

CC-Link I/O MODULE

(CC-Link IE Field network, strain gauge input, 2 points, isolated, screw terminal block)

MODEL R7I4DCIE-LC2-9

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BEFORE USE

Thank you for choosing us. Before use, please check contents of the package you received as outlined below.

If you have any problems or questions with the product, please contact our sales office or representatives.

■ PACKAGE INCLUDES:

Strain gauge input module.....(1)

Surface mounter slider(2)

■ MODEL NO.

Confirm Model No. marking on the product to be exactly what you ordered.

■ INSTRUCTION MANUAL

This manual describes necessary points of caution when you use this product, including installation, connection and basic maintenance procedures.

■ CSP+ file

CSP+ file is downloadable at our web site or CC-Link Partner Association's web site (<https://www.cc-link.org>)

POINTS OF CAUTION

■ CONFORMITY WITH EU DIRECTIVES

- The equipment must be mounted inside the instrument panel of a metal enclosure.
- The actual installation environments such as panel configurations, connected devices, connected wires, may affect the protection level of this unit when it is integrated in a panel system. The user may have to review the CE requirements in regard to the whole system and employ additional protective measures to ensure the CE conformity.

■ POWER INPUT RATING & OPERATIONAL RANGE

- Locate the power input rating marked on the product and confirm its operational range as indicated below:
24V DC rating: 24V \pm 10%, approx. 170mA

■ GENERAL PRECAUTIONS

- Before you remove the unit or mount it, turn off the power supply and input signal for safety.
- Before you remove the terminal block or mount it, make sure to turn off the power supply and input signal for safety.

■ ENVIRONMENT

- Indoor use.
- When heavy dust or metal particles are present in the air, install the unit inside proper housing with sufficient ventilation.
- Do not install the unit where it is subjected to continuous vibration. Do not subject the unit to physical impact.
- Environmental temperature must be within -10 to +55°C (14 to 131°F) with relative humidity within 30 to 90% RH in order to ensure adequate life span and operation.

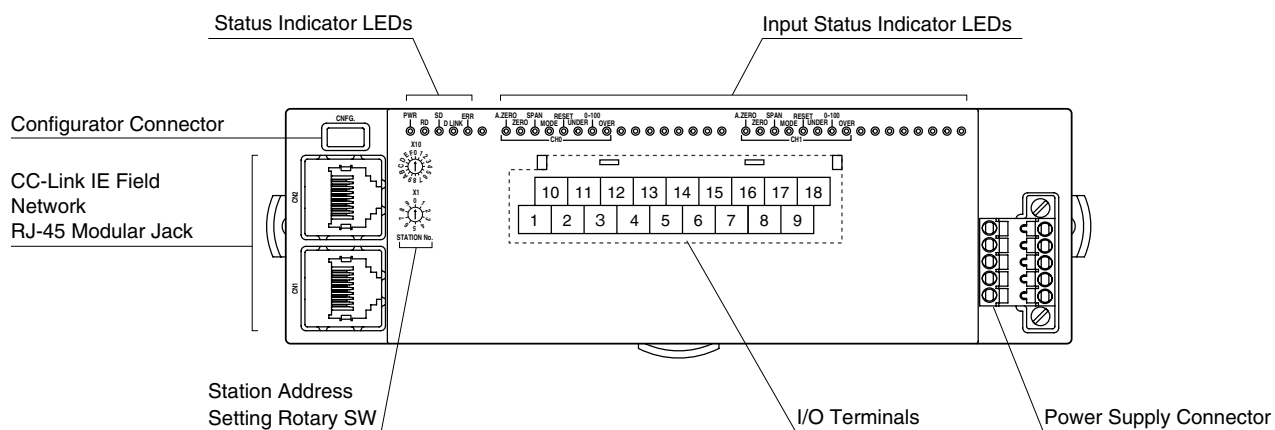
■ WIRING

- Do not install cables close to noise sources (relay drive cable, high frequency line, etc.).
- Do not bind these cables together with those in which noises are present. Do not install them in the same duct.
- Be sure to close the terminal cover for safety.

■ AND

- The unit is designed to function as soon as power is supplied, however, a warm up for 10 minutes is required for satisfying complete performance described in the data sheet.

COMPONENT IDENTIFICATION



■ STATUS INDICATOR LED

ID	COLOR	FUNCTION	STATUS	DESCRIPTION
PWR	Green	Internal power	ON	Normal
			OFF	Abnormal
RUN	Green	Device status	ON	Normal
			OFF	Occurring device error
RD	Green	Receiving Data	ON	Receiving
			OFF	Unreceived data
SD	Green	Sending Data	ON	Sending
			OFF	Unsent
D LINK	Green	Data Link Transmitting	ON	Data link in operation (cyclic transmitting)
			Blink	Data link in operation (stop cyclic transmitting)*1
			OFF	Not in operation, disconnected
ERR	Red	Error	ON	Occurring major error*2
			Blink	Occurring minor error*3
			OFF	Normal

*1. Setting as a reserved station, data link stop, etc.

*2. Upper communication error, internal bus error, non-volatile memory error, etc.

*3. Station no. setting rotary SW has been changed after turning on the power

■ INPUT STATUS INDICATOR LED

ID	COLOR	FUNCTION
A. ZERO	Green	Blink once when auto zero is performed
ZERO	Green	Blink once when zero adjustment is performed
SPAN	Green	Blink once when span adjustment is performed
MODE	Green	OFF at normal output mode ON at monitor output mode
RESET	Green	Blink once when reset offset
UNDER	Green	ON at (input signal $\leq -1\%$)
0-100	Green	ON at ($-1\% < \text{input signal} < 101\%$)
OVER	Green	ON at (input signal $\geq 101\%$)

■ STATION ADDRESS

The upper rotary SW sets the upper digits (MSB), and the lower rotary SW sets the lowest digit (LSB) (configurable range is 1 to 120).

Confirm available station numbers in the manual of the master unit (Factory setting: 01H).



———— For setting MSB of Station No. (×10)



———— For setting LSB of Station No. (×1)

Example of Station No. setting

Characters on Rotary SW for MSB represent; A: 10, B: 11, C: 12.

For example, to set station No. 115, set the SW for MSB to B and SW for LSB to 5.

Do NOT set to D, E, F as they are not in use.

■ I/O TERMINAL ASSIGNMENT

10	11	12	13	14	15	16	17	18
NC	+EXC0	+IN0	NC	V0	+EXC1	+IN1	NC	V1
1	2	3	4	5	6	7	8	9
NC	-EXC0	-IN0	SLD0	C0	-EXC1	-IN1	SLD1	C1

NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	NC	No connection	10	NC	No connection
2	-EXC0	Excitation 0-	11	+EXC0	Excitation 0+
3	-IN0	Input 0-	12	+IN0	Input 0+
4	SLD0	Shield 0	13	NC	No connection
5	C0	Voltage output 0-	14	V0	Voltage output 0+
6	-EXC1	Excitation 1-	15	+EXC1	Excitation 1+
7	-IN1	Input 1-	16	+IN1	Input 1+
8	SLD1	Shield 1	17	NC	No connection
9	C1	Voltage output 1-	18	V1	Voltage output 1+

■ POWER SUPPLY

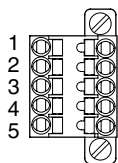
Cable connector: TFMC1,5 / 5-STF-3,5

(Phoenix Contact) (included in the package)

Applicable wire size: 0.2 – 1.5 mm²; stripped length 10 mm

Recommended solderless terminal

- AI0,25-10YE 0.25 mm² (Phoenix Contact)
- AI0,34-10TQ 0.34 mm² (Phoenix Contact)
- AI0,5-10WH 0.5 mm² (Phoenix Contact)
- AI0,75-10GY 0.75 mm² (Phoenix Contact)
- A1-10 1.0 mm² (Phoenix Contact)
- A1,5-10 1.5 mm² (Phoenix Contact)



- | | |
|---------|------------------|
| 1. PWR+ | Power Supply |
| 2. PWR- | Power Supply |
| 3. FE | Functional earth |
| 4. NC | Unused |
| 5. NC | Unused |

Note: The numbers marked on the connector have no relationship to the pin number of the unit.
Wire according to the instruction manual of the unit.

PC CONFIGURATOR

The following parameter items can be configured with PC Configurator Software (model: R7CFG). Refer to the users manual of the software for detailed operations.

■ CHANNEL INDIVIDUAL SETTING

PARAMETER	SETTING RANGE	DEFAULT SETTING
Zero adjustment	-50 to +50%	–
Span adjustment	10% to full scale	full scale
Auto zero	–	–
Reset offset	–	–
Auto scale	0 to 32,000	–
Bias	-320.00 to +320.00 (%)	0.00 (%)
Gain	-3.2000 to +3.2000	1.0000
Zero scale	-32,000 to +32,000	0
Full scale	-32,000 to +32,000	10,000
Load ratio	10.00 to 100.00 (%)	100.00 (%)
Moving average	2, 4, 8, 16, 32, 64, 128, 256, 512, 1024	64
Monitor output	-115.00 to +115.00 (%)	–
Output gain adjustment	-3.2000 to +3.2000	1.0000

■ CHANNEL BATCH SETTING

PARAMETER	SETTING RANGE	DEFAULT SETTING
Excitation	5V, 2.5V	5V
Lowpass filter	2Hz, 2kHz (1Hz)*	2kHz (1Hz)*

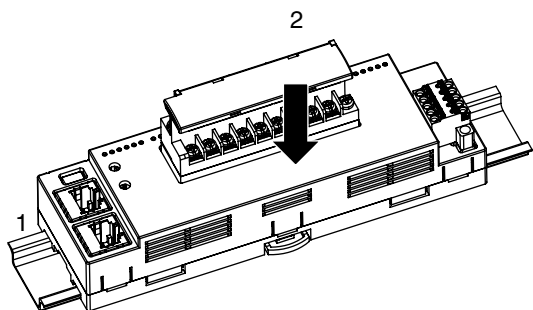
*. Values in () are for the option code: /F1.

