

CC-Link

Instruction Manual

Ver. 5.0

X-SEL

RCS-C

E-Con

Safety Precautions

Read these "Safety Precautions" carefully before selecting a model and to ensure proper use of the product. The precautions shown below allow you to use the product safely and prevent harm to you and others and damage to property from occurring.

Be sure to observe these precautions as well as the safety regulations of JIS B 8433 (Industrial Robot Safety Regulations).

Indications are divided into "DANGER," "WARNING," "CAUTION," and "ATTENTION" according to the degree of risk and trouble.

 DANGER	In the case of mishandling, imminent danger of death or serious injury is assumed.
 WARNING	In the case of mishandling, the possibility of death or serious injury is assumed.
 CAUTION	In the case of mishandling, the possibility of harm or property damage is assumed.
ATTENTION	There is no possibility of harm, but indicated instructions are requested to be observed for proper use of the product.

The product is designed and manufactured as a part for general industrial machinery.

Before selecting and handling equipment, personnel with satisfactory knowledge and experience such as a system designer and a person in charge must never fail to read the Catalogues and Instruction Manuals (Specially, the "Safety Precautions"). It is dangerous if equipment is mishandled.

For the Instruction Manuals, read the Manuals for all equipment including the main unit and controller.

Use the product at your responsibility after verifying and judging its compatibility with your system.

After reading the Catalogues and Instruction Manuals, be sure to retain them at a place where users of the product can read them at any time.

When transferring or renting the product for use, be sure to attach the Catalogues and Instruction Manuals in a noticeable location with the product main unit to allow a new owner to learn about safe and proper usage of the product.

The DANGER, WARNING, and CAUTION indications described in these Safety Precautions do not cover all cases. Especially for separate details, read the Catalogues and Instruction Manual of the relevant equipment carefully for your safe and proper handling.



DANGER

General

- Do not use the product for the following applications:
 1. Medical appliances that involve human life, physical maintenance and control, etc.
 2. Systems, machines or equipment to move or convey people
 3. Important security parts of a machine or equipment

The product is not planned or designed for any applications that require advanced type safety. It does not guarantee human life. This warranty covers the product only.

Installation

- Do not use the product in any place where there are dangerous objects such as combustibles, inflammables, and explosives. Failure to do so may result in ignition, inflammation, or explosion.
- Avoid use in any place where drops of water or oil droplets drip onto the main unit or controller.
- Never disconnect and reconnect a cable to extend or shorten the cable of the product. Failure to do so may result in fire.

Operation

- Those who use a pacemaker must not approach within 1 meter from the product. Failure to do so may result in malfunction of the pacemaker due to the product's powerful magnetic field.
- Do not pour water on the product. Pouring water, cleaning, or using the product in water may result in personal injury, electric shock, or fire because of malfunction.

Maintenance, inspection and, repair

- Never modify the product. Failure to do so may result in personal injury, electric shock, or fire.
- Do not disassemble and assemble the product. Failure to do so may result in personal injury, electric shock, or fire.

**WARNING****General**

- Do not use the product outside the scope of product specifications. Failure to do so may result in product failure, breakdown, or damage, in addition to a reduction in service life. Specially, observe the maximum loading weight and maximum speed.

Installation

- Design the safety circuit or apparatus in such a manner as to avoid equipment damage and accidents resulting in injury or death when the machine stops during system failure such as at emergency stop and power failure.
- Be sure to provide the actuator and controller with class D grounding (previous class 3 grounding, ground resistance: 100 Ω or less). Failure to do so may result in electric shocks or malfunction in the case of a short circuit.
- Before supplying electricity to the product and operating it, be sure to confirm the safety of the operating range of equipment. Supplying electricity carelessly may result in electric shocks or personal injury upon contact with moving parts.
- Install wiring of the product in such a manner as to avoid faulty wiring by referring to the Instruction Manual. Establish cable and connector connections securely so that there is no disconnection or looseness. Failure to do so may result in product malfunction or fire.

Operation

- Do not touch the terminal block or various switches when the power is turned on. Failure to do so may result in electric shock or malfunction.
- When moving the moving part of the product manually (such as in the case of manual positioning), do so after checking the servo off condition (with a teaching box). Failure to do so may result in personal injury.
- Cables superior in flexibility are used, but these are not robot cables. Do not put them in a movable wiring duct with a radius out of specification (such as the cable bear).
- Do not damage cables. Scratching, forcedly bending, pulling, winding, placing a heavy article on, or pinching them may result in fire, electric shock, or malfunction due to a short circuit or faulty electrical continuity.

- In the event of a power failure, turn off the power. Failure to do so may result in personal injury or product damage due to abrupt movement of the product during recovery from the power failure.
- When abnormal heat, smoke, or offensive odors occur in the product, turn off the power immediately. Continued use of the product may result in product damage or fire.
- When the protective equipment (alarm) of the product is activated, turn off the power immediately. Failure to do so may result in personal injury, or product breakage/damage due to product malfunction. After turning off the power and investigating the cause, remove it and turn on the power again.
- When the product LED does not light even at power on, turn off the power immediately. The protective equipment (fuse, etc.), may be activated without blowing. Request our sales office from which you purchased the product to carry out repairs.

Maintenance, inspection, and repair

- Before starting various operations such as maintenance, inspection, service, and replacement related to the product, be sure to shut off electrical supply completely. Observe the following at this time:
 1. Indicate "MEN WORKING, POWER ON PROHIBITED" at an easy-to-see location to prevent a third party from turning on the power inadvertently during operation.
 2. When more than one operator carries out maintenance and inspection, be sure to confirm safety by calling out to other(s) before turning on/off the power and moving the axis.

Disposal

- Do not throw the product into a fire. Failure to do so may result in product explosion or toxic gas generation.



CAUTION

Installation

- Do not use the product at locations in direct sunshine (ultraviolet light), locations with dust, salt content or iron powder, humid locations, or in an atmosphere containing organic solvents or phosphate ester hydraulic oil.
Failure to do so may result in function loss in a short period, or rapid performance deterioration or reduction in service life.
- Do not use the product in an atmosphere of corrosive gases (sulfuric acid, hydrochloric acid, etc.). Failure to do so may result in severe deterioration due to rust formation.
- When using the product at any of the locations shown below, take proper shielding measures. Failure to do so may result in malfunction.
 1. Location with a large current or high magnetic field
 2. Location with arc discharge due to welding operation
 3. Location with noise due to electrostatic action
 4. Location with the possibility of receiving radiation
- Install the main unit and controller at a location with minimal dust and dirt. Failure to do so may result in malfunction.
- Do not install the product at a location where great vibrations or shocks travel (4.9 m/S^2 or more). Failure to do so may result in malfunction.
- Install emergency stop equipment at a location where an emergency stop can be applied upon an immediate dangerous occurrence in operation during operation. Failure to do so may result in personal injury.
- When installing the product, secure space for maintenance work. Failure to do so may result in equipment stop or product damage because a daily check or maintenance becomes impossible.

- When installing the product, do not hold its moving parts or cables. Failure to do so may result in personal injury.
- Be sure to use our genuine cable product between the actuator and controller. For components such as the actuator, controller and teaching box, use a combination of our genuine products.
- When carrying out installation or adjustment work, indicate “MEN WORKING, POWER ON PROHIBITED” to prevent unexpected power-on. Failure to do so may result in electric shock or personal injury due to abrupt operation of the actuator.

Operation

- When turning on the power, do so from the higher-order equipment in sequence. Failure to do so may result in personal injury or product damage due to abrupt start of the product.
- Do not place fingers or objects into the opening of the product. Failure to do so may result in fire, electric shock, or personal injury.
- Do not bring floppy disks or magnetic media within one meter from the product. Failure to do so may result in data corruption due to the magnetic field.

Maintenance, inspection, and repair

- When carrying out an insulation resistance test, do not touch the terminals. Failure to do so may result in electric shock. (For a product using DC power, do not carry out an insulation resistance test.)

ATTENTION**General**

- When considering use in conditions or environments not described in the Catalogues or Instruction Manual, use in air navigation facilities, combustion equipment, amusement machinery, clean room, or fail-safe devices, or other applications that specially require safety with a strong influence on human life and property expected, give adequate consideration to safety measures such as usage with sufficient margins of fail-safe ratings and performance.

Installation

- Do not place any obstacles around the controller. Failure to do so may result in damage to the controller.
- Do not frame controls under which work falls during a power failure. Frame controls that secure the safety of the table, work, etc., for a power failure and emergency stop of the equipment.

Installation, operation, and maintenance

- When handling the product, ensure safety by wearing protective gloves, protective glasses, safety shoes, etc., as required.

Disposal

- When the product becomes unavailable or unnecessary, dispose of it appropriately as industrial waste.

OTHER

- In a case where you do not observe the full-scope of descriptions in the Safety Precautions, we shall accept no liability or responsibility.
- For inquiries as relates to the product, contact our sales office nearest you. The address and telephone number are shown on the back of the Instruction Manual.

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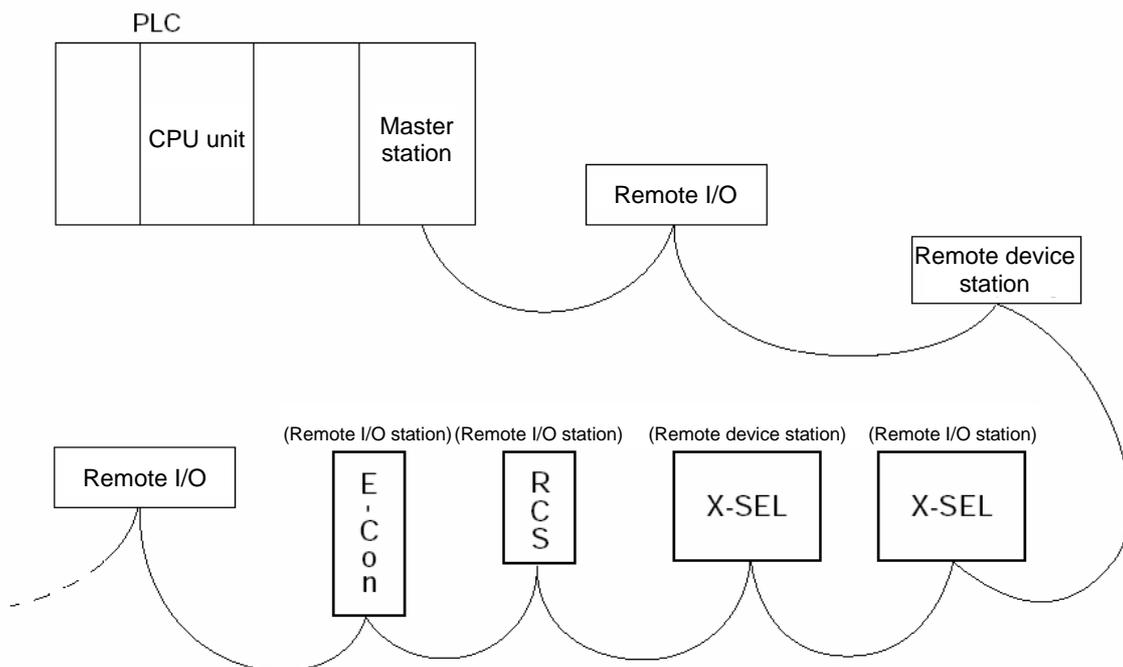
1. Overview

CC-Link stands for Control & Communication Link, which is a field network system.

It is possible to construct the systems of X-SEL, RCS-C, and E-Con with wire saving by connecting each of these controllers to this CC-Link.

The X-SEL controller has two types of remote device station and remote I/O station. Each of the RCS-C and E-Con controllers is handled as a remote I/O station, which allows for communications of I/O data.

- * For further information on CC-Link, refer to the Instruction Manual for the master unit and the programmable controller (PLC) to be mounted.
Use this Instruction Manual together with the Instruction Manual of each controller of X-SEL, RCS-C, and E-Con.
CC-Link cannot be used for any method other than those described as possible in this Instruction Manual.



2. Interface Specifications

Item	Specification					
Communications standard	CC-Link Ver1.0 (*1)					
Communications speed	10M/5M/2.5M/625k/156kbps (Selection with rotary switch)					
Communications system	Broadcast polling system					
Synchronization system	Frame synchronization system					
Encoding system	NRZI					
Transmission path format	Bus format (EIA RS485 conformance)					
Transmission format	HDLC conformance					
Error control system	CRC ($X^{16} + X^{12} + X^5 + 1$)					
Number of occupied stations	X-SEL: Remote device station: Max. 3 stations Remote I/O station: 1 station RCS-C/E-Con: 1 station					
Communications cable length (*2)	Communications speed (bps)	10M	5M	2.5M	625k	156K
	Overall cable length (m)	100	160	400	900	1200
Connector (*3)	Manufactured by Phoenix Contact:	MC1.5/5-G-3.81 (E-Con, RCS)				
	Contact:	MSTB2.5/5-5.08 (X-SEL)				

(*1) Already certified: RCS-C 24V specifications
 To be certified: X-SEL
 RCS-100V, RCS-200V specifications
 E-Con

(*2) For T-branch transmission, refer to the Instruction Manuals for the master unit and PLC to be mounted.

(*3) The cable-side connector is a standard accessory.
 Manufactured by Phoenix Contact: MC1.5-ST-3.81 (E-Con, RCS)
 SMSTB2.5/5-ST-5.08 (X-SEL)

3. X-SEL

The CC-link compatible X-SEL controller has the following two types:

- a. Remote device station: Number of I/O points = Max. 256 points each
- b. Remote I/O station: Number of I/O points = 16 points each

3.1 Remote device station

3.1.1 Models

The CC-Link compatible X-SEL controller handled as a remote device station has one type each of J and K as follows:

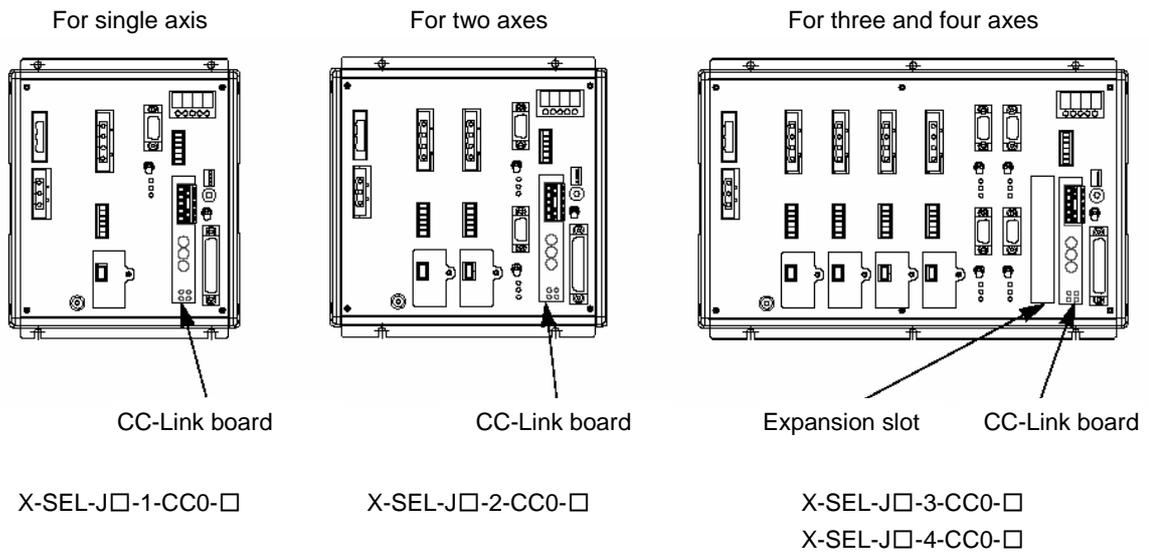
● CC-Link board installation position

No.	Controller type	Number of I/O points in network (Max input/output)	Board installation position				X-SEL model	I/O slot arrangement M
			Standard slot (I/O1)	Expansion slot 1 (I/O2)	Expansion slot 2 (I/O3)	Expansion slot 3 (I/O4)		
1	J type	256/256	●	None for single axis and two axes	/	/	X-SEL-J□-□-CC0-□	Fig. 2-1
2	K type	256/256	●				X-SEL-K□-□-CC0-□	Fig. 2-2

Note: 16 points each for input and output out of the number of I/O points are the system areas for the remote device station and cannot be used.

For further information, refer to "3.1.3 (6) Correspondence between X-SEL I/O port No. and PLC address."

