INSTRUCTION MANUAL

NETWORK INTERFACE MODULE
(CC-Link IE Field network)

MODEL **R3-NCIE1**

BEFORE USE ....

Thank you for choosing M-System. 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 M-System's Sales Office or representatives.

■ PACKAGE INCLUDES:

Network interface module .....(1)

■ 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.

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.

■ HOT SWAPPABLE MODULES

- The module can be replaced while the power is ON. Be sure to replace it when the module is not communicating with a host, as it may affect the system. Replacing multiple modules at once may greatly change line voltage levels. We highly recommend to replace them one by one.

■ GENERAL PRECAUTIONS

- DO NOT set the switches while the power is supplied. The switches are used only for maintenance without the power.

■ 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 attach the terminal cover for safety.

INSTALLATION

Use the Installation Base Model R3-BS, or Model R3-BSW for free I/O address capability.

Before mounting the Network Interface Module onto the Base, be sure to configure the module as explained below.

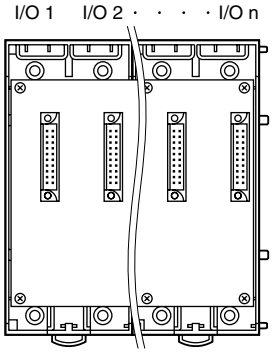
■ DATA ALLOCATION

The setting determines the data area size assigned to each I/O module mounted on the base.
The data sent/received via CC-Link IE Field is mapped according to this setting.
See "COMPONENT IDENTIFICATION" and "TRANSMISSION DATA DESCRIPTIONS".

■ STATION No., ETC.

See "COMPONENT IDENTIFICATION".

■ NETWORK SLOTS ON THE BASE

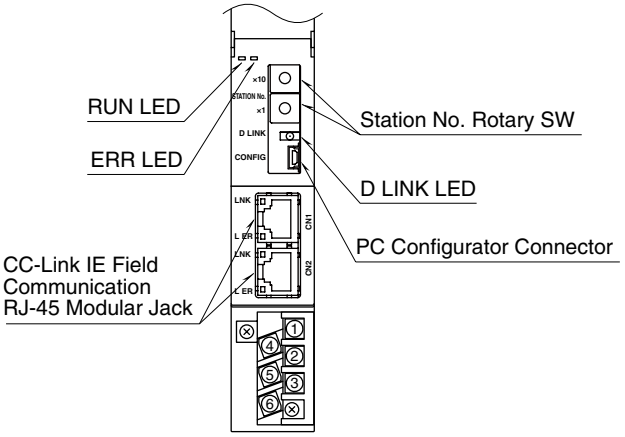


With Model R3-BS base, mount the I/O Modules from the left end (I/O 1) to the right in order that the Network Module assigns data areas from I/O 1.
Network Module(s) and Power Module are mounted basically at the right end though technically they could be mounted in any position.

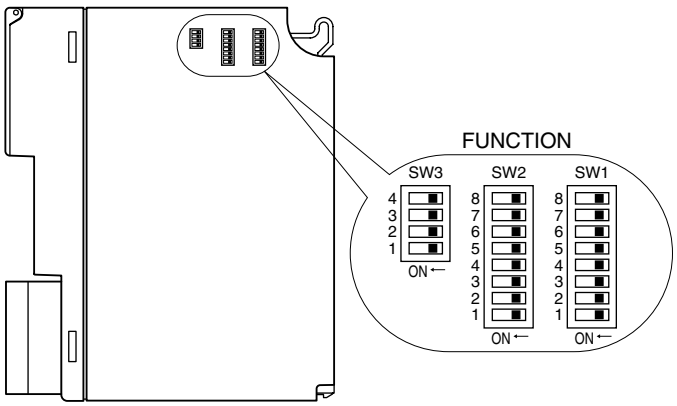
With Model R3-BSW base, there is no limitation in mounting positions as I/O address can be assigned freely to each module using rotary switches equipped on the base.

COMPONENT IDENTIFICATION

■ **FRONT VIEW**

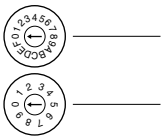


■ **SIDE VIEW**



■ STATION NO. SETTING ROTARY SW

The upper side of station No. setting rotary SW set MSB, and the down side of it set LSB. (configurable range is 1 to 120)
Confirm configurable station number in the manual of master unit (Factory setting: 01H).



e.g. Setting station No.
Rotary SW of setting station MSB, Indicating A: 10, B: 11, C: 12. For example, in the case of setting station No. 115, Set the Station MSB: B and LSB: 5.
NOT allowed to Set D, E, F they are unused.

■ SIDE DIP SW

(*) Factory setting

• Data Allocation: SW1, SW2

Data Allocation Type* must be assigned to each I/O module position to specify how many data areas (four types) are to be occupied by each.
Two bits from SW1 and SW2 are assigned to each position, and data areas can be specified from the module No. 1 through 8. Setting for No. 9 and later modules is identical to No. 8.