MOUNTING INSTRUCTIONS

■ DIN RAIL MOUNTING (PARALLEL)

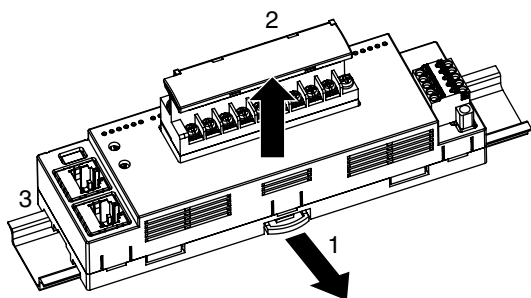
• Mounting

- 1) Set the upper hook at the rear side of the unit on the DIN rail.
- 2) Push in the lower.



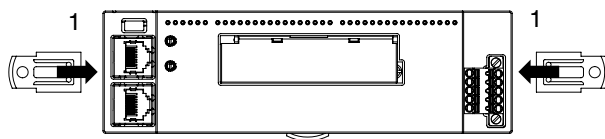
• Dismounting

- 1) Push down the DIN rail mounter slider with tip of a minus screwdriver.
- 2) Pull the lower of the unit.
- 3) Remove the upper hook of the unit from the DIN rail.

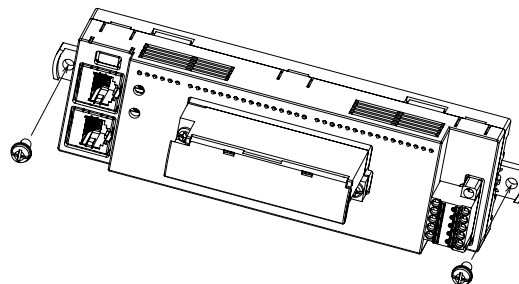


■ SURFACE MOUNTING

- 1) Insert the two surface mounter sliders until it clicks once, as shown below.



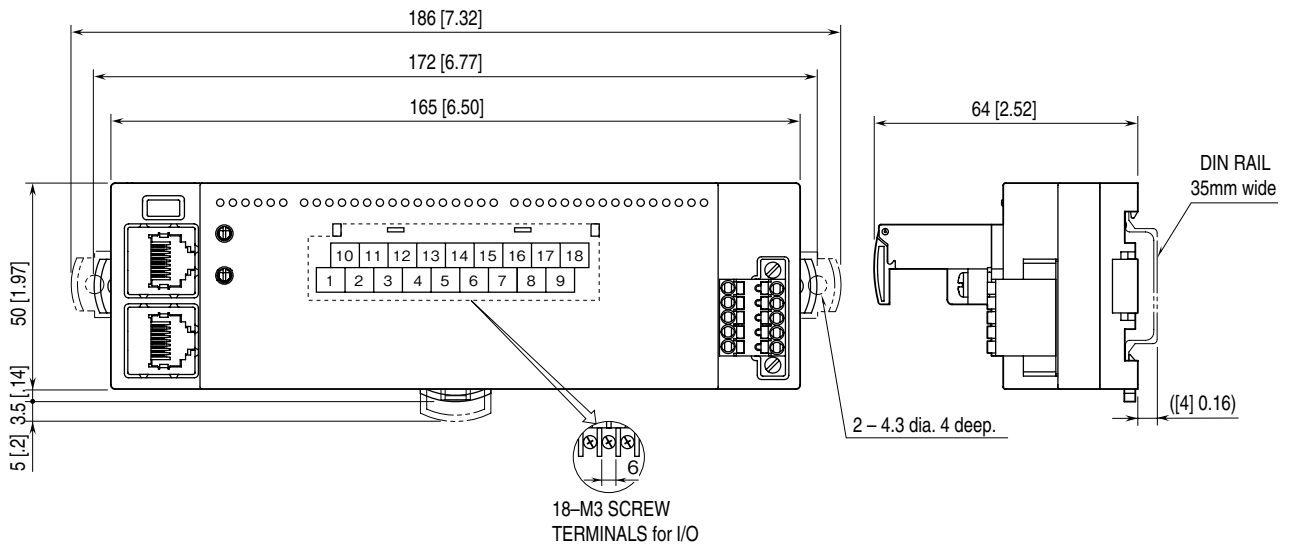
- 2) Mount the unit with M4 screws referring the External Dimensions. (Torque: 1.4 N·m)



TERMINAL CONNECTIONS

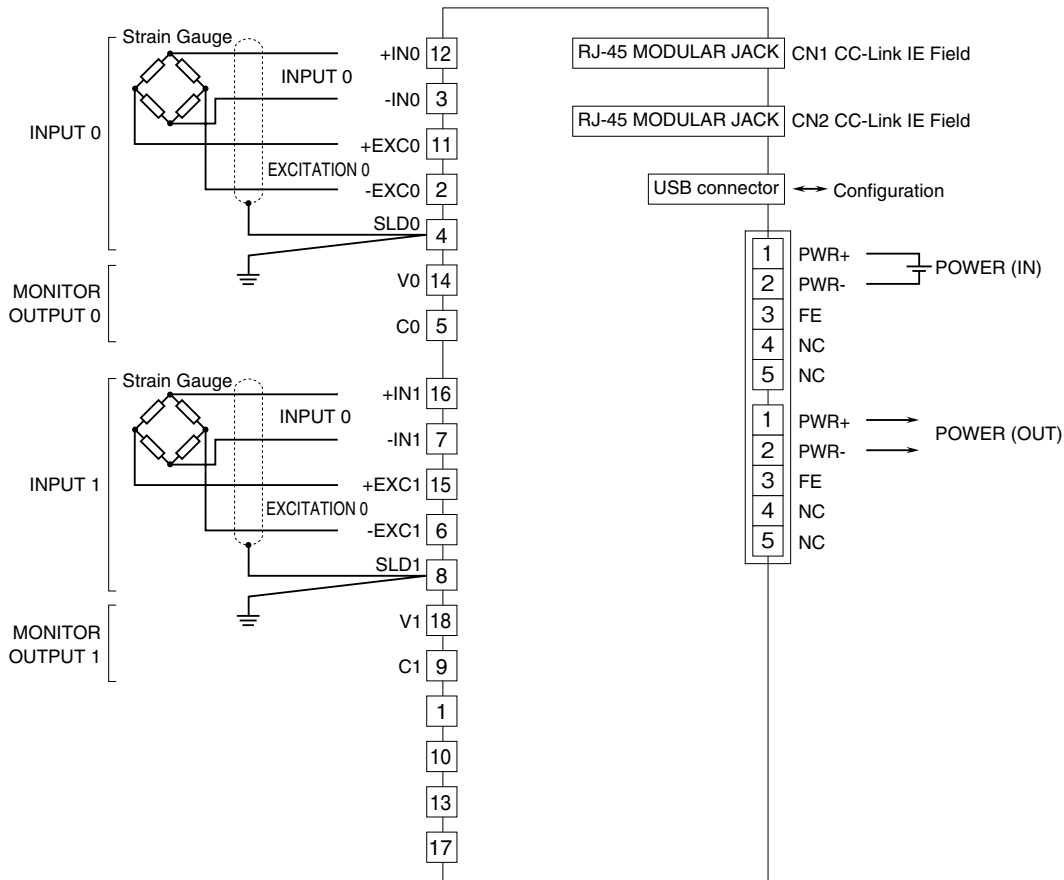
Connect the unit as in the diagram below.

EXTERNAL DIMENSIONS unit: mm [inch]



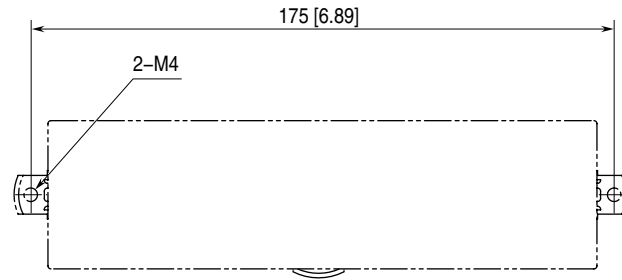
CONNECTION DIAGRAM

Note: In order to improve EMC performance, bond the FE terminal to ground.
Caution: FE terminal is NOT a protective conductor terminal.



Regarding CN1 and CN2 of RJ-45 connector for CC-Link IE Field network, there is no restriction for connection order.