(1) Compact type (J type)

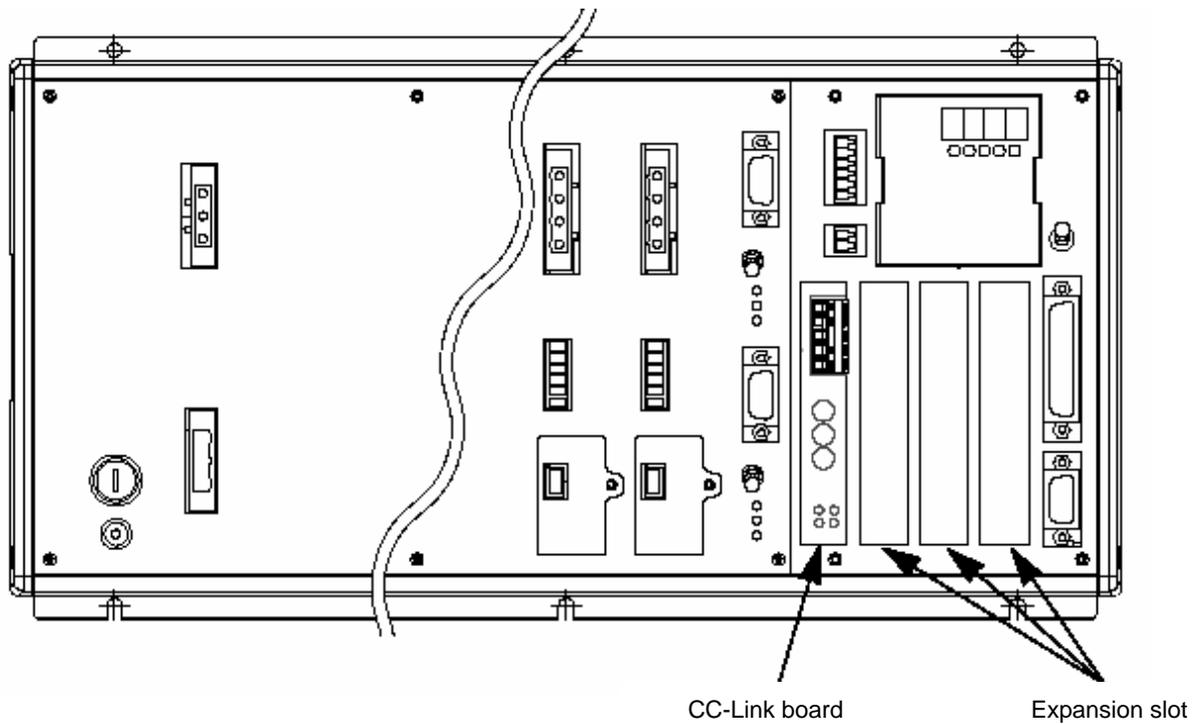


Note: For items of single axis and two axes, a PIO board cannot be installed. For those of three and four axes, an expansion I/O board ⁽¹⁾ can be inserted into the expansion slot.

Fig. 3-1-1

(2) General type (K type)

- The CC-link board is inserted into the standard slot (I/O1: leftmost).
- Either of an expansion I/O board ^{(*)1} or SIO board ^{(*)2} can be inserted into the expansion slot.
- When an expansion I/O board ^{(*)1} is not used, it is not required to supply 24V DC to the IO 24V power connector.



X-SEL-K□-□-CC0-□

Fig. 3-1-2

(*)1 Expansion I/O board

Model (1): IA-103-X-32

(Input: 32 points, Output: 16 points)

Model (2): IA-103-X-16

(Input: 16 points, Output: 32 points)

For further information on specifications, refer to the X-SEL Controller Instruction Manual.

(*)2 SIO board

Model (1): IA-105-X-MW-A

(for RS232C)

Model (2): IA-105-X-MW-B

(for RS422)

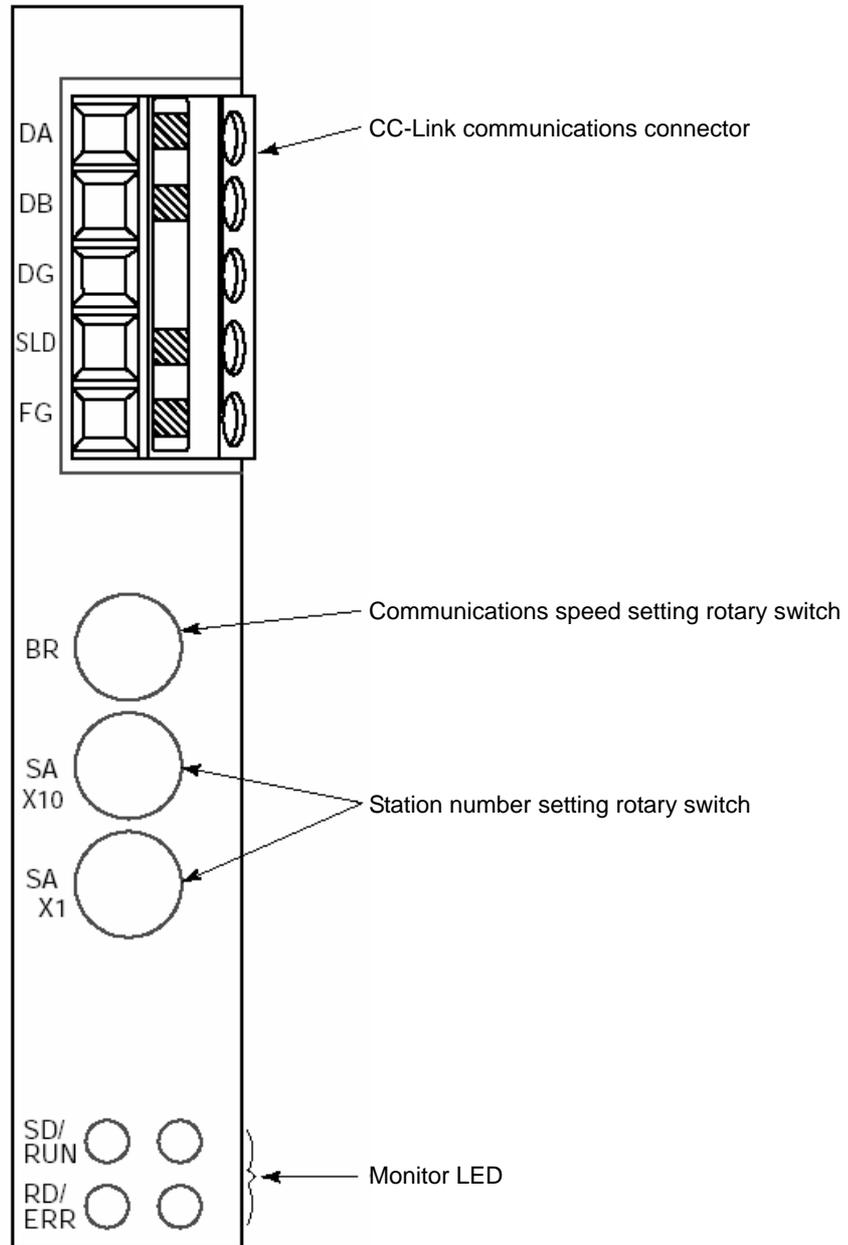
Model (3): IA-105-X-MW-C

(for RS485)

Any single board above is 2-channel compatible.

3.1.2 CC-Link board

(1) Names of each part



(2) Rotary switches

The following can be carried out by rotary switches:

- a. Setting of station number
- b. Setting of communications speed

a. Setting of station number

In the CC-Link, a maximum of 64 stations can be connected.

The station number is set in the 1 to 64 range by the two rotary switches.

SA × 10: Sets the tens place.

SA × 1: Sets the ones place.

Rotary switch selection number	Station number	
	SA × 10	SA × 1
0	0	0
1	10	1
2	20	2
3	30	3
4	40	4
5	50	5
6	60	6
7	—	7
8	—	8
9	—	9

(Example) When setting the station number to 12:

Set the rotary switch SA × 10 to 1.

Set the rotary switch SA × 1 to 2.

Note: The CC-Link first I/O address in PLC is determined according to the master unit installation position and the number of I/O occupied points of the unit installed prior to that.

The I/O addresses in PLC are assigned from the first I/O address above in order of station number.

For further information regarding setting of the station number and setting of the I/O address in the PLC, refer to the Instruction Manuals for the master unit and PLC to be mounted.

b. Setting of communications speed

The communications speed is set by the rotary switch BR.

Rotary switch selection number	Communications speed
0	156kbps
1	625kbps
2	2.5Mbps
3	5Mbps
4	10Mbps
Setting to 5 or more prohibited	Error

(3) Display of monitor LEDs

The four LEDs mounted on the front of the board can indicate the board operating state and network condition.

LED	Color	Display condition	Display details (display indication)
RUN	Green	Lighting	Lights when communications start and turns off when communications are interrupted for a fixed time or longer.
SD	Green	Flashing	Flashing during data transmission
RD	Green	Flashing	Flashing during data reception
ERR	Red	Lighting	Local station address receiving data has an error.
		Flashing	Setting by the communications speed setting rotary switch was changed during communications. Setting by the station number setting rotary switch was changed during communications.

3.1.3 Setting of I/O parameters (assignment of I/O ports)

The X-SEL I/O ports used in the CC-Link are set. X-SEL allows a variety of settings of different I/O ports with I/O parameters. (For further information, refer to the X-SEL Controller Instruction Manual.)

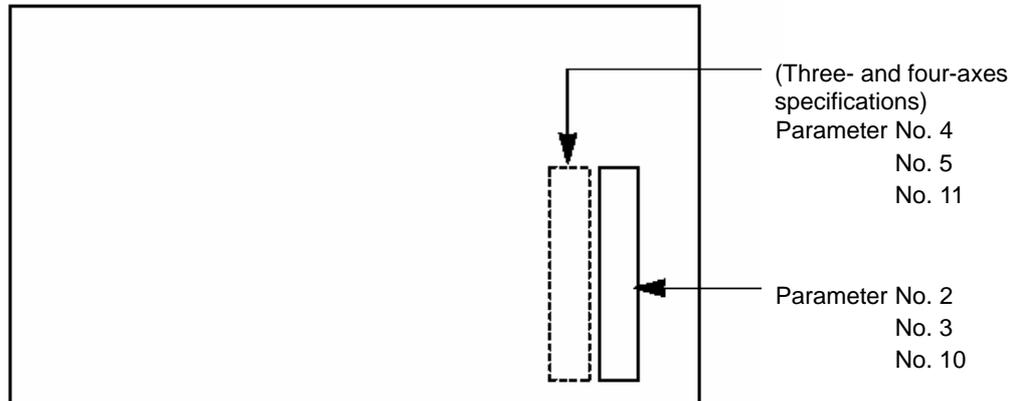
The typical setting methods are shown below in this Manual.

Basically, the I/O parameter No. 1 sets the I/O port assignment type to automatic assignment, while the I/O parameter No. 2 and No. 3 set the I/O port addresses. When the expansion I/O boards are used, the I/O ports are automatically assigned if the expansion I/O boards are installed in order of slot number. Accordingly, it is not required to set the I/O port start numbers of the expansion I/O boards with parameters.

I/O parameter No.	Value	Description
1	1	Assigns the I/O number automatically. (Standard setting)
2	0	Assigns the standard DI from the input port No. 0. (Standard setting)
3	300	Assigns the standard DO from the output port No. 300. (Standard setting)
14	n	Designates the number of CC-Link input points in multiples of 16. ($16 \leq n \leq 256$)
15	m	Designates the number of CC-Link output points in multiples of 16. ($16 \leq m \leq 256$)

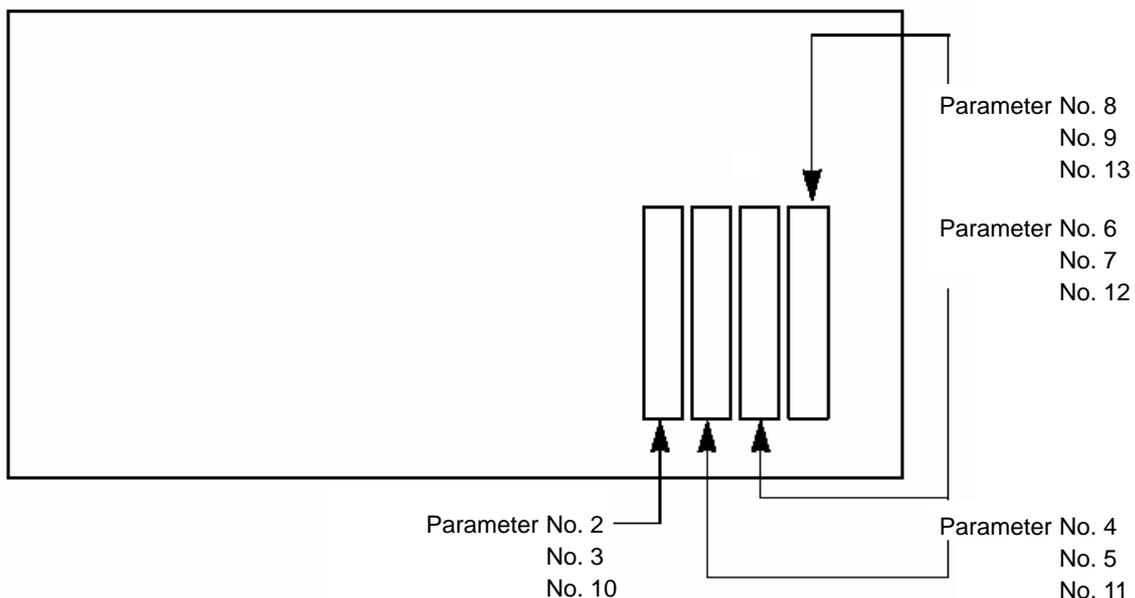
(1) Board installation positions (slots) and parameter numbers

a. J type



Note: With no slots, parameters No. 6 to No. 9 are all set to "-1" and parameters No. 12 and No. 13 are set to "0."
 For the single-axis and two-axes specifications, parameters No. 4 and No. 5 are set to "-1" and parameter No. 11 is set to "0."

b. K type



(2) Factory-configured parameters (standard setting)

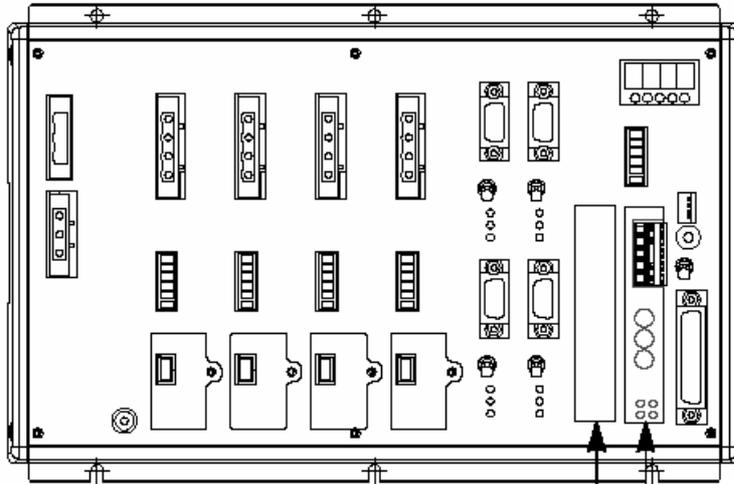
No.	Parameter name	Input range	Set value	Remarks
1	I/O port assignment type	0 – 20	1	0: Fixed assignment 1: Automatic assignment (Priority: slot 1 –) * The ports only in the continuous installation range from slot 1 are assigned for safety.)
2	Standard I/O: Input port start No. (I/O1)	-1 – 599	000	0 + (multiples of 8) (Invalid for negative values)
3	Standard I/O: Output port start No. (I/O1)	-1 – 599	300	300 + (multiples of 8) (Invalid for negative values)
4	Expansion I/O1 fixed assignment time: Input port start No. (I/O2)	-1 – 599	-1	0 + (multiples of 8) (Invalid for negative values) (Slot next to the standard I/O)
5	Expansion I/O1 fixed assignment time: Output port start No. (I/O2)	-1 – 599	-1	300 + (multiples of 8) (Invalid for negative values)
6	Expansion I/O2 fixed assignment time: Input port start No. (I/O3)	-1 – 599	-1	0 + (multiples of 8) (Invalid for negative values)
7	Expansion I/O2 fixed assignment time: Output port start No. (I/O3)	-1 – 599	-1	300 + (multiples of 8) (Invalid for negative values)
8	Expansion I/O3 fixed assignment time: Input port start No. (I/O4)	-1 – 599	-1	0 + (multiples of 8) (Invalid for negative values)
9	Expansion I/O3 fixed assignment time: Output port start No. (I/O4)	-1 – 599	-1	300 + (multiples of 8) (Invalid for negative values)
10	Standard I/O error monitoring (I/O1)	0 – 5	2	0: Non-monitoring 1: Monitoring
11	Expansion I/O1 error monitoring (I/O2)	0 – 5	0	2: Monitoring (Non-monitoring of 24V I/O power related errors) (Main application of Ver. 0.55 or later)
12	Expansion I/O2 error monitoring (I/O3)	0 – 5	0	3: Monitoring (Monitoring of 24V I/O power related errors only) (Main application of Ver. 0.55 or later)
13	Expansion I/O3 error monitoring (I/O4)	0 – 5	0	
14	Network I/F card remote: Number of ports used for input	0 – 256	64	Multiples of 16
15	Network I/F card remote: Number of ports used for output	0 – 256	64	Multiples of 16

(I/O1) to (I/O4) indicate the slot numbers.

