports on MSEL and TTA
2018.06	Edition 6C 1. Outline: Descriptions revised 3.2, 4.2, 5.2 and 6.2: Models added in model codes Parameter No. 1, 120, 121, 225, 233 and 234: Descriptions revised
2021.06	Seventh edition Notes added in caution in handling Item 3. Applicable for communication feature for Implicit Messaging, not applicable for communication feature for Explicit Messaging Item 4. (Caution When Multiple Interface Modules Combined to Use in XSEL-RA/SA/RAX/SAX/RAXD/SAXD) PCON-CBP/CGBP, RSEL, REC added in Chapter 1 Operation Manual List CC-Link IE Field added in XSEL-RA/SA Series 3.2.1 Expression of Model Codes 3.2.2 Caution for Model Code Decision 3.5.1 Parameter Setting No.225 3.5.2Example for Parameter Settings 4.1, 5.1, 6.1: Supplementary explanation added regarding TCP/IP messaging communication Chapter 3 to 6: Operation Modes and Functions Expression changed in explanation Terms and expressions integrated entirely

Revision Date	Description of Revision
2022.01	Eighth Edition Change made to cover page design Description revised for the [Please Read Before Use] Description revised in Safety Guide 1. Overview Added RCON-NCN to the explanation column of controllers other than this manual
2023.06	Ninth Edition Chapter 7 XSEL-P/Q/PX/QX added Appendix changed from Chapter 7 to Chapter 8 8.3 EDS file name and applicable model list added, URL of download page described

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