MOUNTING REQUIREMENTS unit: mm [inch]



WIRING INSTRUCTIONS

■ TORQUE

Wiring screw for separable terminal: 0.5 N·m

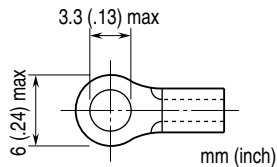
Fixing screw for separable terminal: 0.5 N·m

■ SOLDERLESS TERMINAL

Refer to the drawing below for recommended ring tongue terminal size. Spade tongue type is also applicable.

Applicable wire size: 0.25 to 1.65 mm² (AWG 22 to 16)

Recommended manufacturer: Japan Solderless Terminal MFG. Co., Ltd, Nichifu Co., Ltd



■ HOW TO UNMOUNT THE SEPARABLE TERMINAL

The separable terminal of the unit is 2 piece constructions. It is possible to remove the terminal by loosening two screws of terminal alternately.

CC-Link IE Field COMMUNICATION

Protocol: IEEE 802.3

Transmission type: 1000BASE-T

Communication speed: 1 Gbps

Network cable: Cable conformed to CC-Link IE Field

Double shielded twist pair cable (CAT5e)

RJ-45 connector

Network topology: Line, star and ring

Max. number of stations: 120 (Total slave stations)

(Number of max. connectable slaves may vary depending on the master module. Refer to the instruction manual of the master module)

Max. station-to-station distance: 100 m

Station type: Remote device station

Link device: RX/Ry 16 points, RWw/RWr 16 points

NetWork No.: 1 to 239 (factory default: 1)

Synchronous communication: Available

TRANSMISSION DATA DESCRIPTIONS

■ REMOTE REGISTER

• INPUT DATA (RW_r)

The figure below shows the data sent from the device to the master.

	15	0
RW _r (n+0)	Total input data *1	
+1	CH0 input data	
+2	CH1 input data	
+3	CH0 setting command (Read back)	
+4	CH1 setting command (Read back)	
+5	Unused	
+6	Unused	
+7	Unused	
+8	Unused	
+9	Unused	
+10	Unused	
+11	Unused	
+12	Unused	
+13	System reservation	
+14	Unused	
+15	Unused	

*1. Total input data: Sum of input 0 and input 1

• OUTPUT REGISTER (RW_w)

The figure below shows the data received from the master.

	15	0
RW _w (n+0)	Unused	
+1	CH0 setting data	
+2	CH1 setting data	
+3	CH0 setting command	
+4	CH1 setting command	
+5	Unused	
+6	Unused	
+7	Unused	
+8	Unused	
+9	Unused	
+10	Unused	
+11	Unused	
+12	Unused	
+13	System reservation	
+14	Unused	
+15	Unused	

■ REMOTE I/O SIGNAL

• REMOTE INPUT (RX)

The figure below shows the data sent from the device to the master.

	15	0
RX (n+0)	0 Unused	
	1 Unused	
	2 Unused	
	3 Unused	
	4 Unused	
	5 Unused	
	6 Unused	
	7 Unused	
	8 Unused	
	9 Unused	
	A Unused	
	B Remote READY	
	C Unused	
	D Unused	
	E Unused	
	F Unused	

• REMOTE OUTPUT (RY)

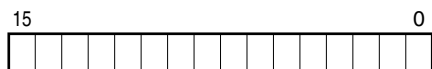
The figure below shows the data received from the master.

	15	0
RY (n+0)	0 Unused	
	1 Unused	
	2 Unused	
	3 Unused	
	4 Unused	
	5 Unused	
	6 Unused	
	7 Unused	
	8 Unused	
	9 Unused	
	A Unused	
	B Unused	
	C Unused	
	D Unused	
	E Unused	
	F Unused	

I/O DATA DESCRIPTIONS

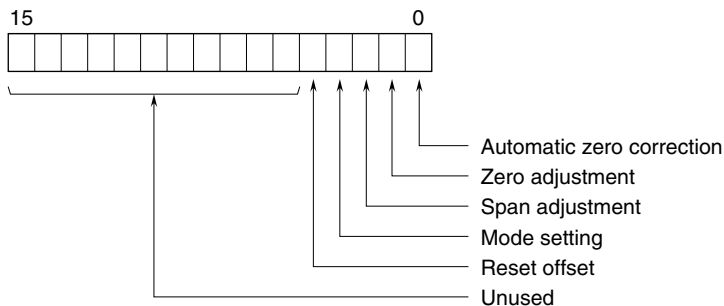
Scaling of analog input module is configurable with the configurator software (model: R7CFG). Refer to the software manual for details.

■ ANALOG I/O UNIT



Data is represented in 16-bit binary.
Negative value is represented in 2's complements

■ LC2 SETTING COMMAND DETAILS



■ AUTOMATIC ZERO CORRECTION

Set the offset input value. Perform automatic zero correction setting after Zero/Span adjustments. The procedures are as follows.

- 1) Apply desired offset input value to the sensor.
- 2) Set "1" to Automatic zero correction bit. When the offset is completed, A.ZERO LED turns on.
- 3) After checking the LED, set "0" to Automatic zero correction bit.

■ ZERO ADJUSTMENT

Adjust input zero point. The procedures are as follows.

- 1) Apply 0% load to the sensor.
- 2) Set "1" to Zero adjustment bit. When the adjustment is completed, ZERO LED turns on.
- 3) After checking the LED, set "0" to Zero adjustment bit.

■ SPAN ADJUSTMENT (with actual load)

Adjust input span point with the actual load. The procedures are as follows.

- 1) Apply actual 100% load to the sensor.
- 2) Set "1" to Span adjustment bit. When the adjustment is completed, SPAN LED turns on.
- 3) After checking the LED, set "0" to Span adjustment bit.

■ LOAD COEFFICIENT

Adjust input Span point by setting load coefficient without applying 100% actual load. The followings are an example of adjustment with 20 % load.

- 1) Apply 20% load of the actual load to the sensor.
- 2) Set the value equivalents to 20% of the scaling value to Input set data area. (scaling value setting: 2000 for 0 to 10000)
- 3) Set "1" to Span adjustment bit. When the adjustment is completed, SPAN LED turns on.
- 4) After checking the LED, set "0" to Span adjustment bit.

MODE SETTING

Select measuring mode or monitor output mode.

- Measuring mode

Set "0" to Mode setting bit to enter measuring mode. In measuring mode, monitor output is linked with input data.

- Monitor output mode

Set "1" to Mode setting bit to enter monitor output mode.

In monitor output mode, values at set data area of each input are outputted at the Mode setting bit is changed to "1".

Set values at set data area are displayed in Input data area and inputs are disabled.

The followings are setting procedures of 20% monitor output for Input 0.

- 1) Set the value equivalent to 20% of the scaling value to Input 0 set data area. (scaling value setting: 2000 for 0 to 10000)
- 2) Set "1" to Mode setting bit. When the setting is completed, MODE LED turns on and 20% of Input 0 is outputted from monitor output terminal.
- 3) After checking the output, set "0" to Mode setting bit to return to measuring mode.

RESET OFFSET

Reset the offset value set by Automatic zero correction to zero. The procedures are as follows.

- 1) Set "1" to Reset offset bit. When the reset is completed, RESET LED turns on.
- 2) After checking the LED, set "0" to Reset offset bit.

SETTING (NORMAL MODE)

■ SUMMARY

This section explains the setting of the unit on the premise of using GX Works3 made by Mitsubishi Electric (hereinafter called “GX Works3”).

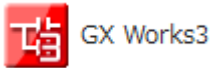
■ REGISTRATION OF PROFILE

R7I4DCIE-LC2-9 supports CC-Link Family system profile (hereinafter called “CSP+”).

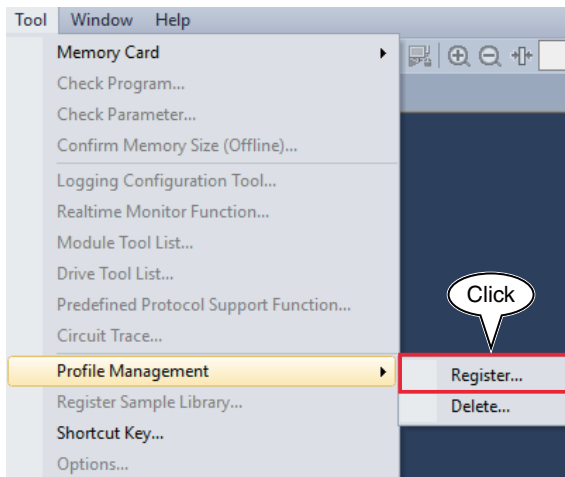
CSP+ is downloadable at our web site or CC-Link Association Home page, <https://www.cc-link.org>.

* It is not necessary to register CSP+. If you skip this procedure, start from [2. CONSTRUCTION OF SYSTEM].