(3) CC-Link connection with standard I/O ports

The following are settings in cases where 16 points each for input and output are used from the first standard I/O ports of X-SEL and other I/O ports are not used.

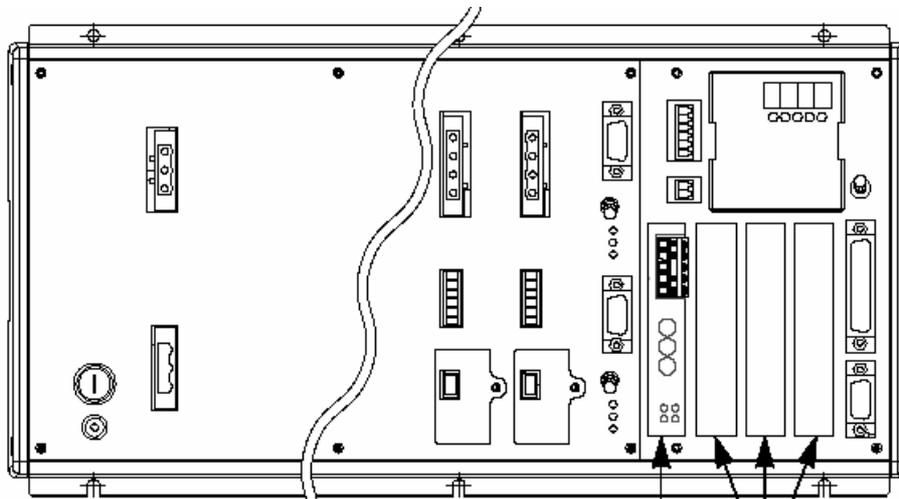
X-SEL (J type)



Not used
(None for single axis and two axes)

Input port No. 000 – 015
Output port No. 300 – 315

X-SEL (K type)



Input port No. 000 – 015
Output port No. 300 – 315

Not used

(The above are cases where the installation conditions as shown in Fig. 3-1-1 and Fig. 3-1-2 in section 3.1.1 are applied.)

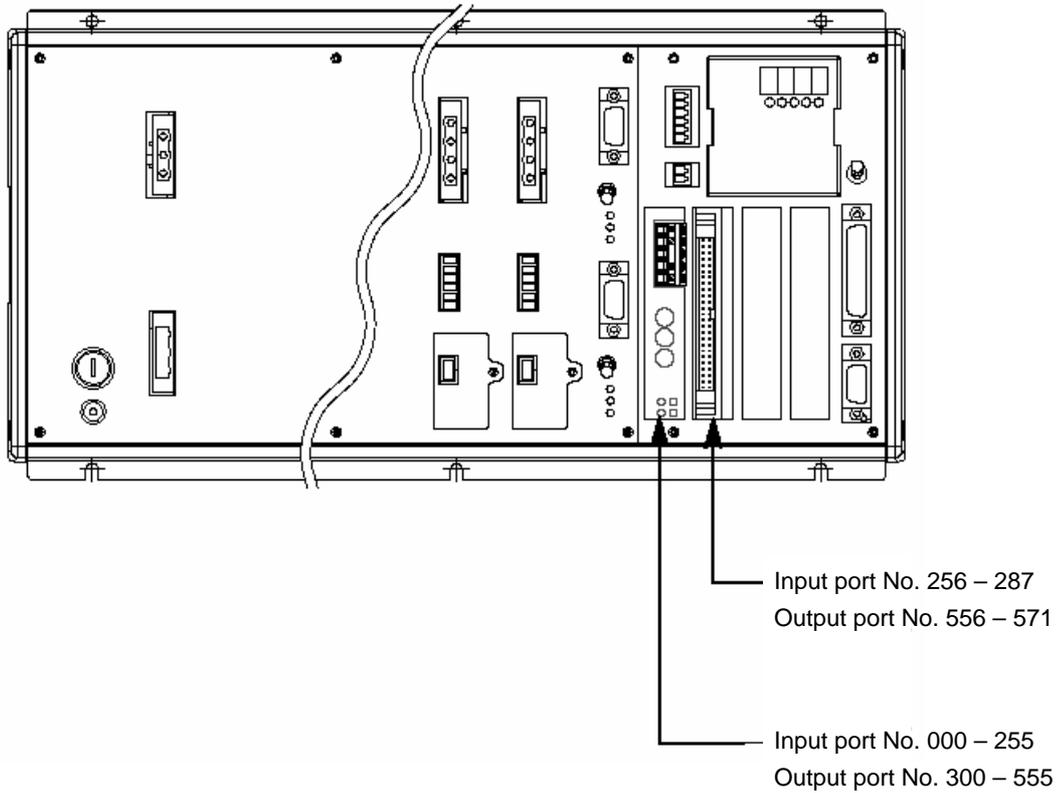
X-SEL I/O parameter

No.	Parameter name	Default (reference)	Input range	Setting	Remarks
1	I/O port assignment type	1	0 – 20	1	0: Fixed assignment 1: Automatic assignment (Priority: slot 1 –) * The ports only in the continuous installation range from slot 1 are assigned for safety.)
2	Standard I/O: Input port start No. (I/O1)	000	-1 – 599	000	0 + (multiples of 8) (Invalid for negative values)
3	Standard I/O: Output port start No. (I/O1)	300	-1 – 599	300	300 + (multiples of 8) (Invalid for negative values)
4	Expansion I/O1 fixed assignment time: Input port start No. (I/O2)	-1	-1 – 599	-1	0 + (multiples of 8) (Invalid for negative values) (Slot next to the standard I/O)
5	Expansion I/O1 fixed assignment time: Output port start No. (I/O2)	-1	-1 – 599	-1	300 + (multiples of 8) (Invalid for negative values)
6	Expansion I/O2 fixed assignment time: Input port start No. (I/O3)	-1	-1 – 599	-1	0 + (multiples of 8) (Invalid for negative values)
7	Expansion I/O2 fixed assignment time: Output port start No. (I/O3)	-1	-1 – 599	-1	300 + (multiples of 8) (Invalid for negative values)
8	Expansion I/O3 fixed assignment time: Input port start No. (I/O4)	-1	-1 – 599	-1	0 + (multiples of 8) (Invalid for negative values)
9	Expansion I/O3 fixed assignment time: Output port start No. (I/O4)	-1	-1 – 599	-1	300 + (multiples of 8) (Invalid for negative values)
10	Standard I/O error monitoring (I/O1)	2	0 – 5	2	0: Non-monitoring 1: Monitoring
11	Expansion I/O1 error monitoring (I/O2)	0	0 – 5	0	2: Monitoring (Non-monitoring of 24V I/O power related errors) (Main application of Ver. 0.55 or later) 3: Monitoring (Monitoring of 24V I/O power related errors only) (Main application of Ver. 0.55 or later)
12	Expansion I/O2 error monitoring (I/O3)	0	0 – 5	0	
13	Expansion I/O3 error monitoring (I/O4)	0	0 – 5	0	
14	Network I/F card remote: Number of ports used for input	64	0 – 256	16	Multiples of 16
15	Network I/F card remote: Number of ports used for output	64	0 – 256	16	Multiples of 16

(I/O1) to (I/O4) indicate the slot numbers.

(4) Combined use of CC-Link board and I/O board

- a. The following is the setting in the case where automatic assignment allocates 256 points each for input and output to the CC-Link board as the standard I/O ports as well as 32 points for input and 16 points for output to the expansion I/O board IA-103-X-32 from the subsequent I/O port numbers.
The J type has the same setting.



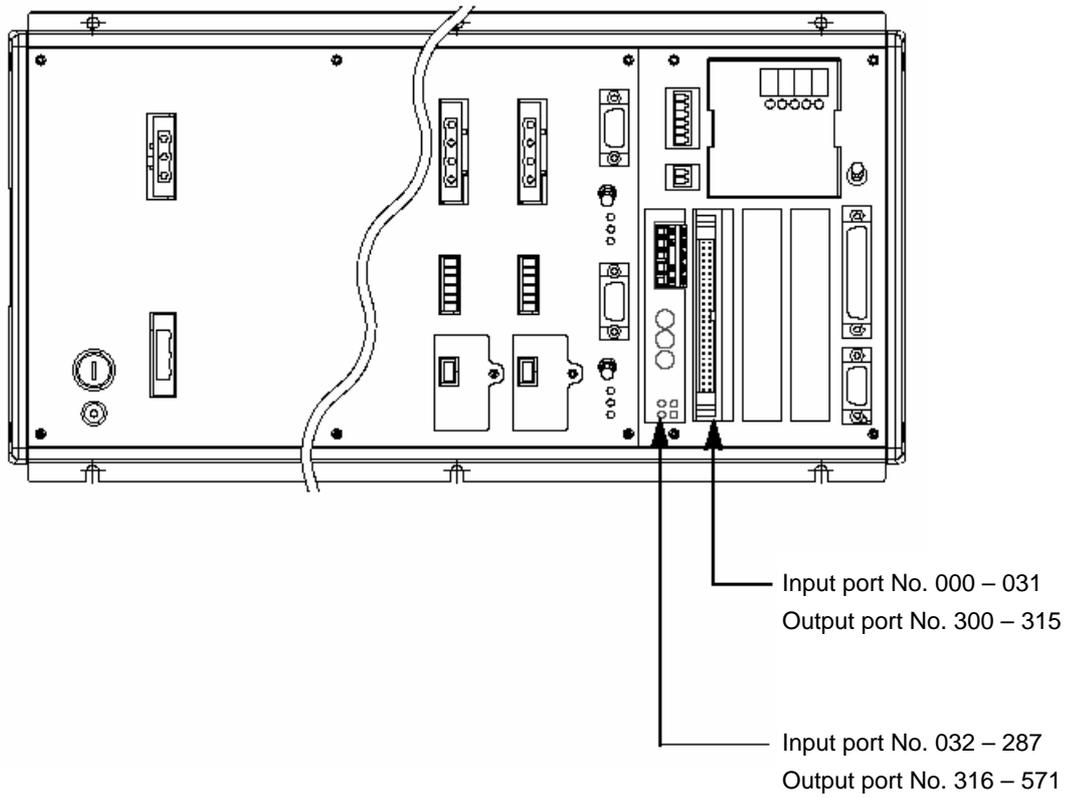
X-SEL I/O parameter

No.	Parameter name	Default (reference)	Input range	Setting	Remarks
1	I/O port assignment type	1	0 – 20	1	0: Fixed assignment 1: Automatic assignment (Priority: slot 1 –) * The ports only in the continuous installation range from slot 1 are assigned for safety.)
2	Standard I/O: Input port start No. (I/O1)	000	-1 – 599	000	0 + (multiples of 8) (Invalid for negative values)
3	Standard I/O: Output port start No. (I/O1)	300	-1 – 599	300	300 + (multiples of 8) (Invalid for negative values)
4	Expansion I/O1 fixed assignment time: Input port start No. (I/O2)	-1	-1 – 599	-1	0 + (multiples of 8) (Invalid for negative values) (Slot next to the standard I/O)
5	Expansion I/O1 fixed assignment time: Output port start No. (I/O2)	-1	-1 – 599	-1	300 + (multiples of 8) (Invalid for negative values)
6	Expansion I/O2 fixed assignment time: Input port start No. (I/O3)	-1	-1 – 599	-1	0 + (multiples of 8) (Invalid for negative values)
7	Expansion I/O2 fixed assignment time: Output port start No. (I/O3)	-1	-1 – 599	-1	300 + (multiples of 8) (Invalid for negative values)
8	Expansion I/O3 fixed assignment time: Input port start No. (I/O4)	-1	-1 – 599	-1	0 + (multiples of 8) (Invalid for negative values)
9	Expansion I/O3 fixed assignment time: Output port start No. (I/O4)	-1	-1 – 599	-1	300 + (multiples of 8) (Invalid for negative values)
10	Standard I/O error monitoring (I/O1)	2	0 – 5	2	0: Non-monitoring 1: Monitoring
11	Expansion I/O1 error monitoring (I/O2)	0	0 – 5	1	2: Monitoring (Non-monitoring of 24V I/O power related errors) (Main application of Ver. 0.55 or later) 3: Monitoring (Monitoring of 24V I/O power related errors only) (Main application of Ver. 0.55 or later)
12	Expansion I/O2 error monitoring (I/O3)	0	0 – 5	0	
13	Expansion I/O3 error monitoring (I/O4)	0	0 – 5	0	
14	Network I/F card remote: Number of ports used for input	64	0 – 256	256	Multiples of 16
15	Network I/F card remote: Number of ports used for output	64	0 – 256	256	Multiples of 16

(I/O1) to (I/O4) indicate the slot numbers.

- b. The following is the setting in the case where fixed assignment makes the expansion I/O board IA-103-X-32 (input: 32 points, output: 16 points) used as the standard I/O ports and 256 points each for input and output assigned to the CC-Link board as the general I/O ports.

The J type has the same setting.



X-SEL I/O parameter

No.	Parameter name	Default (reference)	Input range	Setting	Remarks
1	I/O port assignment type	1	0 – 20	0	0: Fixed assignment 1: Automatic assignment (Priority: slot 1 –) * The ports only in the continuous installation range from slot 1 are assigned for safety.)
2	Standard I/O: Input port start No. (I/O1)	000	-1 – 599	032	0 + (multiples of 8) (Invalid for negative values)
3	Standard I/O: Output port start No. (I/O1)	300	-1 – 599	316	300 + (multiples of 8) (Invalid for negative values)
4	Expansion I/O1 fixed assignment time: Input port start No. (I/O2)	-1	-1 – 599	000	0 + (multiples of 8) (Invalid for negative values) (Slot next to the standard I/O)
5	Expansion I/O1 fixed assignment time: Output port start No. (I/O2)	-1	-1 – 599	300	300 + (multiples of 8) (Invalid for negative values)
6	Expansion I/O2 fixed assignment time: Input port start No. (I/O3)	-1	-1 – 599	-1	0 + (multiples of 8) (Invalid for negative values)
7	Expansion I/O2 fixed assignment time: Output port start No. (I/O3)	-1	-1 – 599	-1	300 + (multiples of 8) (Invalid for negative values)
8	Expansion I/O3 fixed assignment time: Input port start No. (I/O4)	-1	-1 – 599	-1	0 + (multiples of 8) (Invalid for negative values)
9	Expansion I/O3 fixed assignment time: Output port start No. (I/O4)	-1	-1 – 599	-1	300 + (multiples of 8) (Invalid for negative values)
10	Standard I/O error monitoring (I/O1)	2	0 – 5	2	0: Non-monitoring 1: Monitoring
11	Expansion I/O1 error monitoring (I/O2)	0	0 – 5	1	2: Monitoring (Non-monitoring of 24V I/O power related errors) (Main application of Ver. 0.55 or later) 3: Monitoring (Monitoring of 24V I/O power related errors only) (Main application of Ver. 0.55 or later)
12	Expansion I/O2 error monitoring (I/O3)	0	0 – 5	0	
13	Expansion I/O3 error monitoring (I/O4)	0	0 – 5	0	
14	Network I/F card remote: Number of ports used for input	64	0 – 256	256	Multiples of 16
15	Network I/F card remote: Number of ports used for output	64	0 – 256	256	Multiples of 16

(I/O1) to (I/O4) indicate the slot numbers.

(5) X-SEL I/O port numbers

The standard I/O port numbers of X-SEL are shown below.

The X-SEL port numbers and functional assignment can be changed with I/O parameters. (For further information, refer to the X-SEL Controller Instruction Manual.)

	Port No.	Function		Port No.	Function
Input	000	Program start	Output	300	Alarm output
	001	General input		301	Ready output
	002	General input		302	Emergency stop output
	003	General input		303	General output
	004	General input		304	General output
	005	General input		305	General output
	006	General input		306	General output
	007	Program designation (PRG No. 1)		307	General output
	008	Program designation (PRG No. 2)		308	General output
	009	Program designation (PRG No. 4)		309	General output
	010	Program designation (PRG No. 8)		310	General output
	011	Program designation (PRG No. 10)		311	General output
	012	Program designation (PRG No. 20)		312	General output
	013	Program designation (PRG No. 40)		313	General output
	014	General input		314	General output
	015	General input		315	General output
⋮	⋮	⋮	⋮		

Note: The number of I/O ports is as follows:

Input	000 to 299	(Max, 300 points)
Output	300 to 599	(Max, 300 points)

When the CC-Link board is used in combination with the expansion I/O board, pay attention to the number of I/O ports.