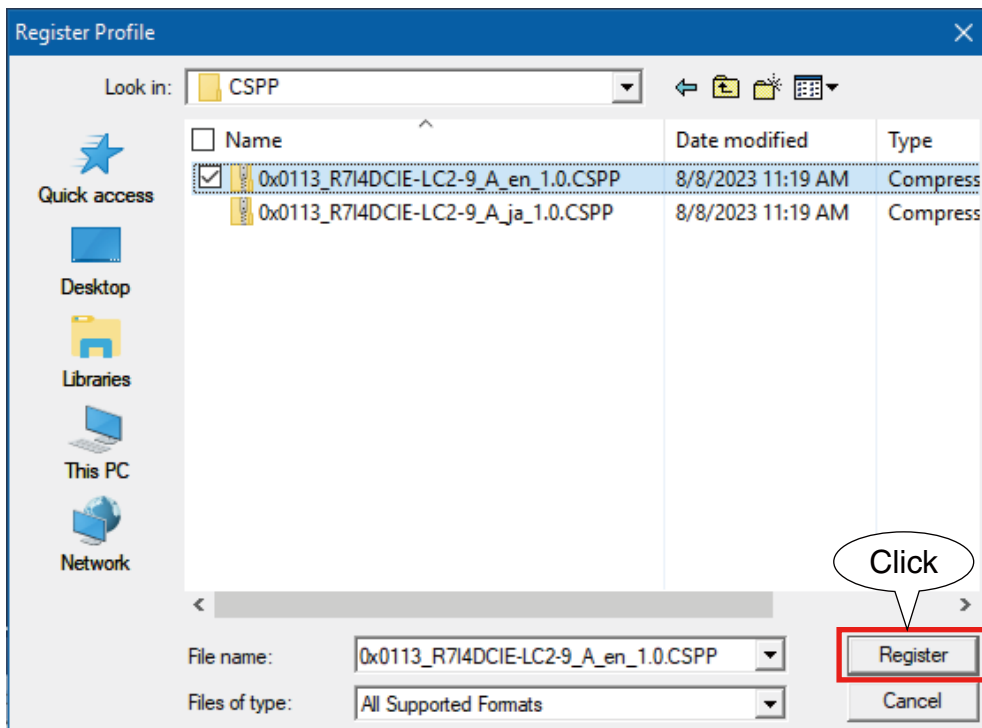
1) Start GX Works3.



2) Click [Tool] → [Profile Management] → [Resister].

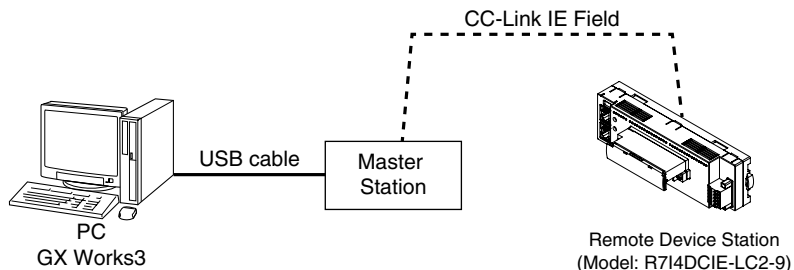


3) Select the downloaded CSP+ file, and click [Register] to finish registration.



■ CONSTRUCTION OF SYSTEM

Here is an example of the configuration of a line connection.



1) Connect Master station and Remote Device Station (model: R7I4DCIE-LC2-9) with Ethernet Cable.

Make sure to turn off the power of each unit before wiring. CN1 and CN2 of modular jack RJ-45 for CC-Link IE Field Network have no limit of wiring connection order.

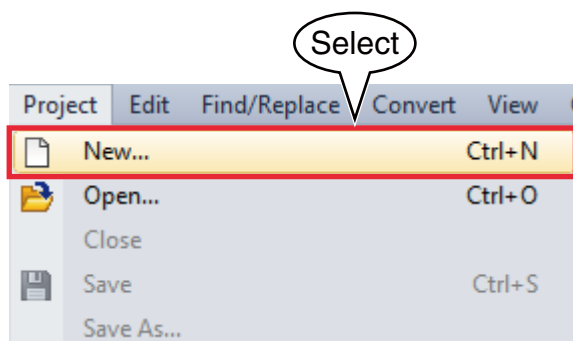
2) After finishing wiring, turn on the power of each unit.

■ CREATION OF PROJECT

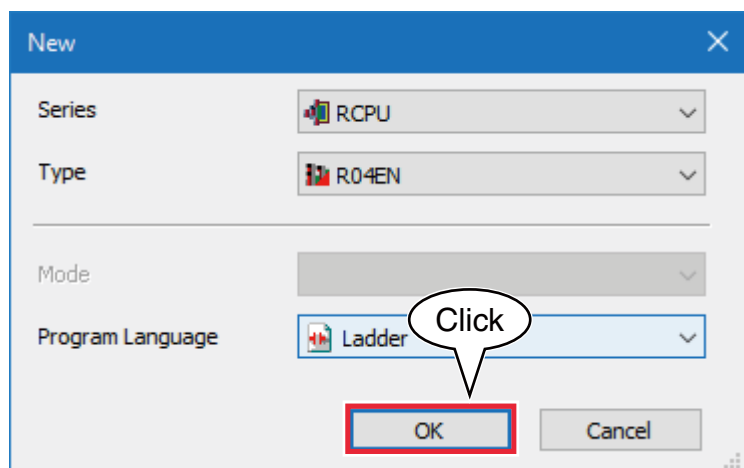
Connect the PC and the master Station, and create a project of the master station by GX Works3 installed on the PC.

1) Start GX Works3.

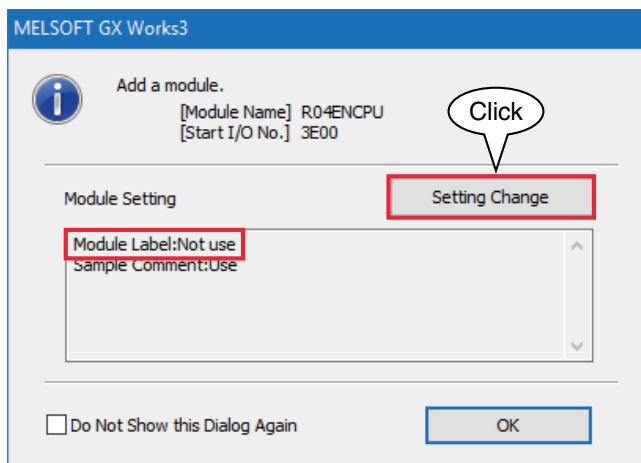
2) Click [Project] → [New] to create a new project.



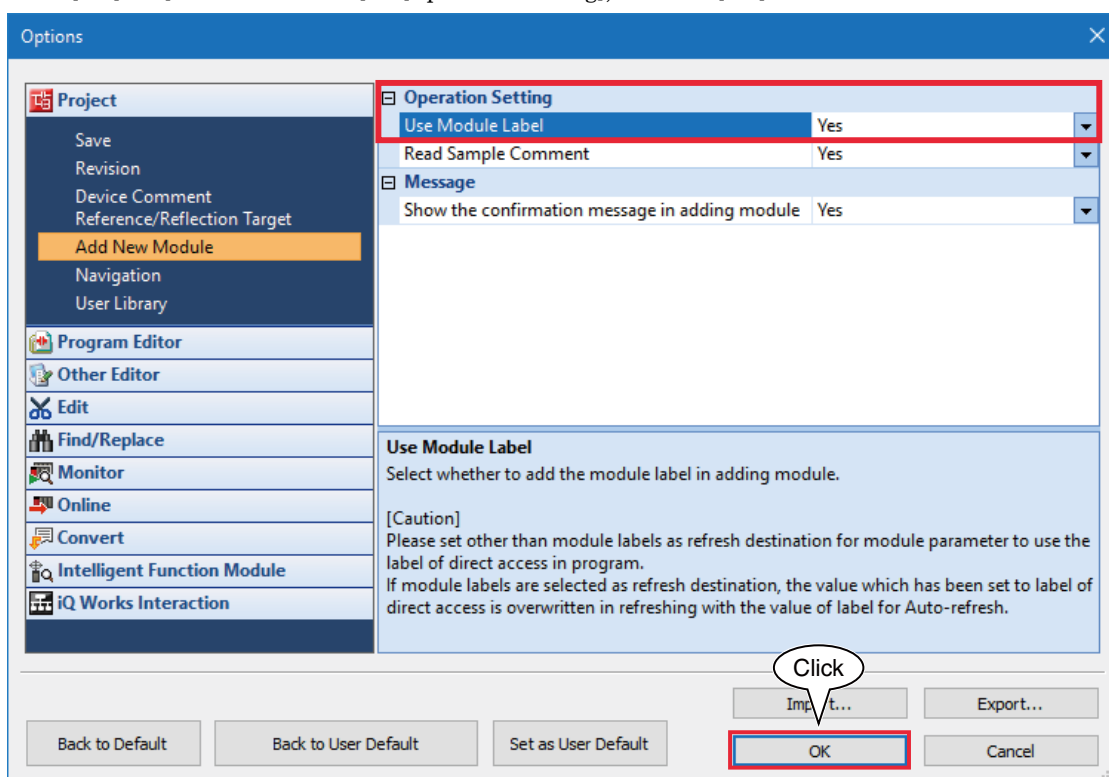
3) Select [Series], [Type] and [Program Language] of the PLC from each pull-down menu, and click [OK].



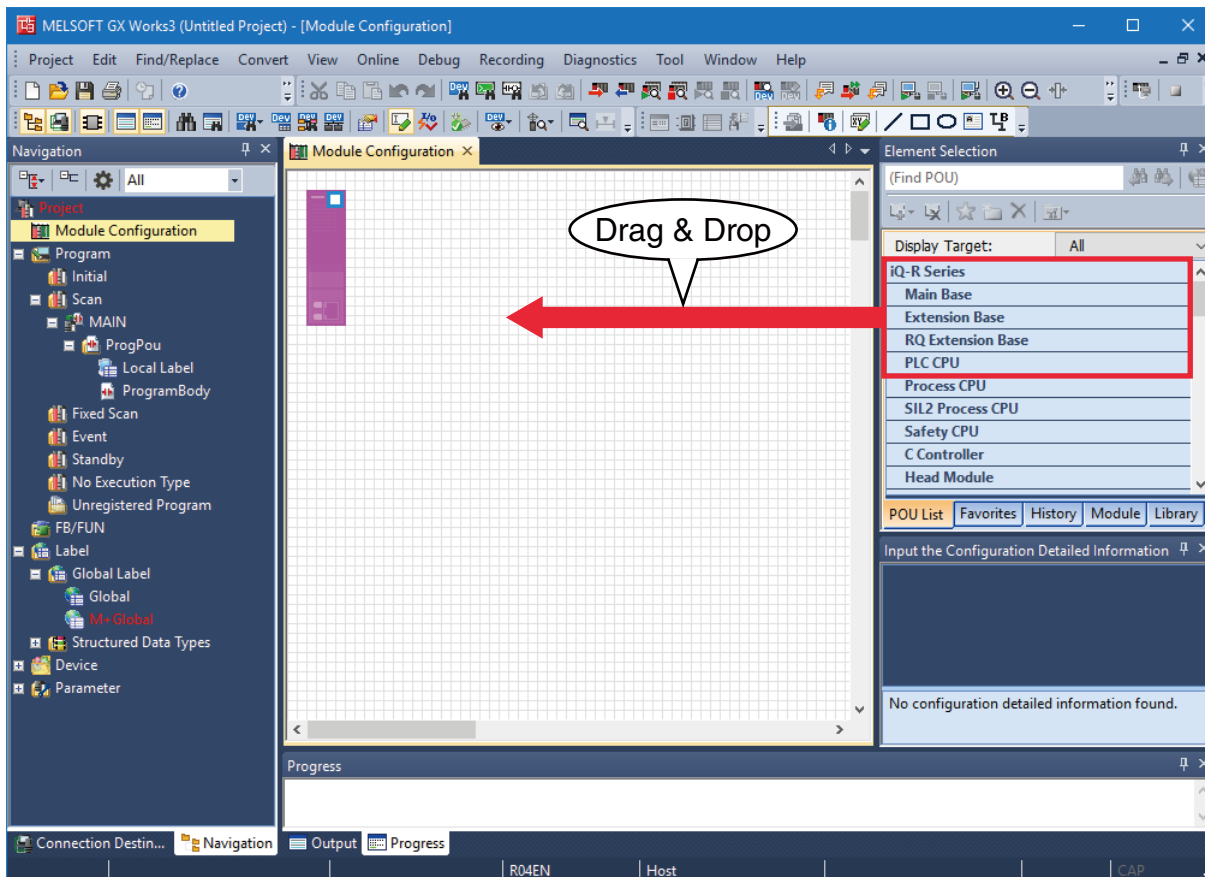
- 4) In the following window, when [Module Label: Not use] is displayed in Module Setting, click [Setting Change] to open the option window, and change to [Use].



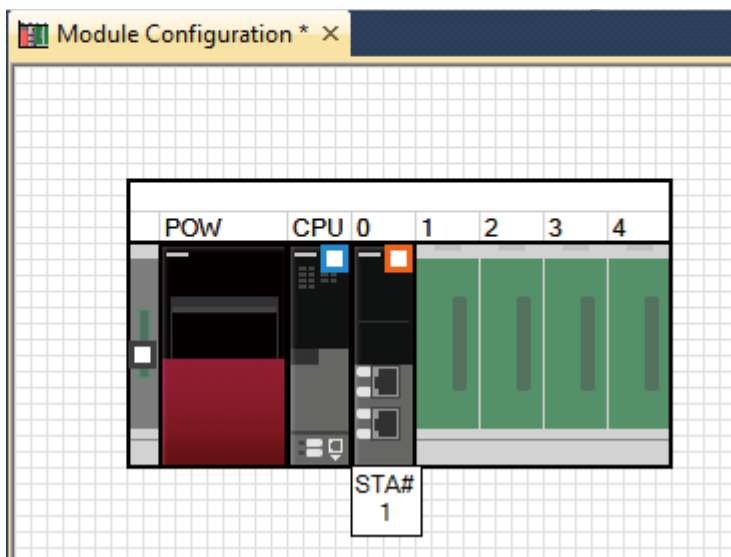
- Select [Yes] for [Use Module Label] in [Operation Setting], and click [OK].



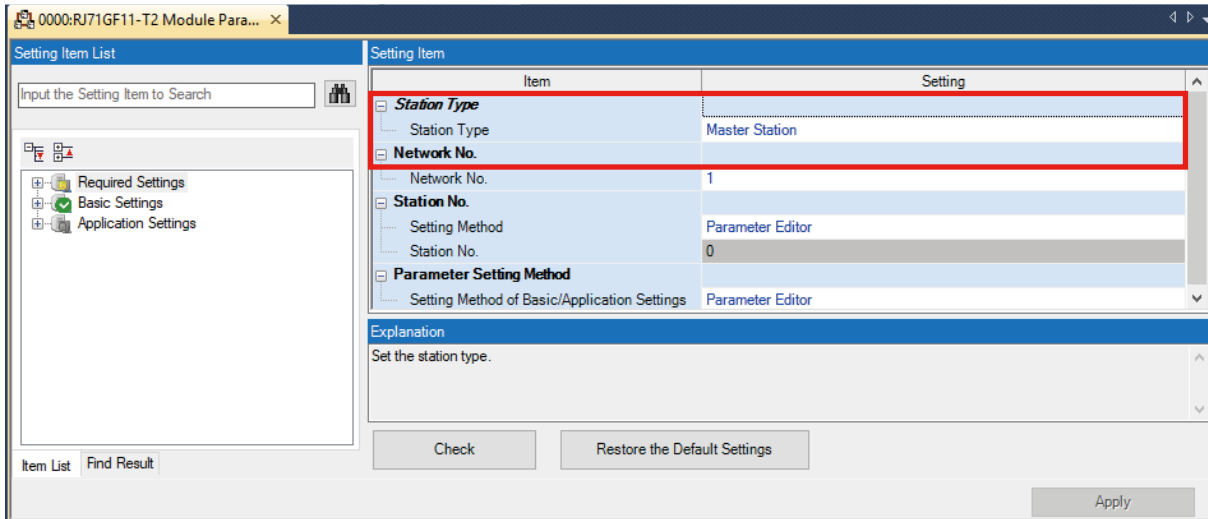
- 5) Double click [Module Configuration] in the Navigation window to open the [Module Configuration] window. According to the real PLC configuration, select the module from [POU List] of the [Element Selection] window, and drag and drop it to the module configuration diagram.



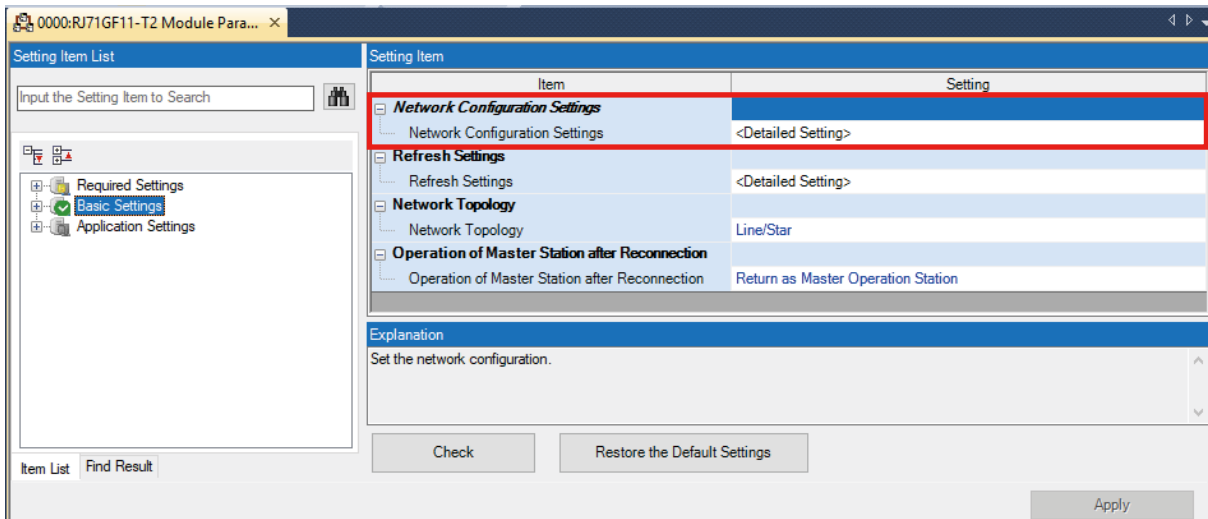
- 6) Double click [CC-Link IE TSN network module] to open the parameter setting window.



7) Set Station Type to [Master Station], Network No. to 1 in [Required Settings].