(6) Correspondence between X-SEL I/O port number and PLC address

PLC sets the X-SEL CC-Link board as a remote device.

The number of occupied stations of the remote device varies according to the setting of the number of I/O points on the X-SEL side.

The table below indicates the correspondence between the I/O port number and PLC address according to the settings of I/O parameters No. 14 and No. 15. (The following is a case where the I/O parameters No. 2 and No. 3 have standard settings [defaults].)

Note: It is not required to set the same number of points for the I/O parameters No. 14 and No. 15, but the number of stations is determined according to the larger number of points. Be careful about the setting of the number of occupied stations and overlapping of addresses of the PLC.

a. When the number of I/O points is set to 96 or less:

Configured as one remote device. (One station occupied)

I/O parameter		X-SEL side DI (Port No.)	PLC side	X-SEL side DO (Port No.)	PLC side
No. 14	No. 15				
16	16	000 – 015	RY 0 – F	300 – 315	RX 0 – F
32	32	016 – 031	RY 10 – 1F	316 – 331	RX 10 – 1F
48	48	032 – 047	RWw0	332 – 347	RWr 0
64	64	048 – 063	RWw1	348 – 363	RWr 1
80	80	064 – 079	RWw2	364 – 379	RWr 2
96	96	080 – 095	RWw3	380 – 395	RWr 3

* Since the shaded portions are the system areas for the remote device station on the PLC side, they cannot be used as I/O.

b. When the number of I/O points is set to 112 or more and 192 or less:

Configured as two remote devices. (Two stations occupied)

I/O parameter		X-SEL side DI (Port No.)	PLC side	X-SEL side DO (Port No.)	PLC side
No. 14	No. 15				
—	—	000 – 031	RY 0 – 1F	300 – 331	RX 0 – 1F
—	—	032 – 047	RY 20 – 2F	332 – 347	RX 20 – 2F
—	—	048 – 063	RY 30 – 3F	348 – 363	RX 30 – 3F
—	—	064 – 079	RWw0	364 – 379	RWr 0
—	—	080 – 095	RWw1	380 – 395	RWr 1
112	112	096 – 111	RWw2	396 – 411	RWr 2
128	128	112 – 127	RWw3	412 – 427	RWr 3
144	144	128 – 143	RWw4	428 – 443	RWr 4
160	160	144 – 159	RWw5	444 – 459	RWr 5
176	176	160 – 175	RWw6	460 – 475	RWr 6
192	192	176 – 191	RWw7	476 – 491	RWr 7

* Since the shaded portions are the system areas for the remote device station on the PLC side, they cannot be used as I/O.

- c. When the number of I/O points is set to 208 or more and 256 or less:
Configured as three remote devices. (Three stations occupied)

I/O parameter		X-SEL side DI (Port No.)	PLC side	X-SEL side DO (Port No.)	PLC side
No. 14	No. 15				
—	—	000 – 031	RY 0 – 1F	300 – 331	RX 0 – 1F
—	—	032 – 063	RY 20 – 3F	332 – 363	RX 20 – 3F
—	—	064 – 079	RY 40 – 4F	364 – 379	RX 40 – 4F
		080 – 095	RY 50 – 5F	380 – 395	RX 50 – 5F
—	—	096 – 111	RWw0	396 – 411	RWr 0
—	—	112 – 127	RWw1	412 – 427	RWr 1
—	—	128 – 143	RWw2	428 – 443	RWr 2
—	—	144 – 159	RWw3	444 – 459	RWr 3
—	—	160 – 175	RWw4	460 – 475	RWr 4
—	—	176 – 191	RWw5	476 – 491	RWr 5
208	208	192 – 207	RWw6	492 – 507	RWr 6
224	224	208 – 223	RWw7	508 – 523	RWr 7
240	240	224 – 239	RWw8	524 – 539	RWr 8
256	256	240 – 255	RWw9	540 – 555	RWr 9

* Since the shaded portions are the system areas for the remote device station on the PLC side, they cannot be used as I/O.

(7) Data in remote registers

Addresses in PLC are assigned to the remote I/O addresses and remote register areas that correspond to the station number set on the CC-Link board and the number of occupied stations set by the PLC parameter, in steps of 16 points (one word) in order of X-SEL port number.

Setting the I/O parameter No. 120 to "0" allows the data in one word to be transmitted by reversing the order of the higher-order byte (higher-order 8 bits) and the lower-order byte (lower-order 8 bits) in the communications area with the PLC remote register. (Remote I/O areas are not changed.)

I/O parameters

No.	Parameter name	Default (reference)	Input range	Remarks
120	Network attribute 1	1	0H – FFFFFFFFH	CC-Link remote register area H/L byte SWAP selection 0: X-SEL side: H byte ↔ PLC side: L byte X-SEL side: L byte ↔ PLC side: H byte 1: X-SEL side: H byte ↔ PLC side: H byte X-SEL side: L byte ↔ PLC side: L byte (Main application of Ver. 0.55 or later)

The relationships between I/O signals are shown below by taking a case where the number of I/O points of X-SEL is set to 112 or more and 192 or less (two stations occupied) for example.

a. X-SEL remote I/O areas and remote register areas

Remote input: Port No. 0 to No. 63

Remote output: Port No. 300 to No. 363

Remote address (input): Port No. 64 to No. 192

Remote address (output): Port No. 364 to No. 392

Note: Since ports No. 48 to No. 63 and No. 348 to No. 363 are the system areas for the remote device stations on the PLC side, they cannot be used.

b. Transmission and receipt of signals in remote I/O areas

The transmission and receipt of signals in remote I/O areas are irrelevant to the setting of the I/O parameter No. 120.

●: On, ○: OFF

X-SEL port No. (Input)	015	014	013	012	011	010	009	008	007	006	005	004	003	002	001	000
ON/OFF	●	●	●	●	○	○	○	○	●	○	○	○	○	○	○	●
Hexadecimal data	F				0				8				1			

↑

PLC: RYnn (Output)	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
ON/OFF	●	●	●	●	○	○	○	○	●	○	○	○	○	○	○	●
Hexadecimal data	F				0				8				1			

X-SEL port No. (Output)	315	314	313	312	311	310	309	308	307	306	305	304	303	302	301	300
ON/OFF	●	●	●	●	○	○	○	○	●	○	○	○	○	○	○	●
Hexadecimal data	F				0				8				1			

↓

PLC: RXnn (Input)	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
ON/OFF	●	●	●	●	○	○	○	○	●	○	○	○	○	○	○	●
Hexadecimal data	F				0				8				1			

c. Transmission and receipt of signals in remote register areas

The I/O parameter No. 120 allows the data in one word (16 bits) to be transmitted by reversing the order of the higher-order byte (higher-order 8 bits) and the lower-order byte (lower-order 8 bits).

(a) When the I/O parameter No. 120 is set to "1"

●: On, ○: OFF

X-SEL port No. (Input)	079	078	077	076	075	074	073	072	071	070	069	068	067	066	065	064
ON/OFF	●	●	●	●	○	○	○	○	●	○	○	○	○	○	○	●
Hexadecimal data	F				0				8				1			

↑

PLC: RWwn (Output)	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
ON/OFF	●	●	●	●	○	○	○	○	●	○	○	○	○	○	○	●
Hexadecimal data	F				0				8				1			

X-SEL port No. (Output)	379	378	377	376	375	374	373	372	371	370	369	368	367	366	365	364
ON/OFF	●	●	●	●	○	○	○	○	●	○	○	○	○	○	○	●
Hexadecimal data	F				0				8				1			

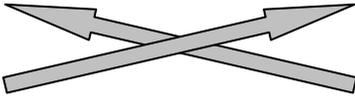
↓

PLC: RWrn (Input)	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
ON/OFF	●	●	●	●	○	○	○	○	●	○	○	○	○	○	○	●
Hexadecimal data	F				0				8				1			

(b) When the I/O parameter No. 120 is set to "0"

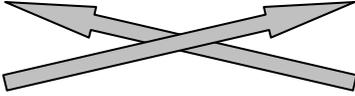
●: On, ○: OFF

X-SEL port No. (Input)	079	078	077	076	075	074	073	072	071	070	069	068	067	066	065	064
ON/OFF	●	○	○	○	○	○	○	●	●	●	●	○	○	○	○	○
Hexadecimal data	8				1				F				0			



PLC: RWwn (Output)	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
ON/OFF	●	●	●	●	○	○	○	○	●	○	○	○	○	○	○	●
Hexadecimal data	F				0				8				1			

X-SEL port No. (Output)	379	378	377	376	375	374	373	372	371	370	369	368	367	366	365	364
ON/OFF	●	●	●	●	○	○	○	○	●	○	○	○	○	○	○	○
Hexadecimal data	F				0				8				1			

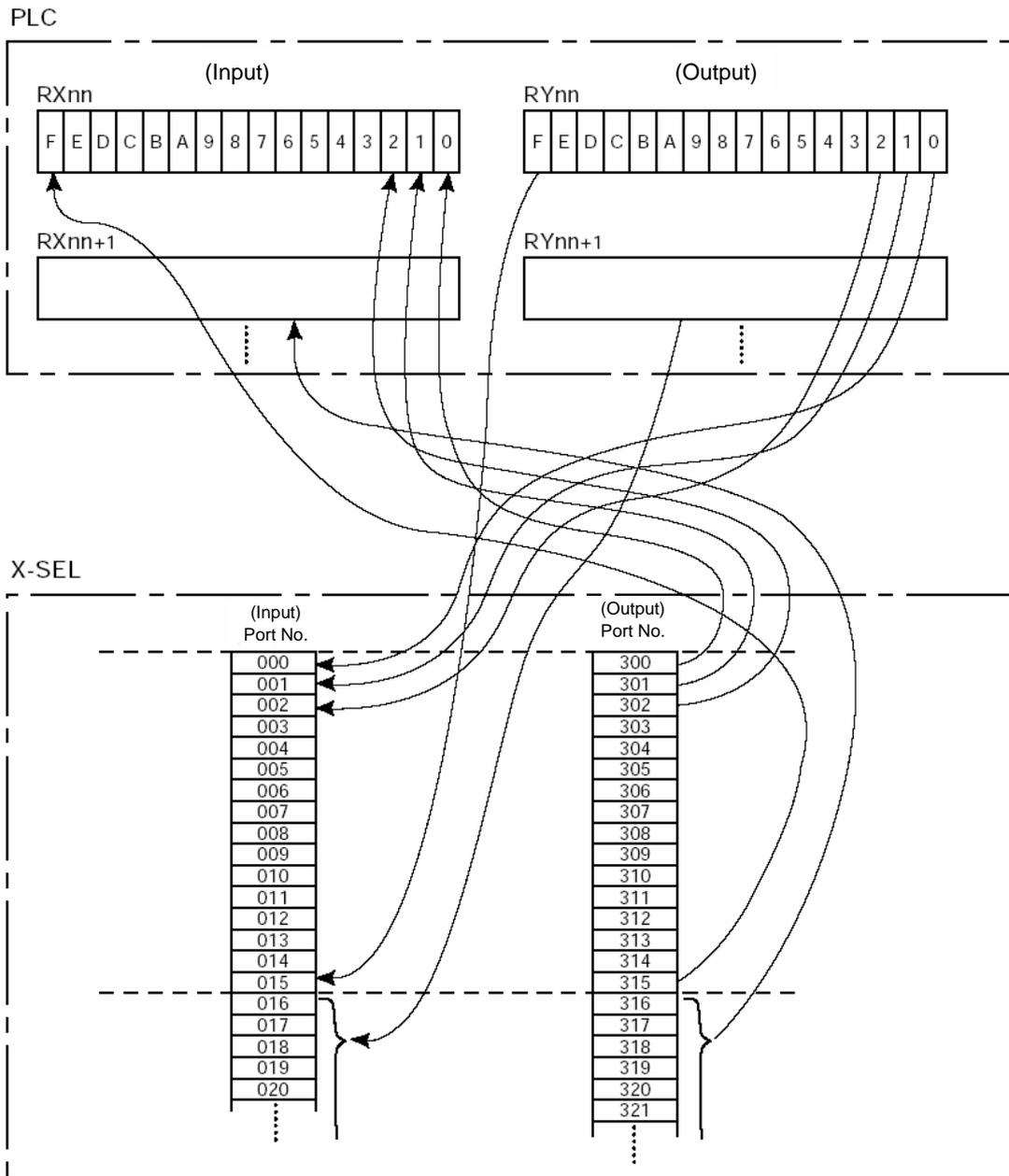


PLC: RWrn (Input)	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
ON/OFF	●	○	○	○	○	○	○	●	●	●	●	○	○	○	○	○
Hexadecimal data	8				1				F				0			

Reference

■ When the number of I/O points is set to 112 or more and 192 or less: two stations are occupied
 Addresses in PLC are assigned to the remote I/O addresses and remote register areas that correspond to the station number set by the rotary switch and the number of occupied stations set by the PLC parameter, in order of port number.

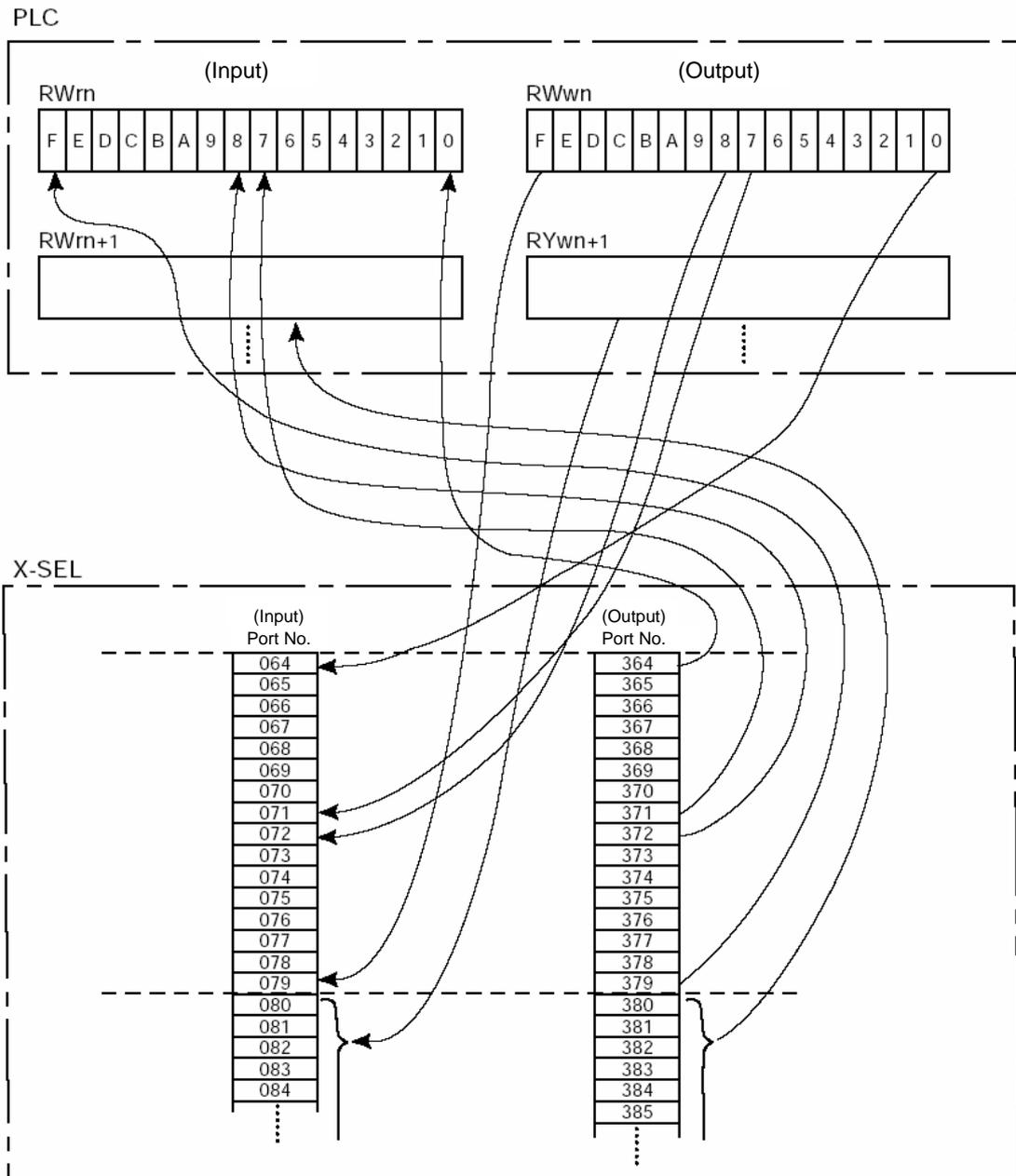
(1) Remote I/O



Xnn and Ynn are the remote I/O addresses in PLC that correspond to the station number.
 The addresses of the remote I/O in PLC (RX and RY) are set to Xnn and Ynn.