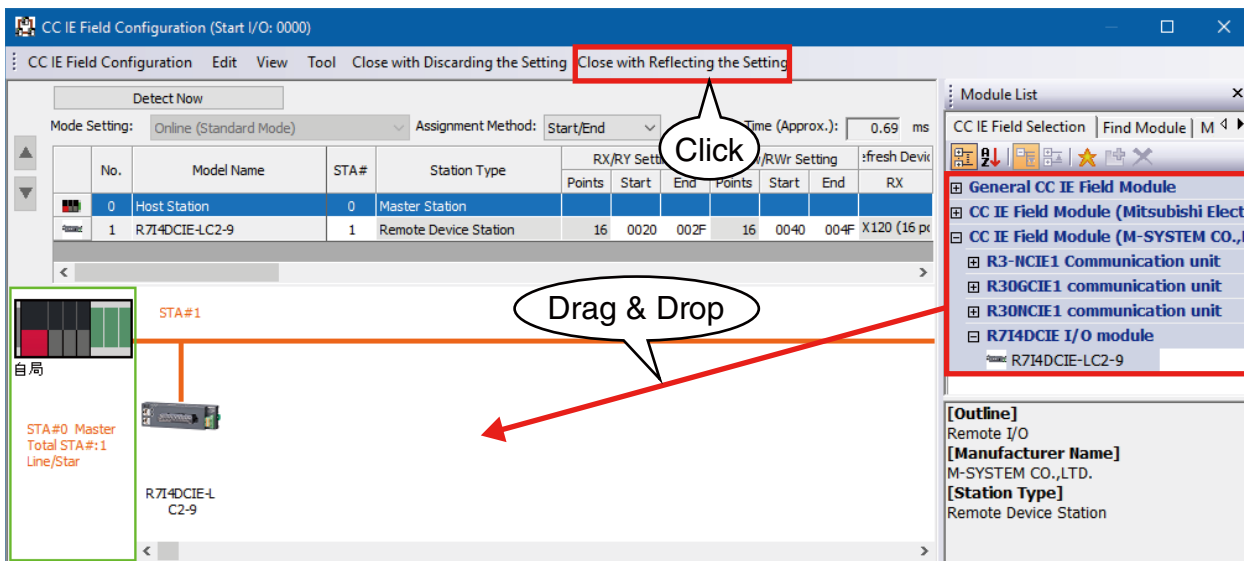


8) Click <Detailed Setting> of [Network Configuration Settings] in [Basic Settings] to display the [CC IE TSN Configuration] window

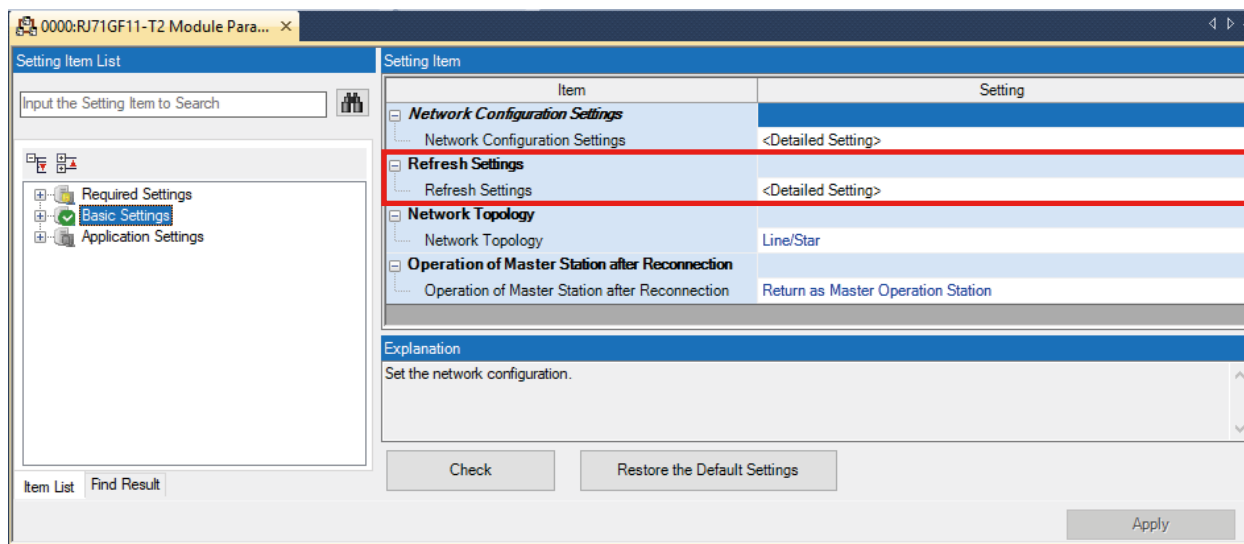


According to the real system configuration, select the device from [Module List], and drag and drop it to the device configuration diagram. Click [Close with Reflecting Setting].

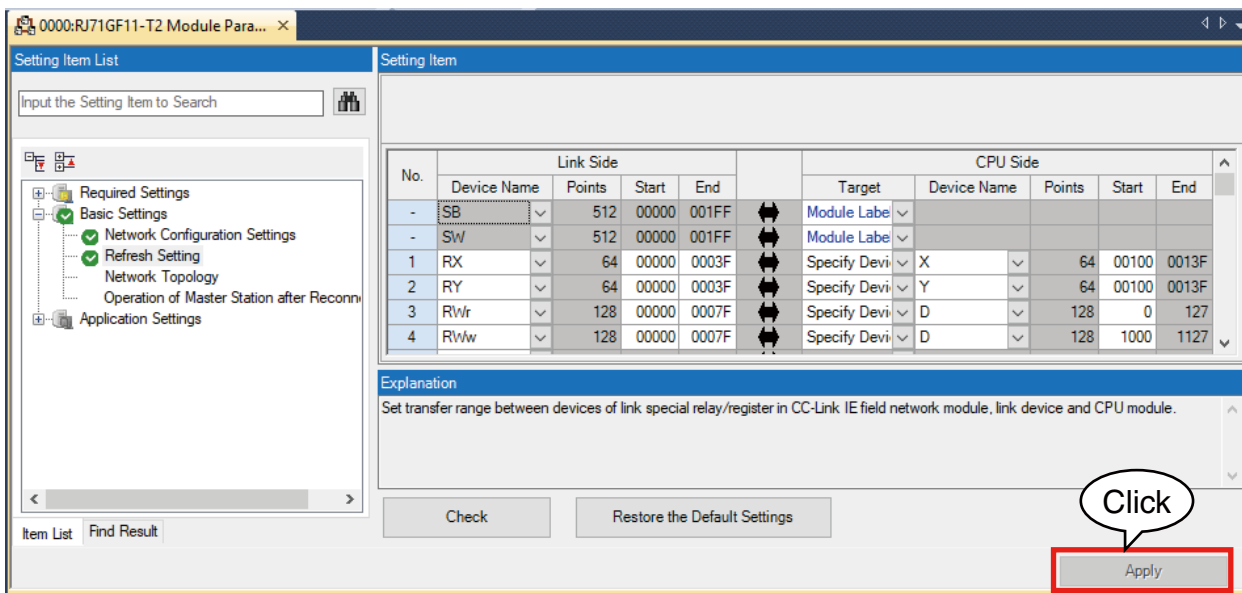
* When CSP+ not registered, select [General CC IE TSN Module].



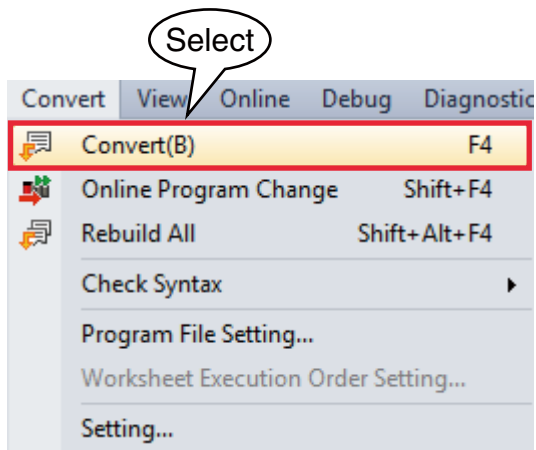
9) Click <Detailed Setting> of [Refresh Setting] to display the Refresh Setting window



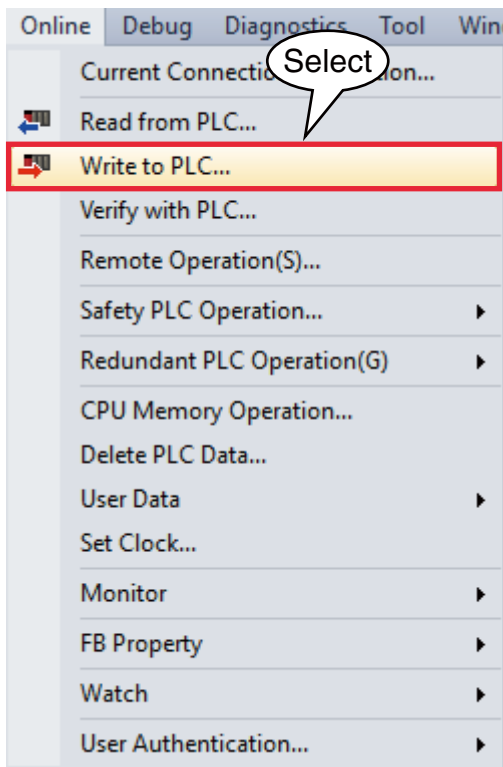
Assign link devices RX/RX/RWr/RWw to devices of the CPU unit, click [Apply] to close the window.



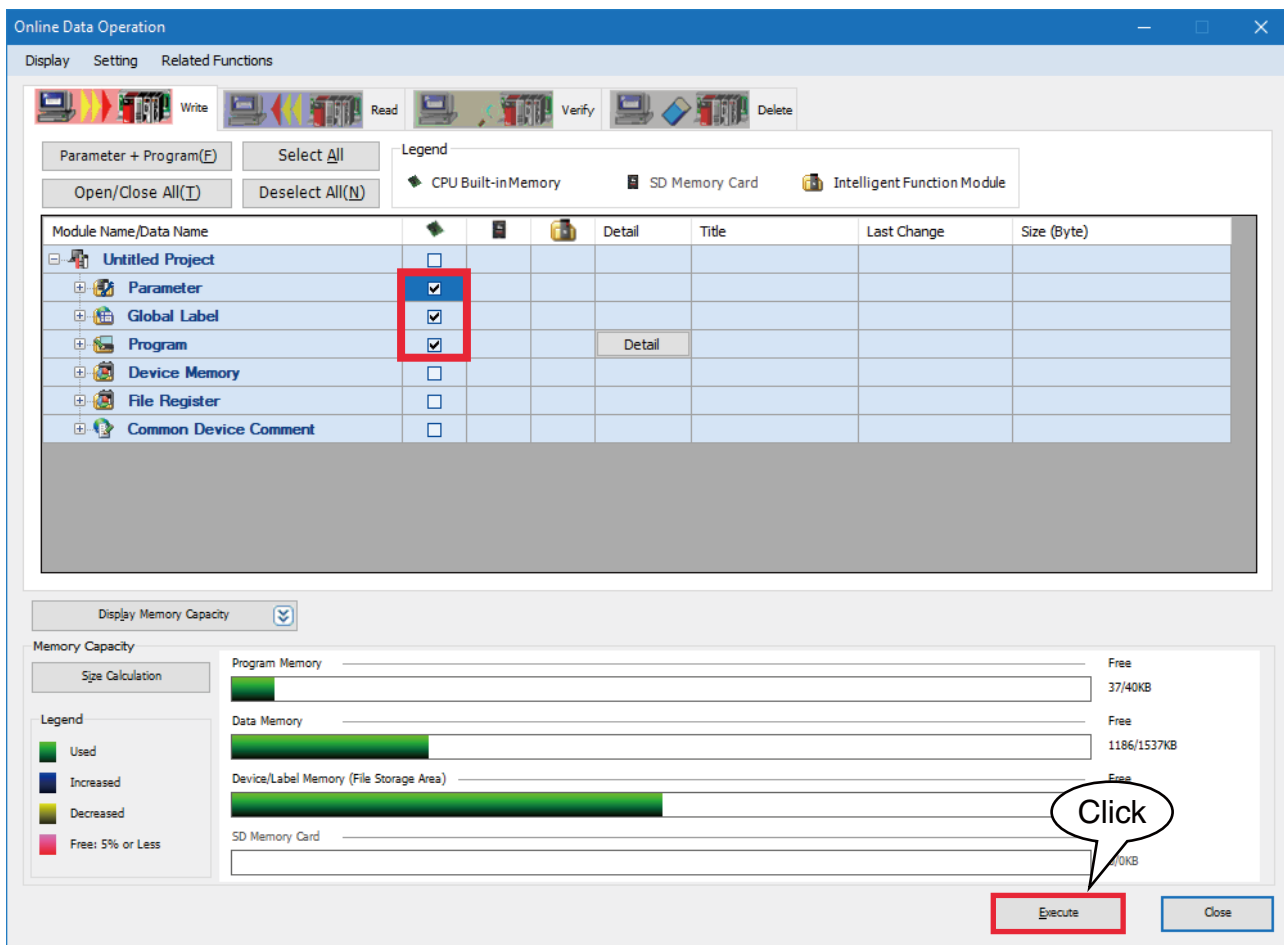
10) Click [Convert] → [Convert] to execute conversion.



11) Click [Write to PLC...] in [Online] on menu bar to open [Online Data Operation] window.



Check necessary items, and click [Execute].



SETTING (SYNCHRONOUS COMMUNICATION MODE)

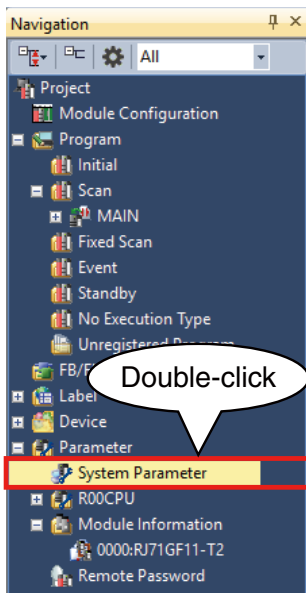
The R714DCIE-LC2-9 supports CC-Link IE Field Inter-module Synchronization function.

Assuming that the project has been created in the previous section, the setup for synchronous communication mode is described below.

Note: Refreshing must be executed before and after the inter-module synchronous interrupt program(I44).

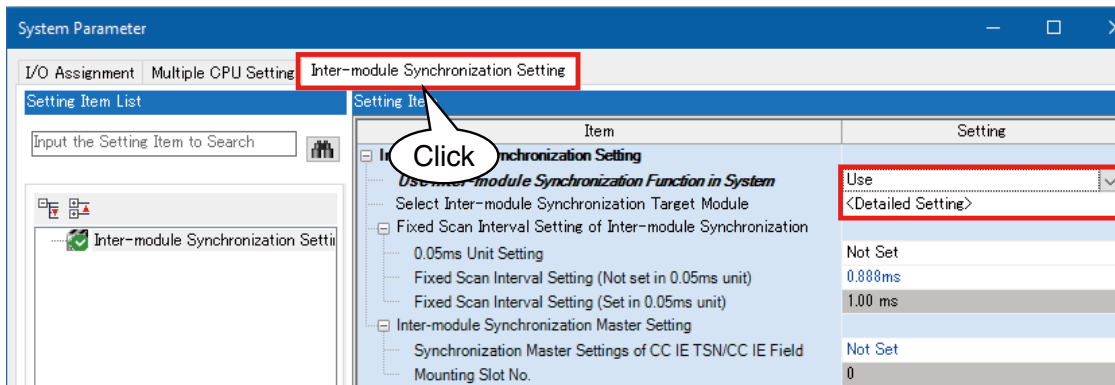
Refer to the reference manual of the master module.

1) Double-click [System Parameter] in [Parameter] on Navigation window.

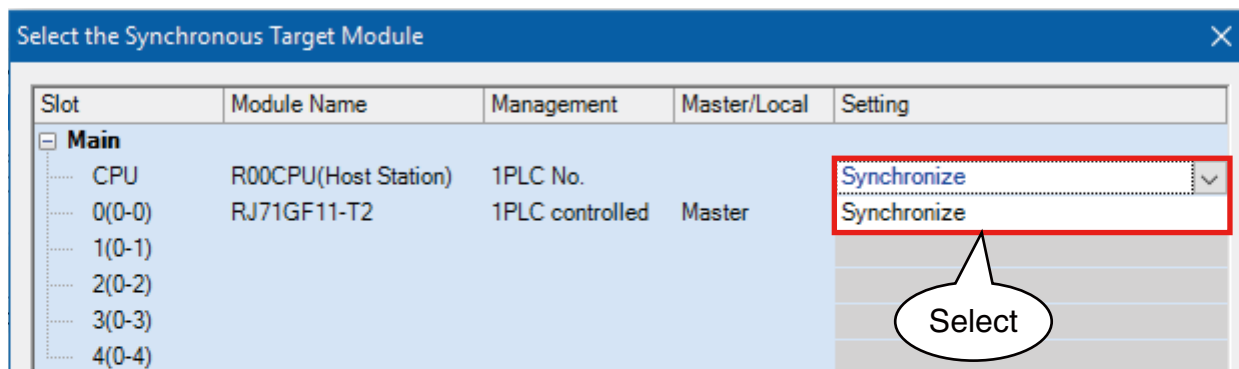


2) Click [Inter-module Synchronization Setting] tab.

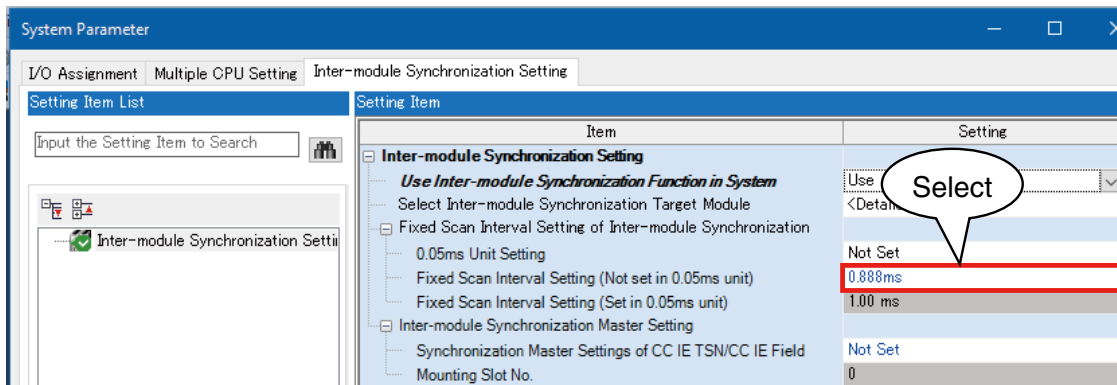
Select [Use] for [Use Inter-module Synchronization Function in System].