Reference

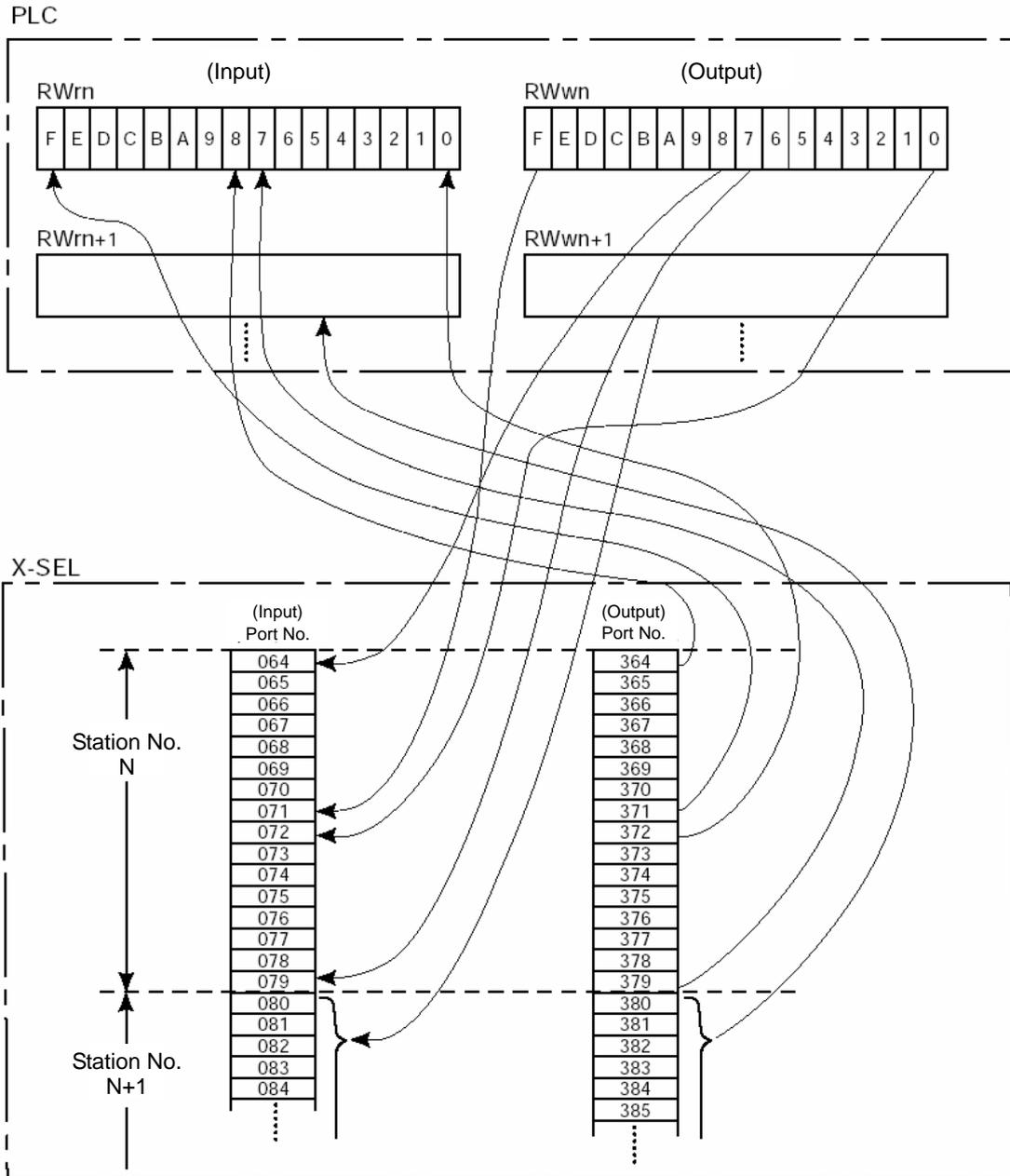
- (2) Remote register
- a. When the I/O parameter No. 120 is set to "1"



RWm and RWwn are the remote register addresses in PLC that correspond to the station number N.

Reference

b. When the I/O parameter No. 120 is set to "0"



RWrm and RWwm are the remote register addresses in PLC that correspond to the station number. The remote register is comprised of one word (16 bits), but the data order of the higher-order 8 bits (higher-order byte) and the lower-order 8 bits (lower-order byte) is reversed under this setting. Take caution.

Example
PLC → X-SEL

PLC	Register D100	15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0																	
			Data	●	●	●	●	○	○	○	○	●	○	○	○	○	○	○	○
		F				0				8				1					
X-SEL	Ports No. 064 to No. 079	079 078 077 076 075 074 073 072 071 070 069 068 067 066 065 064																	
			●	○	○	○	○	○	○	○	●	●	●	●	○	○	○	○	○
	Data	8				1				F				0					

3.1.4 CSP file

When using the GX Configurator-CC (manufactured by Mitsubishi Electric Corporation), download the CSP file from our Web site shown below if required.

Web site: <http://www.iai-robot.co.jp>

The CSP file to be used is different according to the number of ports used (number of I/O ports) set by the I/O parameters No. 14 and No. 15 of X-SEL.

File name	Description	Number of ports used in X-SEL (Number of I/O points)
HMS-ABS-CCL_1.cs p	For one remote device (one station)	96 points or less each
HMS-ABS-CCL_2.cs p	For one remote device (two stations)	112 points or more and 192 points or less each
HMS-ABS-CCL_3.cs p	For one remote device (three stations)	208 points or more and 256 points or less each

For the setting method of the remote station (X-SEL) information to the master station, refer to the Instruction Manuals for the master station, PLC to be mounted, and peripherals.

3.2 Remote I/O station

3.2.1 Models

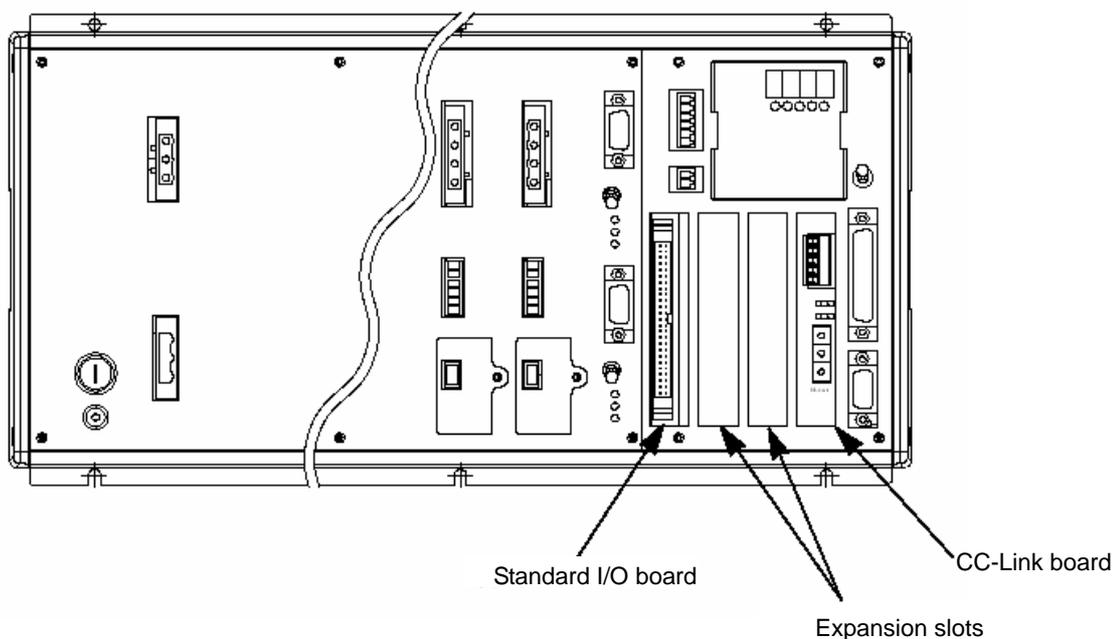
The CC-Link compatible X-SEL controller handled as the remote I/O station has three types as shown below. The single CC-Link board allows communications through 16 points each for input and output.

The model of X-SEL varies according to the installation positions and number of boards.

● CC-Link board, ○ Standard I/O board

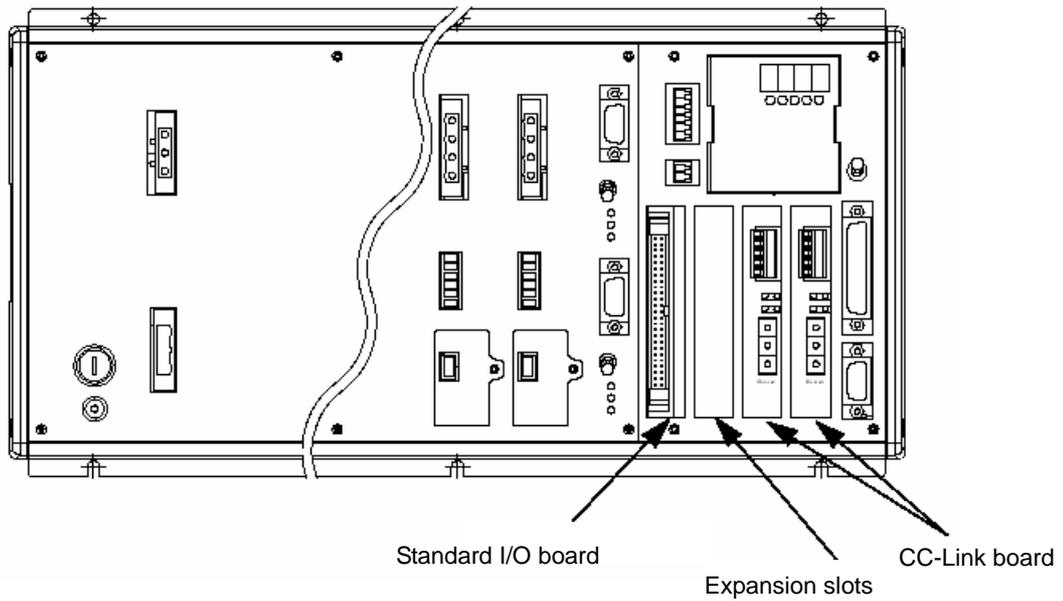
No.	Controller type	Number of I/O points in network	Board installation position				X-SEL model	I/O slot arrangement
			Standard slot (I/O1)	Expansion slot 1 (I/O2)	Expansion slot 2 (I/O3)	Expansion slot 3 (I/O4)		
1	K type	16/16	○			●	X-SEL-K□-□-CC1-□	Fig. 3-2-1
2		32/32 (16/16 × 2)	○		●	●	X-SEL-K□-□-CC2-□	Fig. 3-2-2
3		48/48 (16/16 × 3)	○	●	●	●	X-SEL-K□-□-CC3-□	Fig. 3-2-3

- For the standard slot (I/O1, leftmost), a standard I/O board is required.
- For expansion slots, either of an expansion I/O board ^{(*)2} or SIO board ^{(*)3} is installable in addition to the CC-Link board ^{(*)1}.



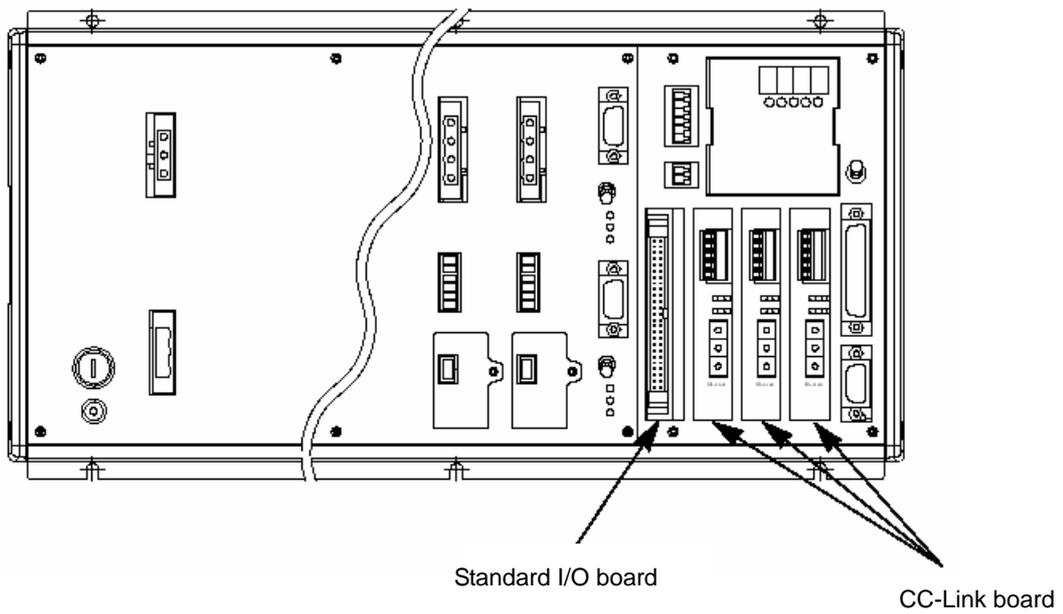
X-SEL-K□-□-CC1-□

Fig. 3-2-1



X-SEL-K□-□-CC2-□

Fig. 3-2-2



X-SEL-K□-□-CC3-□

Fig. 3-2-3

(*1) CC-Link board
Model: IANT-3201-CC

(*2) Expansion I/O board
Model (1): IA-103-X-32
(Input: 32 points, Output: 16 points)
Model (2): IA-103-X-16
(Input: 16 points, Output: 32 points)

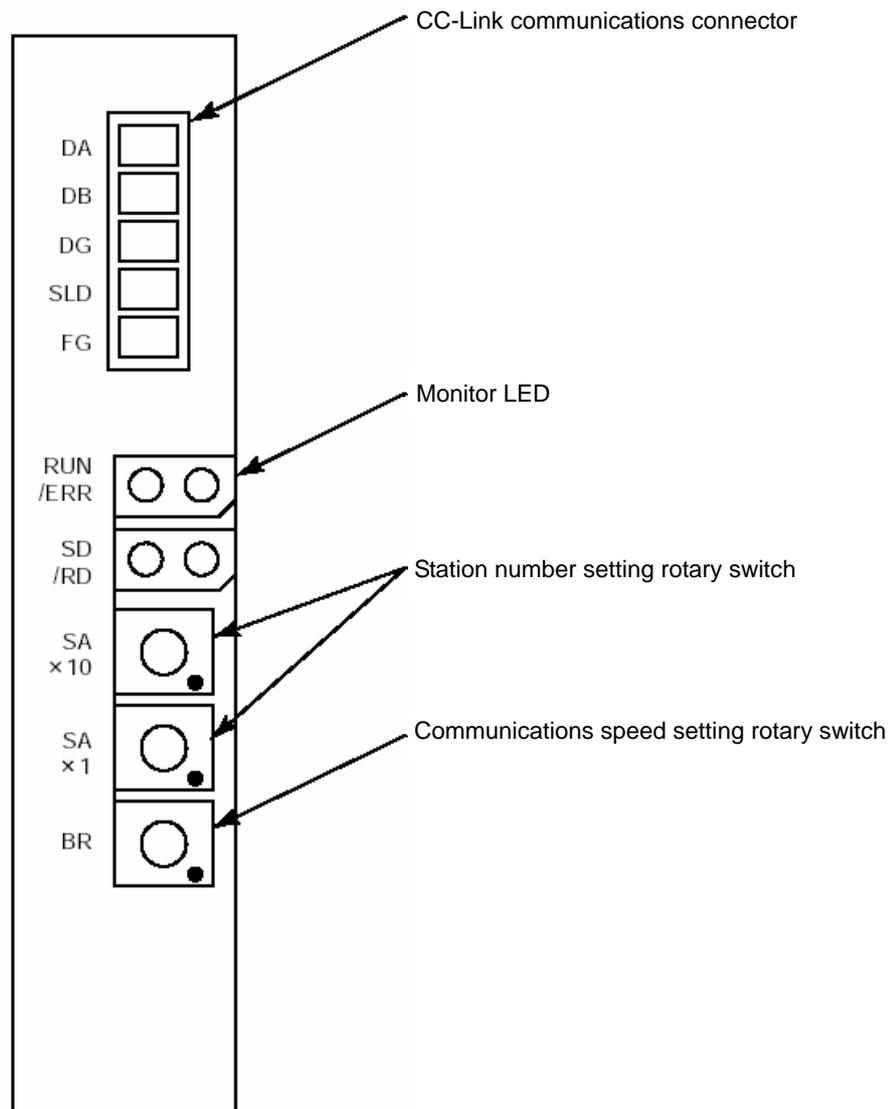
For further information on specifications, refer to the X-SEL Controller Instruction Manual.