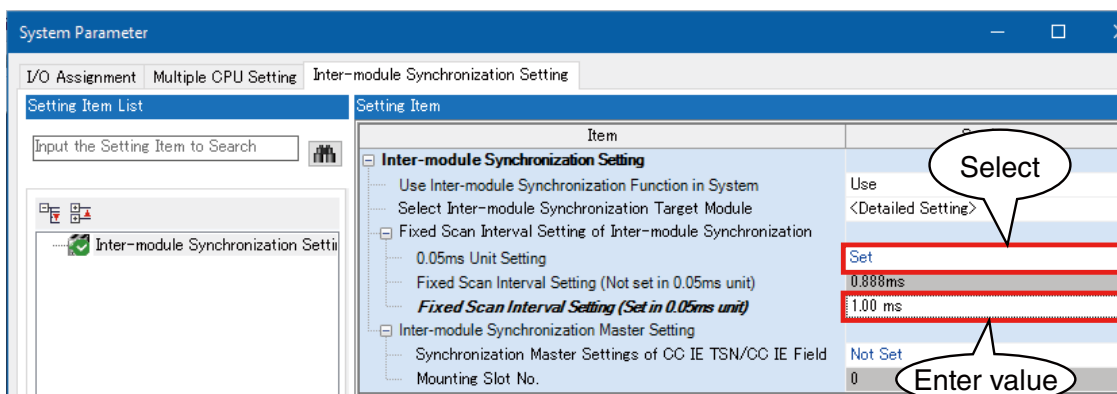
3) Click [Detailed Setting] in [Select Inter-module Synchronization Target Module] and select [Synchronize] for the module to synchronize. Click [OK] to close the window.



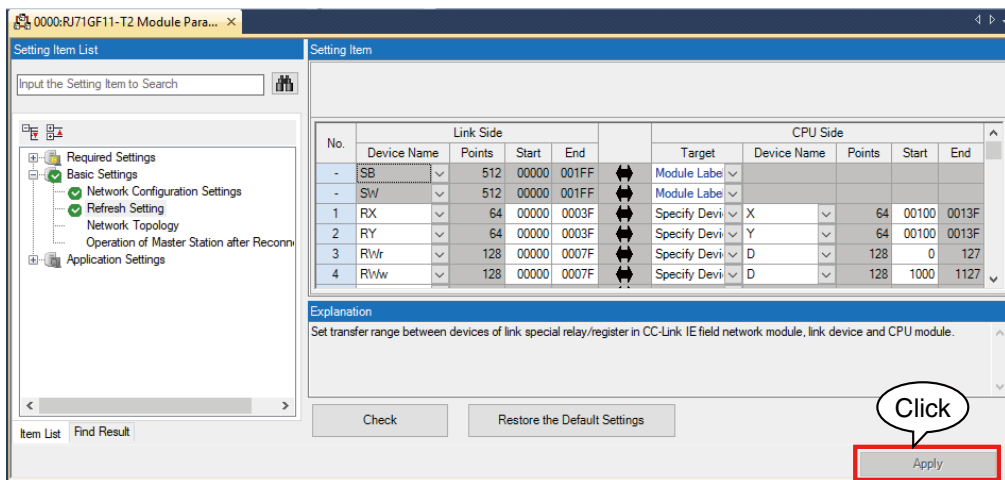
4) When the [Fixed Scan Interval Setting of Inter-module Synchronization] is not set in 0.05 ms unit, select setting value from the pull-down menu in [Fixed can Interval Setting (Not set in 0.05 ms unit)].



5) When the [Fixed Scan Interval Setting of Inter-module Synchronization] is set in 0.05 ms unit, select [Set] in [0.05 ms Unit Setting] then enter the setting value to [Fixed Scan Interval (Set in 0.05 ms Unit)].

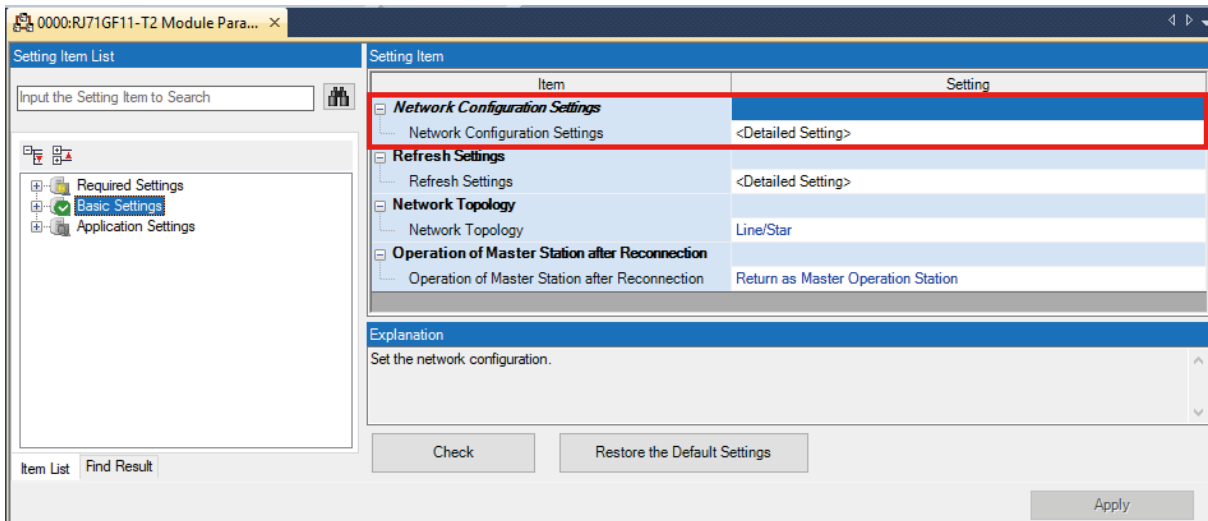


6) Click [OK] to close System Parameter window.



7) Open CC-Link IE Field Parameter Setting Window.

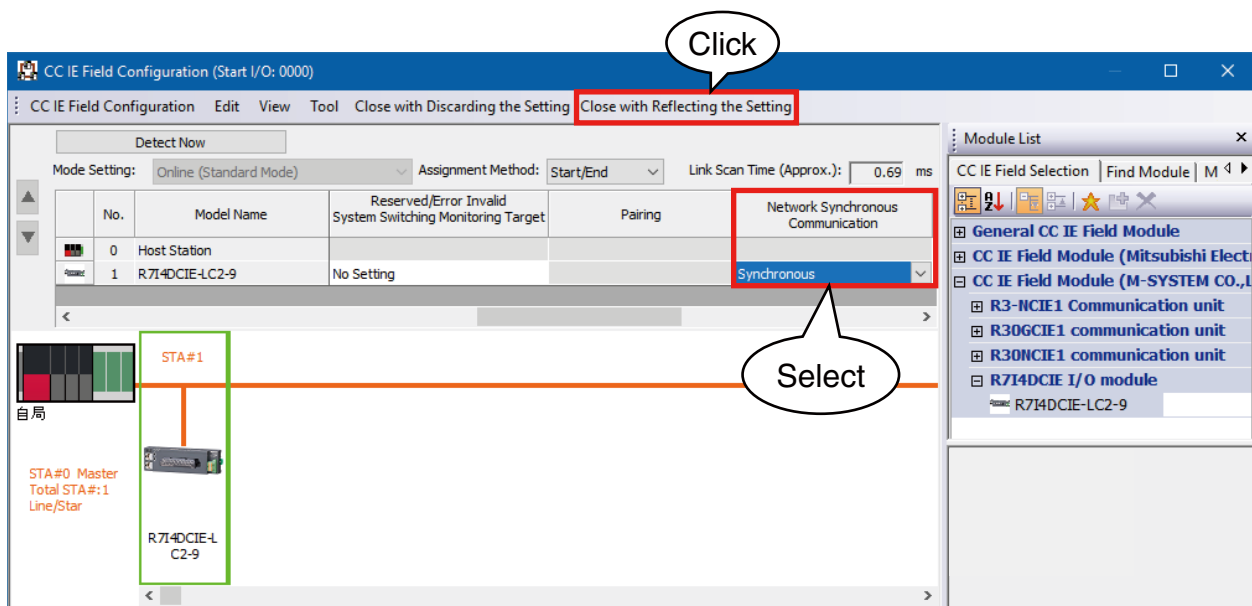
Click <Detailed Setting> in [Network Configuration Setting] to open [CC IE Field Configuration] window.



8) Select [Synchronous] in [Network Synchronous Communication].

Click [Close with Reflecting the Setting] to close the window.

Click [Apply] on [CC IE Field Configuration] window to close.



Write to the sequencer according to the procedure described in the previous section 10) or later.