(*3) SIO board
Model (1): IA-105-X-MW-A
(for RS232C)
Model (2): IA-105-X-MW-B
(for RS422)
Model (3): IA-105-X-MW-C
(for RS485)

Any single board above is 2-channel compatible.

3.2.2 CC-Link board

(1) Names of each part



(2) Rotary switches

The following can be carried out by rotary switches:

- a. Setting of station number
- b. Setting of communications speed

a. Setting of station number

In the CC-Link only with remote I/O stations, up to 64 units can be connected.

The station number is set in the 1 to 64 range by the two rotary switches.

- SA × 10: Sets the tens place.
- SA × 1: Sets the ones place.

Rotary switch selection number	Station number	
	SA × 10	SA × 1
0	0	0
1	10	1
2	20	2
3	30	3
4	40	4
5	50	5
6	60	6
7	—	7
8	—	8
9	—	9

(Example) When setting the station number to 12:

- Set the rotary switch SA × 10 to 1.
- Set the rotary switch SA × 1 to 2.

Note: The CC-Link first I/O address in PLC is determined according to the master unit installation position and the number of I/O occupied points of the unit installed prior to that.

The I/O addresses in PLC are assigned from the first I/O address above in order of station number.

When two or more CC-Link boards are used in X-SEL, it is recommended to set station numbers in order of installation position so that measures can be taken smoothly in the event of trouble.

For further information regarding setting of the station number and setting of the I/O address in the PLC, refer to the Instruction Manuals for the master unit and PLC to be mounted.

b. Setting of communications speed

The communications speed is set by the rotary switch BR.

Rotary switch selection number	Communications speed
0	156kbps
1	625kbps
2	2.5Mbps
3	5Mbps
4	10Mbps
Setting to 5 or more prohibited	Error

(3) Display of monitor LEDs

The four LEDs mounted on the front of the board can indicate the board operating state and network condition.

LED	Color	Display condition	Display details (display indication)
RUN	Green	Lighting	Lights when communications start and turns off when communications are interrupted for a fixed time or longer.
SD	Green	Flashing	Flashing during data transmission
RD	Green	Flashing	Flashing during data reception
ERR	Red	Lighting	Local station address receiving data has an error.
		Flashing	Setting by the communications speed setting rotary switch was changed during communications. Setting by the station number setting rotary switch was changed during communications.

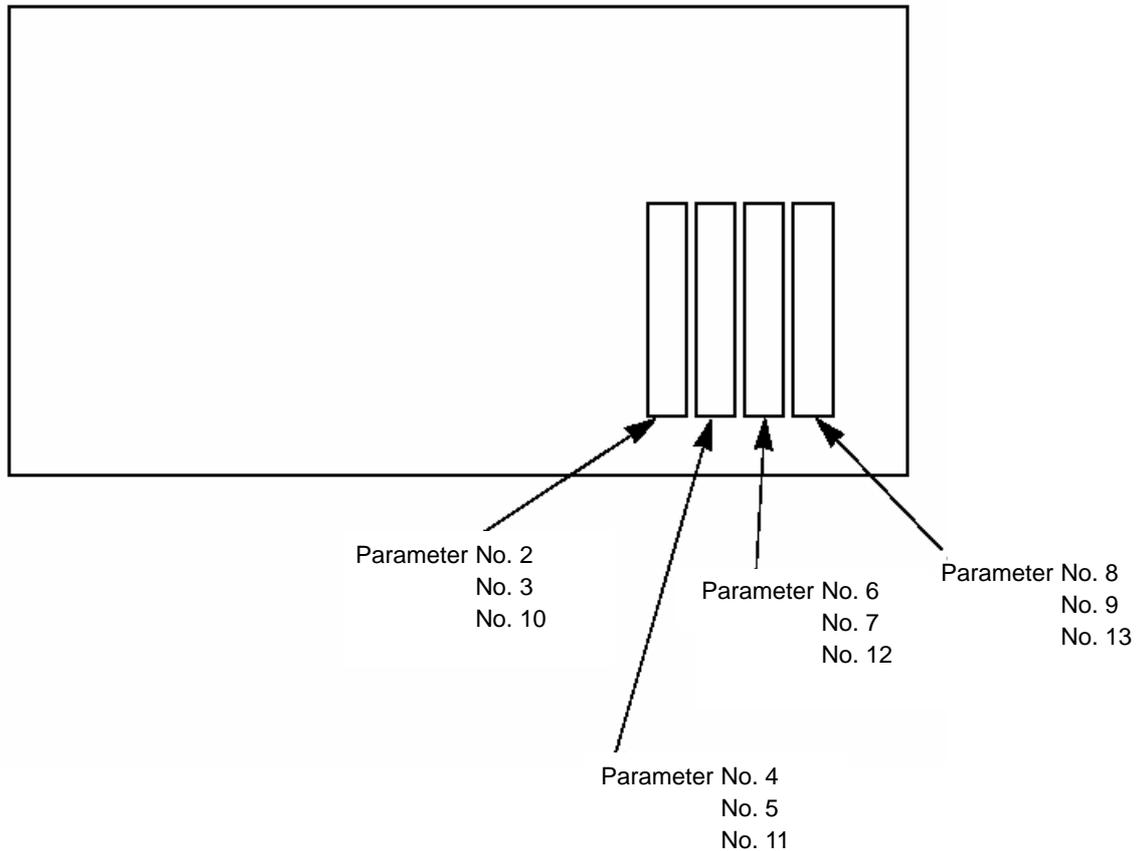
3.2.3 Setting of I/O parameters (assignment of I/O ports)

The X-SEL I/O ports used in the CC-Link are set. X-SEL allows a variety of settings of different I/O ports with I/O parameters. (For further information, refer to the X-SEL Controller Instruction Manual.)

The typical setting methods are shown below in this Manual.

Basically, the I/O parameter No. 1 sets the I/O port assignment type to fixed assignment by setting the I/O port address for each I/O slot.

(1) Board installation positions (slots) and parameter numbers



(2) Factory-configured parameters

A: X-SEL-K□-□-CC1-□

B: X-SEL-K□-□-CC2-□

C: X-SEL-K□-□-CC3-□

No.	Parameter name	Input range	Set value			Remarks
			A	B	C	
1	I/O port assignment type	0 – 20	0	0	0	0: Fixed assignment 1: Automatic assignment (Priority: slot 1 →) * The ports only in the continuous installation range from slot 1 are assigned for safety.)
2	Standard I/O: Input port start No. (I/O1)	-1 – 599	-1	-1	-1	0 + (multiples of 8) (Invalid for negative values)
3	Standard I/O: Output port start No. (I/O1)	-1 – 599	-1	-1	-1	300 + (multiples of 8) (Invalid for negative values)
4	Expansion I/O1 fixed assignment time: Input port start No. (I/O2)	-1 – 599	-1	-1	032	0 + (multiples of 8) (Invalid for negative values) (Slot next to the standard I/O)
5	Expansion I/O1 fixed assignment time: Output port start No. (I/O2)	-1 – 599	-1	-1	332	300 + (multiples of 8) (Invalid for negative values)
6	Expansion I/O2 fixed assignment time: Input port start No. (I/O3)	-1 – 599	-1	016	016	0 + (multiples of 8) (Invalid for negative values)
7	Expansion I/O2 fixed assignment time: Output port start No. (I/O3)	-1 – 599	-1	316	316	300 + (multiples of 8) (Invalid for negative values)
8	Expansion I/O3 fixed assignment time: Input port start No. (I/O4)	-1 – 599	0	0	0	0 + (multiples of 8) (Invalid for negative values)
9	Expansion I/O3 fixed assignment time: Output port start No. (I/O4)	-1 – 599	300	300	300	300 + (multiples of 8) (Invalid for negative values)
10	Standard I/O error monitoring (I/O1)	0 – 5	0	0	0	0: Non-monitoring 1: Monitoring
11	Expansion I/O1 error monitoring (I/O2)	0 – 5	0	0	2	2: Monitoring (Non-monitoring of 24V I/O power related errors) (Main application of Ver. 0.55 or later)
12	Expansion I/O2 error monitoring (I/O3)	0 – 5	0	2	2	3: Monitoring (Monitoring of 24V I/O power related errors only) (Main application of Ver. 0.55 or later)
13	Expansion I/O3 error monitoring (I/O4)	0 – 5	2	2	2	
14	Network I/F card remote: Number of ports used for input	0 – 256	0	0	0	Multiples of 16
15	Network I/F card remote: Number of ports used for output	0 – 256	0	0	0	Multiples of 16

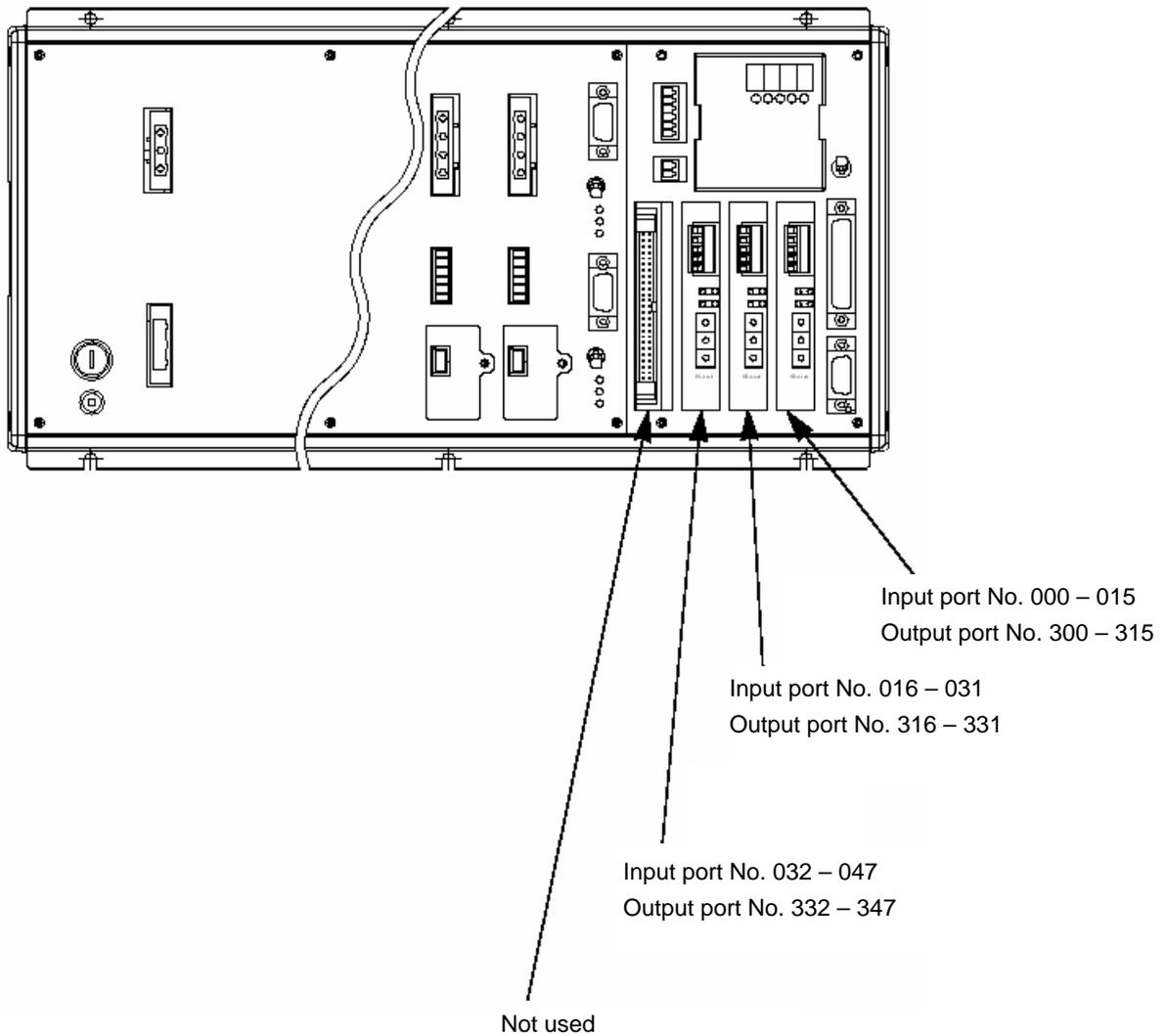
(I/O1) to (I/O4) indicate the slot numbers.

Note: When a standard I/O board is not used, it is not required to supply 24V DC to the IO 24V power connector. In this case, set the parameter No. 10 to "0."

(3) CC-Link connection with standard I/O ports

a. When only three CC-link boards are used

The following is the setting of a case where standard I/O ports are assigned to the CC-Link boards from the first port without using a standard I/O board.



(The above is a case where the installation condition as shown in Fig. 3-2-3 in section 3.2.1 is applied.)

X-SEL I/O parameter

No.	Parameter name	Default (reference)	Input range	Setting	Remarks
1	I/O port assignment type	1	0 – 20	0	0: Fixed assignment 1: Automatic assignment (Priority: slot 1 –) * The ports only in the continuous installation range from slot 1 are assigned for safety.)
2	Standard I/O: Input port start No. (I/O1)	000	-1 – 599	-1	0 + (multiples of 8) (Invalid for negative values)
3	Standard I/O: Output port start No. (I/O1)	300	-1 – 599	-1	300 + (multiples of 8) (Invalid for negative values)
4	Expansion I/O1 fixed assignment time: Input port start No. (I/O2)	-1	-1 – 599	032	0 + (multiples of 8) (Invalid for negative values) (Slot next to the standard I/O)
5	Expansion I/O1 fixed assignment time: Output port start No. (I/O2)	-1	-1 – 599	332	300 + (multiples of 8) (Invalid for negative values)
6	Expansion I/O2 fixed assignment time: Input port start No. (I/O3)	-1	-1 – 599	016	0 + (multiples of 8) (Invalid for negative values)
7	Expansion I/O2 fixed assignment time: Output port start No. (I/O3)	-1	-1 – 599	316	300 + (multiples of 8) (Invalid for negative values)
8	Expansion I/O3 fixed assignment time: Input port start No. (I/O4)	-1	-1 – 599	000	0 + (multiples of 8) (Invalid for negative values)
9	Expansion I/O3 fixed assignment time: Output port start No. (I/O4)	-1	-1 – 599	300	300 + (multiples of 8) (Invalid for negative values)
10	Standard I/O error monitoring (I/O1)	2	0 – 5	0	0: Non-monitoring 1: Monitoring
11	Expansion I/O1 error monitoring (I/O2)	0	0 – 5	2	2: Monitoring (Non-monitoring of 24V I/O power related errors) (Main application of Ver. 0.55 or later) 3: Monitoring (Monitoring of 24V I/O power related errors only) (Main application of Ver. 0.55 or later)
12	Expansion I/O2 error monitoring (I/O3)	0	0 – 5	2	
13	Expansion I/O3 error monitoring (I/O4)	0	0 – 5	2	
14	Network I/F card remote: Number of ports used for input	64	0 – 256	0	Multiples of 16
15	Network I/F card remote: Number of ports used for output	64	0 – 256	0	Multiples of 16

(I/O1) to (I/O4) indicate the slot numbers.

b. When only two CC-Link boards are used

The I/O2 (expansion I/O1) slot becomes empty. Accordingly, both the default and set value become “-1” for the I/O parameter No. 4 and No. 5 and “0” for No. 11 in the table above.

(The above is a case where the installation condition as shown in Fig. 3-2-2 in section 3.2.1 is applied.)

c. When only one CC-Link board is used

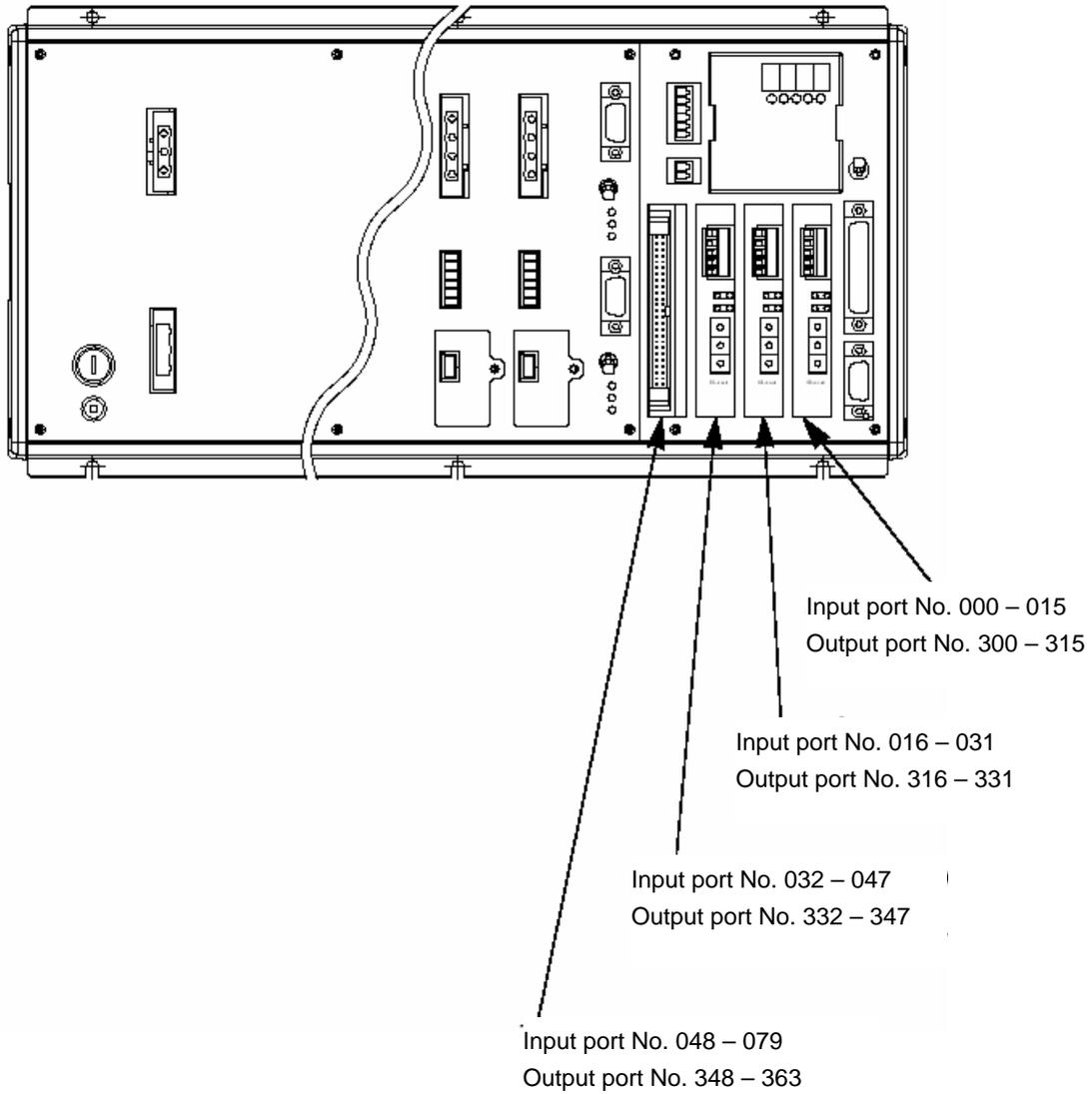
The I/O2 (expansion I/O1) and I/O3 (expansion I/O2) slots become empty. Accordingly, both the default and set value become “-1” for the I/O parameters No. 4 to No. 7 and “0” for No. 11 and No. 12 in the table above.

(The above is a case where the installation condition as shown in Fig. 3-2-1 in section 3.2.1 is applied.)

Note: When no I/O board is used, it is not required to supply 24V DC to the I/O 24V power connector. In any case of a, b, and c above, set the I/O parameter No. 10 to “0.”

d. When a standard I/O board is used as general I/O

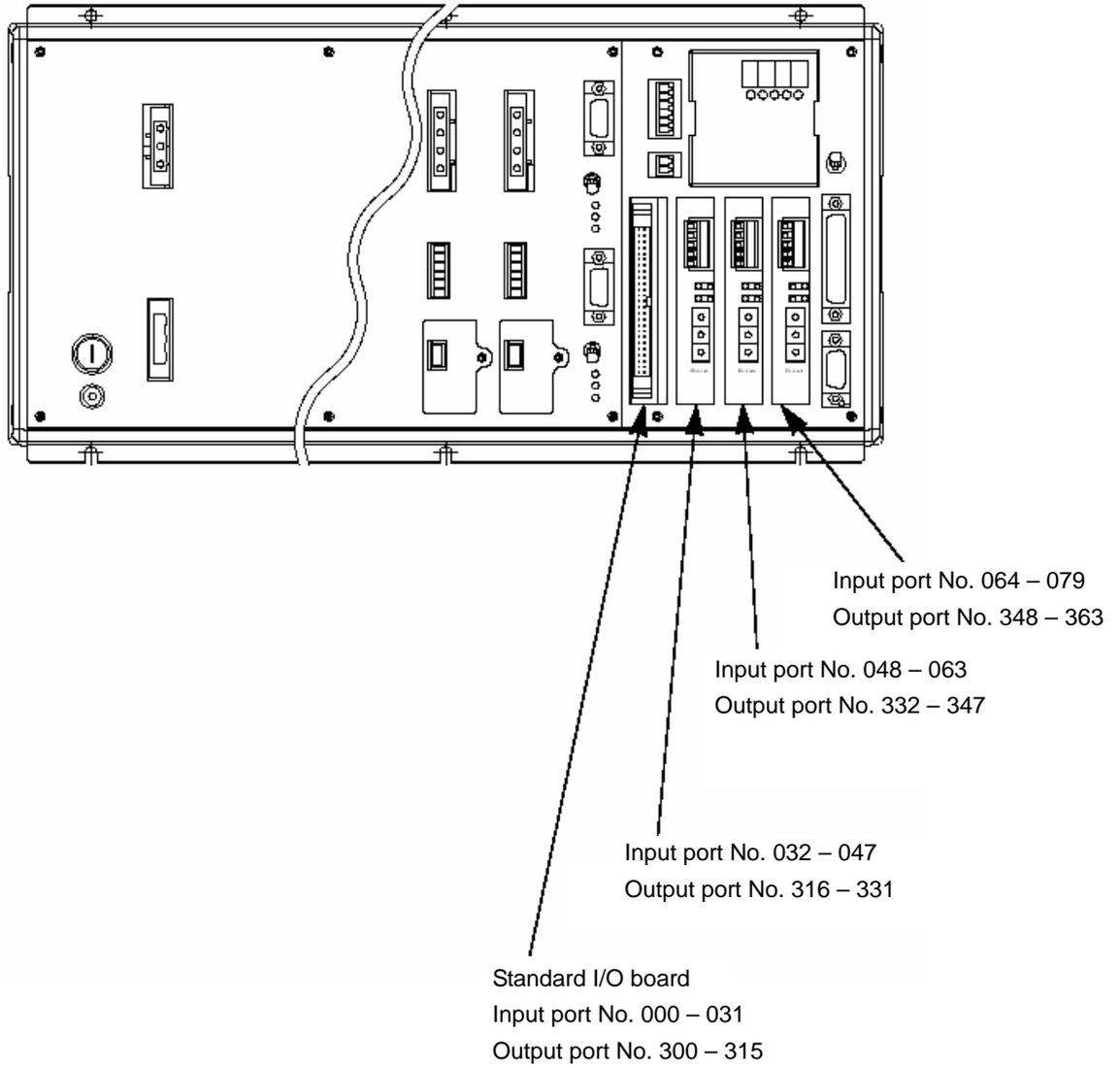
When a standard I/O board is used as general I/O (input: 32 points, output: 16 points) with the setting of a, the number becomes 048 for the I/O parameter No. 2, 348 for No. 3, and 1 for No. 10 in the table on the previous page for the following assignments:



(The above is a case where the installation condition as shown in Fig. 3-2-3 in section 3.2.1 is applied.)

(4) General I/O connection of CC-Link boards

The following is a case where a standard I/O board is used as standard I/O ports and 48 points each for input and output are assigned to three CC-link boards as general I/O ports:



(The above is a case where the installation condition as shown in Fig. 3-2-3 in section 3.2.1 is applied.)

X-SEL I/O parameter

No.	Parameter name	Default (reference)	Input range	Setting	Remarks
1	I/O port assignment type	1	0 – 20	0	0: Fixed assignment 1: Automatic assignment (Priority: slot 1 –) * The ports only in the continuous installation range from slot 1 are assigned for safety.)
2	Standard I/O: Input port start No. (I/O1)	000	-1 – 599	000	0 + (multiples of 8) (Invalid for negative values)
3	Standard I/O: Output port start No. (I/O1)	300	-1 – 599	300	300 + (multiples of 8) (Invalid for negative values)
4	Expansion I/O1 fixed assignment time: Input port start No. (I/O2)	-1	-1 – 599	32	0 + (multiples of 8) (Invalid for negative values) (Slot next to the standard I/O)
5	Expansion I/O1 fixed assignment time: Output port start No. (I/O2)	-1	-1 – 599	316	300 + (multiples of 8) (Invalid for negative values)
6	Expansion I/O2 fixed assignment time: Input port start No. (I/O3)	-1	-1 – 599	048	0 + (multiples of 8) (Invalid for negative values)
7	Expansion I/O2 fixed assignment time: Output port start No. (I/O3)	-1	-1 – 599	332	300 + (multiples of 8) (Invalid for negative values)
8	Expansion I/O3 fixed assignment time: Input port start No. (I/O4)	-1	-1 – 599	064	0 + (multiples of 8) (Invalid for negative values)
9	Expansion I/O3 fixed assignment time: Output port start No. (I/O4)	-1	-1 – 599	348	300 + (multiples of 8) (Invalid for negative values)
10	Standard I/O error monitoring (I/O1)	2	0 – 5	1	0: Non-monitoring 1: Monitoring
11	Expansion I/O1 error monitoring (I/O2)	0	0 – 5	2	2: Monitoring (Non-monitoring of 24V I/O power related errors) (Main application of Ver. 0.55 or later) 3: Monitoring (Monitoring of 24V I/O power related errors only) (Main application of Ver. 0.55 or later)
12	Expansion I/O2 error monitoring (I/O3)	0	0 – 5	2	
13	Expansion I/O3 error monitoring (I/O4)	0	0 – 5	2	
14	Network I/F card remote: Number of ports used for input	64	0 – 256	0	Multiples of 16
15	Network I/F card remote: Number of ports used for output	64	0 – 256	0	Multiples of 16

(I/O1) to (I/O4) indicate the slot numbers.

(5) X-SEL I/O port numbers

The standard I/O port numbers of X-SEL are shown below.

The X-SEL port numbers and functional assignment can be changed with I/O parameters. (For further information, refer to the X-SEL Controller Instruction Manual.)

	Port No.	Function		Port No.	Function
Input	000	Program start	Output	300	Alarm output
	001	General input		301	Ready output
	002	General input		302	Emergency stop output
	003	General input		303	General output
	004	General input		304	General output
	005	General input		305	General output
	006	General input		306	General output
	007	Program designation (PRG No. 1)		307	General output
	008	Program designation (PRG No. 2)		308	General output
	009	Program designation (PRG No. 4)		309	General output
	010	Program designation (PRG No. 8)		310	General output
	011	Program designation (PRG No. 10)		311	General output
	012	Program designation (PRG No. 20)		312	General output
	013	Program designation (PRG No. 40)		313	General output
	014	General input		314	General output
	015	General input		315	General output
⋮	⋮	⋮	⋮		

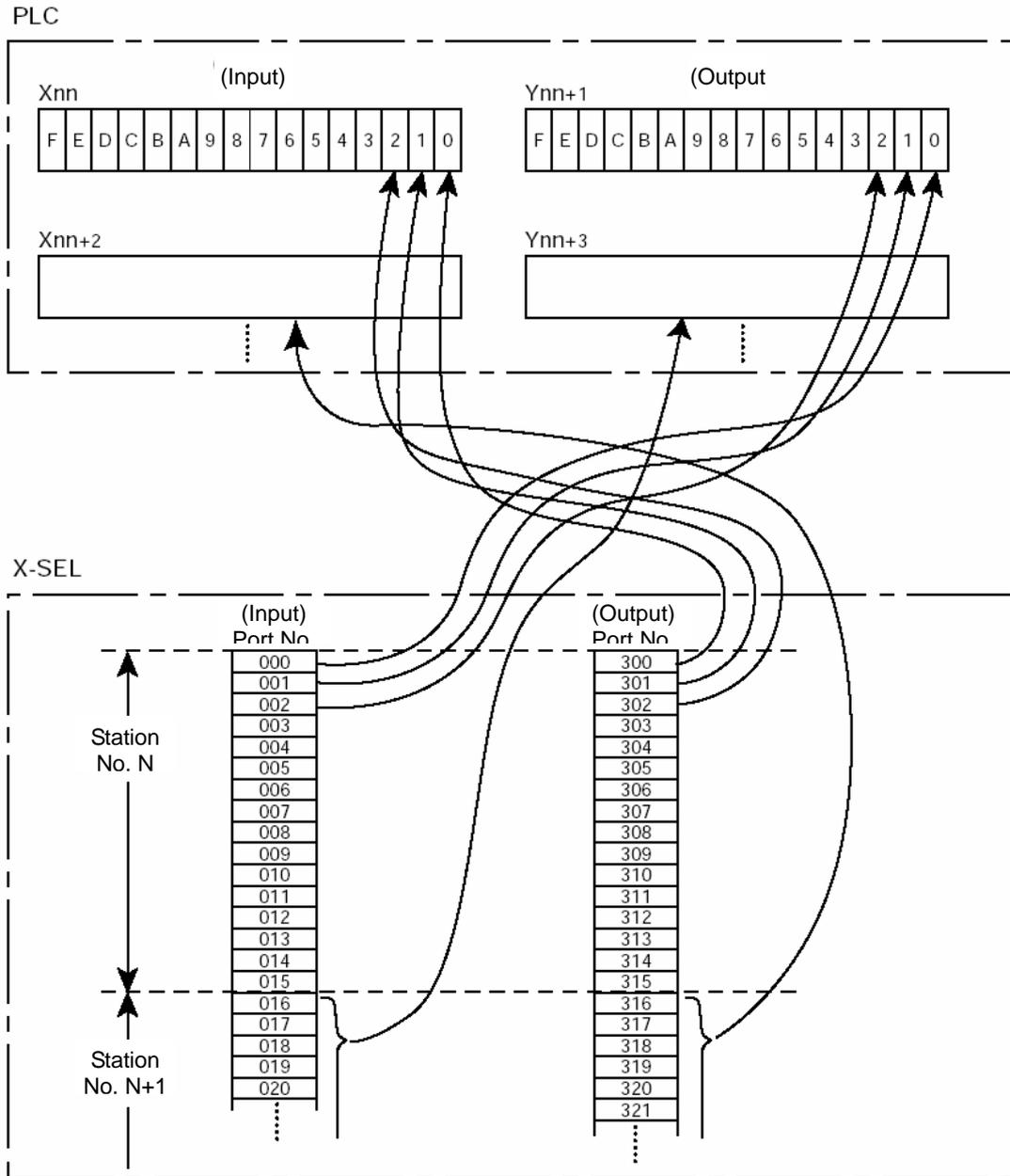
Note: The number of I/O ports is as follows:

Input	000 to 299	(Max, 300 points)
Output	300 to 599	(Max, 300 points)

When the CC-Link board is used in combination with the expansion I/O board, pay attention to the number of I/O ports.

Reference

Addresses in PLC are assigned to the remote I/O addresses that correspond to the station number set by the rotary switch and the station number set by the PLC parameter, in steps of 16 points in order of port number.



Xnn and Ynn+1 are the addresses in PLC that correspond to the station number N.

Since 2-word (32-point) processing is made per station in PLC, the PLC remote I/O (RX/RV) addresses are set to Xnn and Ynn.

3.3 Troubleshooting

When a problem occurs in the CC-Link, check the operating condition with the table below.

When the ERR LED lights or flashes, or when the green LED turns off abnormally during communications, check (or reset) connections of the power and communications cables, setting of rotary switches, and setting of parameters before turning on the power to the controller main unit again.

○: ON, ●: OFF, ⊙: Flashing

RUN (Green)	ERR (Red)	SD (Green)	RD (Green)	Operating condition
○	⊙	⊙	○	There is normal communications, but a CRC error sometimes occurs with noise.
○	0.4s⊙	⊙	○	Resetting of the baud rate or station number has changed the rate or number.
○	⊙	⊙	●	(Impossible condition)
○	⊙	●	○	With the received data having a CRC error, there can be no response.
○	⊙	●	●	(Impossible condition)
○	●	⊙	○	Normal communications
○	●	⊙	●	(Impossible condition)
○	●	●	○	Local station address receiving data has not arrived.
○	●	●	●	(Impossible condition)
●	⊙	⊙	○	There is the polling response, but refresh receiving has a CRC error.
●	⊙	⊙	●	(Impossible condition)
●	⊙	●	○	Local station address receiving data has a CRC error.
●	⊙	●	●	(Impossible condition)
●	●	⊙	○	There is no link start-up.
●	●	⊙	●	(Impossible condition)
●	●	●	○	There is no local station address receiving data or it is impossible to receive such data with noise.
●	●	●	●	It is impossible to receive data as a result of disconnection, etc. There is power interruption or H/W setting is being made.
●	○	●	○	The baud rate or station number is invalid.
●	○	●	●	The baud rate or station number is invalid.

4. RCS-C and E-Con

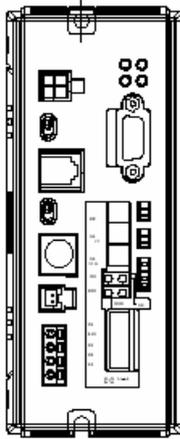
4.1 Models

The CC-Link compatible RCS-C and E-Con controllers are shown below.

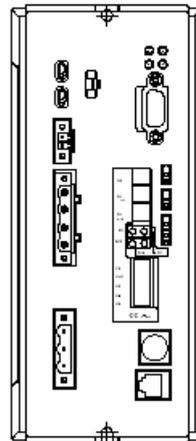
(1) RCS-C

Model: RCS-C-□□□□-□□-CC-□

Number of I/O points = Dedicated input: 8 points, Dedicated output: 10 points



24V type

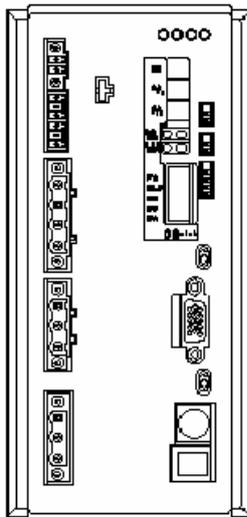


100V and 200V type

(2) E-Con

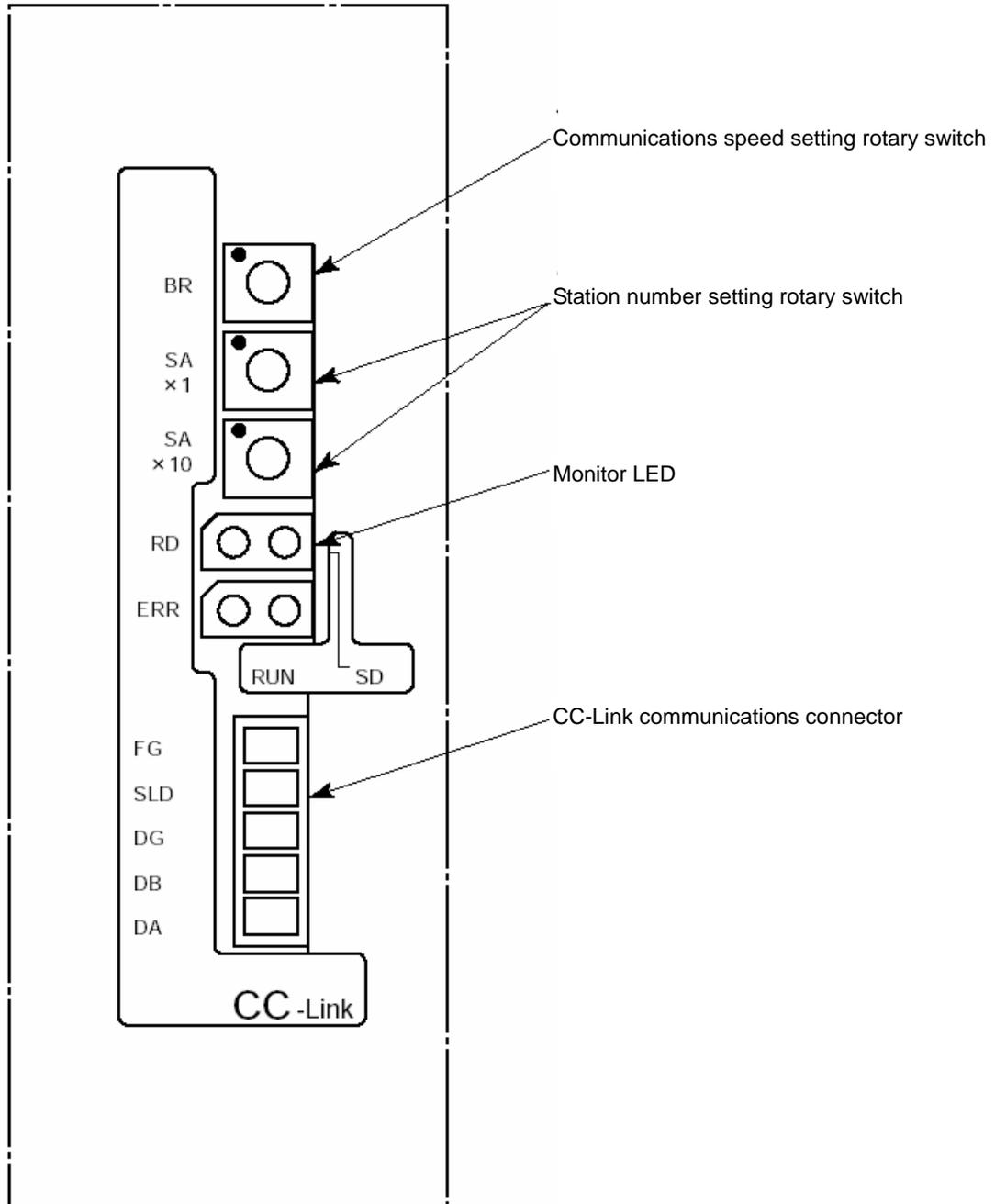
Model: ECON-□-□-CC-□

Number of I/O points = Dedicated input: 10 points, Dedicated output: 12 points



4.2 CC-Link interface

(1) Names of each part



(2) Rotary switches

The following can be carried out by rotary switches:

- a. Setting of station number
- b. Setting of communications speed

a. Setting of station number

In the CC-Link only with remote I/O stations, up to 64 units can be connected.

The station number is set in the 1 to 64 range by the two rotary switches.

- SA × 10: Sets the tens place.
- SA × 1: Sets the ones place.

Rotary switch selection number	Station number	
	SA × 10	SA × 1
0	0	0
1	10	1
2	20	2
3	30	3
4	40	4
5	50	5
6	60	6
7	—	7
8	—	8
9	—	9

(Example) When setting the station number to 12:

- Set the rotary switch SA × 10 to 1.
- Set the rotary switch SA × 1 to 2.

Note: The CC-Link first I/O address in PLC is determined according to the master unit installation position and the number of I/O occupied points of the unit installed prior to that.

The I/O addresses in PLC are assigned from the first I/O address above in order of station number.

For further information regarding setting of the station number and setting of the I/O address in the PLC, refer to the Instruction Manuals for the master unit and PLC to be mounted.

b. Setting of communications speed

The communications speed is set by the rotary switch BR.

Rotary switch selection number	Communications speed
0	156kbps
1	625kbps
2	2.5Mbps
3	5Mbps
4	10Mbps
Setting to 5 or more prohibited	Error

(3) Display of monitor LEDs

The four LEDs mounted on the front of the board can indicate the board operating state and network condition.

LED	Color	Display condition	Display details (display indication)
RUN	Green	Lighting	Lights when communications start and turns off when communications are interrupted for a certain time or longer.
SD	Green	Flashing	Flashing during data transmission
RD	Green	Flashing	Flashing during data reception
ERR	Red	Lighting	Local station address receiving data has an error.
		Flashing	Setting by the communications speed setting rotary switch was changed during communications. Setting by the station number setting rotary switch was changed during communications.

4.3 Input and output (I/O)

The input and output points of each of RCS-C and E-Con are as follows:

- (1) RCS-C = Dedicated input: 8 points, Dedicated output: 10 points
- (2) E-Con = Dedicated input: 10 points, Dedicated output: 12 points

For further information on each signal, refer to the RCS Series of Robo Cylinder Controller RCS-C Type Instruction Manual and the E-Con Controller Instruction Manual.

(1) RCS-C signal assignment

8 bit input		10 bit output	
Input No.	Signal name	Output No.	Signal name
0	Commanding position 1	0	Completion position 1
1	Commanding position 2	1	Completion position 2
2	Commanding position 4	2	Completion position 4
3	Commanding position 8	3	Completion position 8
4	Start	4	Positioning completed
5	Reset	5	Zero return completed
6	Servo ON	6	Zone
7	* Pause	7	* Alarm
8	Reserved	8	* Emergency stop
9	Reserved	9	Moving
10	Reserved	10	* Battery alarm Note)
11	Reserved	11	* Reserved
12	Reserved	12	* Reserved
13	Reserved	13	* Reserved
14	Reserved	14	* Reserved
15	Reserved	15	* Reserved

* Signals with an asterisk are b contact (always ON) signals.

Note) Supported by the controller of main power supply 100/200V specifications only.

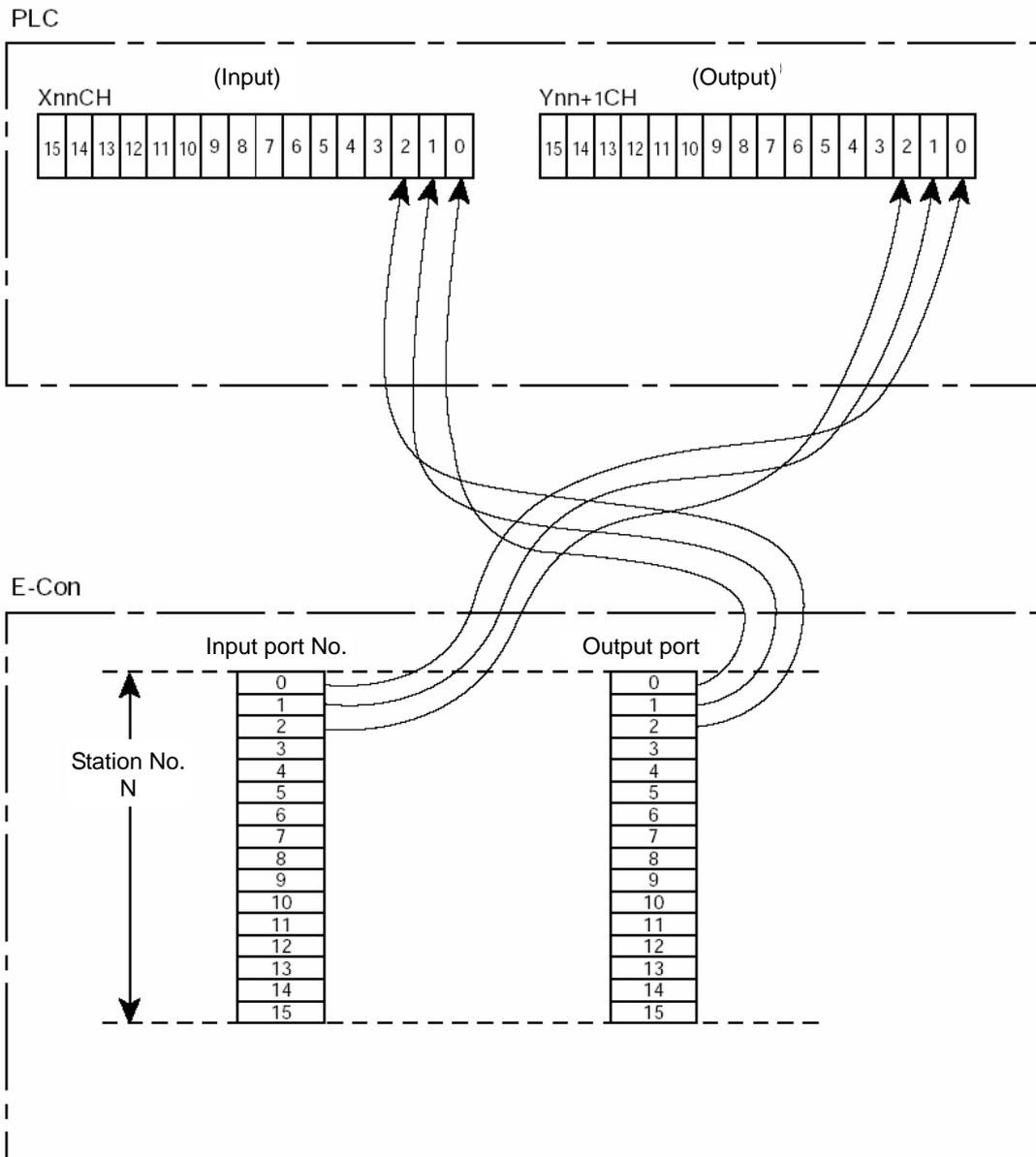
(2) E-Con signal assignment

8 bit input		10 bit output	
Input No.	Signal name	Output No.	Signal name
0	Commanding position 1	0	Completion position 1
1	Commanding position 2	1	Completion position 2
2	Commanding position 4	2	Completion position 4
3	Commanding position 8	3	Completion position 8
4	Commanding position 16	4	Completion position 16
5	Commanding position 32	5	Completion position 32
6	Reserved	6	* Reserved
7	Reserved	7	* Reserved
8	Start	8	Positioning completed
9	Reset	9	Zero return completed
10	Servo ON	10	Zone
11	* Pause	11	* Alarm
12	Reserved	12	* Emergency stop
13	Reserved	13	Moving
14	Reserved	14	* Battery alarm
15	Reserved	15	* Reserved

* Signals with an asterisk are b contact (always ON) signals.

Reference

For both RCS-C and E-Con, bit addresses in PLC are assigned to the remote I/O addresses that correspond to the station number set by the rotary switch and the station number set by the PLC parameter, in numerical order.



Xnn and Ynn+1 are the addresses in PLC that correspond to the station number N.

Since 2-word (32-point) processing is made per station in PLC, the PLC remote I/O (RX/RV) addresses are set to Xnn and Ynn.

4.4 Troubleshooting

When a problem occurs in the CC-Link, check the operating condition with the table below and remove the cause.

When the ERR LED lights or flashes, or when the green LED turns off abnormally during communications, check (or reset) connections of the power and communications cable, and setting of rotary switches before turning on the power to the controller main unit again.

○: ON, ●: OFF, ◎: Flashing

RUN (Green)	ERR (Red)	SD (Green)	RD (Green)	Operating condition
○	◎	◎	○	There is normal communications, but a CRC error sometimes occurs with noise.
○	0.5S◎	◎	○	There is normal communications, but the station number setting switch has a failure.
○	◎	◎	●	(Impossible condition)
○	◎	●	○	With the received data having a CRC error, there can be no response.
○	◎	●	●	(Impossible condition)
○	●	◎	○	Normal communications
○	●	◎	●	(Impossible condition)
○	●	●	○	Local station address receiving data has not arrived.
○	●	●	●	(Impossible condition)
●	◎	◎	○	There is the polling response, but refresh receiving has a CRC error.
●	◎	◎	●	(Impossible condition)
●	◎	●	○	Local station address receiving data has a CRC error.
●	◎	●	●	(Impossible condition)
●	●	◎	○	There is no link start-up.
●	●	◎	●	(Impossible condition)
●	●	●	○	There is no local station address receiving data or it is impossible to receive such data with noise. (The amount of data transmitted from the master is insufficient.)
●	●	●	●	It is impossible to receive data as a result of disconnection, etc.
●	○	●	○, ●	The baud rate or station number is invalid.
●	●	●	●	There is a power interruption or there is a breakdown with the remote station power supply part.

5. Common Items and Others

5.1 Communications cable

Use the dedicated cable compatible with the CC-Link Ver. 1.10 (FANC-SBH, FANC-SB, etc.) for the CC-Link communications cable.

5.2 Connection of communications cable connector

Connect the communications cable according to the following connector table:

Pin No.	Signal name	Application
1	DA	Communications line
2	DB	Communications line
3	DG	Ground
4	SLD	Shield
5	FG	Ground

SLD and FG are internally connected.

The communications cable is connected to pin No. 1 to No. 4.

5.3 Terminators

It is required to connect a terminator to the units at each end of the CC-Link system.

Connect it between DA and DB of the connector.

Terminators are attached to each controller of X-SEL, RCS-C, and E-Con.

The terminator varies according to the model name of the CC-Link compatible cable as follows:

Cable FANC-SBH: 130 Ω 1/2W

Cable FANC-SB: 110 Ω 1/2W

Note: For further information, refer to the Instruction Manual for the master unit.

5.4 Useful functions for X-SEL controller adjustment

- (1) When a standard or expansion I/O board is installed onto the K-type controller, X-SEL can individually be started up without connection of the 24V DC power for I/O.
- (2) When a CC-Link board is installed, X-SEL can individually be started up without establishment of the network.

In either case, set the relevant I/O parameters of No. 10 to No. 13 to "0: Non-monitoring."

Note: After completing the required operation or adjustment, be sure to restore the parameters. Without doing so, an error check of the relevant slots of the boards will not be carried out.



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