SW ASSIGNMENT		MODULE NO.
SW1-1	SW1-2	1
SW1-3	SW1-4	2
SW1-5	SW1-6	3
SW1-7	SW1-8	4
SW2-1	SW2-2	5
SW2-3	SW2-4	6
SW2-5	SW2-6	7
SW2-7	SW2-8	8
SW SETTING		DATA ALLOCATION
OFF	OFF	1
ON	OFF	4
OFF	ON	8
ON	ON	16

* Refer to the specifications of the related series for the Data Allocation Type of I/O modules.

• Dual Communication: SW3-1

When two network modules are mounted, one must be 'Main' (OFF) network and the other must be 'Sub' (ON) network. For single communication, the network module must always be set to 'Main' (OFF).

SW	DUAL COMMUNICATION	
	MAIN (*)	SUB
SW3-1	OFF	ON

• Input Error Data: SW3-2

Hold: When the communication from an input module is lost due to the input module error, the network module holds the signal and stands by until the communication recovers.
Set to '0': When the communication from an input module is lost due to the input module error, the network module outputs '0.'

SW	INPUT ERROR DATA	
	HOLD (*)	SET '0'
SW3-2	OFF	ON

Note: Be sure to set unused SW3-3 and 3-4 to OFF.

■ **STATUS INDICATOR LED**

ITEM	ID	COLOR	FUNCTION	STATUS	DESCRIPTION
Status Indicator	RUN	Green	Device State	ON	Normal
				OFF	Occurring device error
	D LINK	Green	Data Link Transmitting	ON	Data link in operation (cyclick transmitting)
				Blinking	Data link in operation (stop cyclick transmitting)*1
				OFF	Not in operation, disconnected
	ERR	Red	Error	ON	Occurring major error*2
				Blinking	Occuring minor error*3
				OFF	Normal
CN1	LINK	Green	CN1 Linking Up	ON	Linking up
				OFF	Link-down
	L ER	Red	CN1 Receiving Data	ON	Abnormality receiving data, loopback in operation
				OFF	Normality receiving data, loopback not in operation
CN2	LINK	Green	CN2 Linking Up	ON	Linking up
				OFF	Link-down
	L ER	Red	CN2 Receiving Data	ON	Abnormality receiving data, loopback in operation
				OFF	Normality receiving data, loopback not in operation

*1. Setting as a reserved station, data link stop, etc.
*2. Upper communication error, and internal bus error etc.
*3. Non-volatile memory error, or station no. setting rotary SW has been changed after turning on the power.

PC CONFIGURATOR

The following parameter items can be set with using PC Configurator Software (model: R3CON).
Refer to the users manual for the R3CON for detailed operation of the software program.

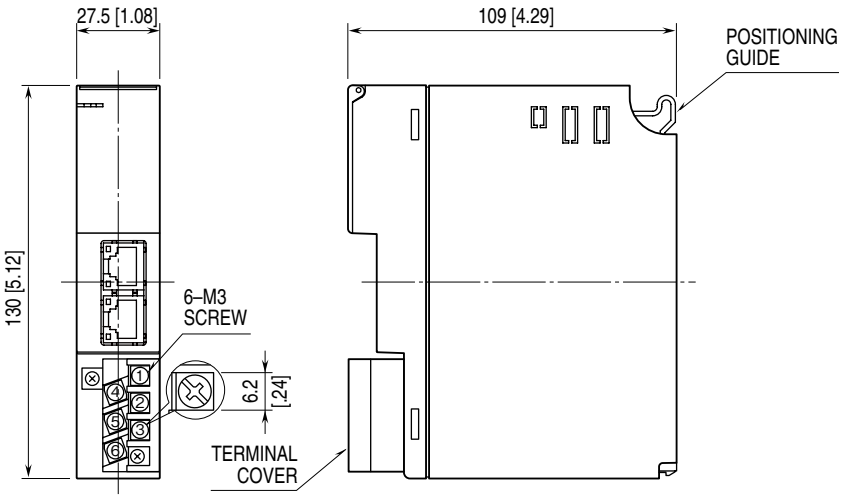
■ **CC-Link IE SETTING**

PARAMETER	SETTING RANGE	DEFAULT SETTING
NetWork No.	1 - 239	1
Main/Sub switching delay time (0 - 5000 msec)	0 - 5000 (msec.)	0

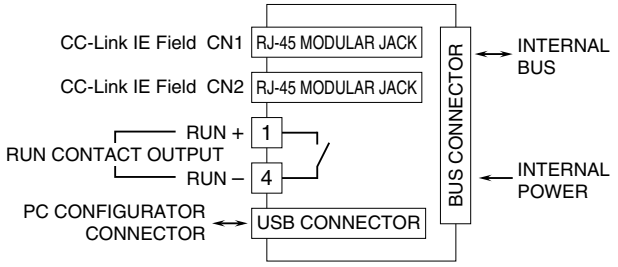
TERMINAL CONNECTIONS

Connect the unit as in the diagram below.

■ **EXTERNAL DIMENSIONS unit: mm [inch]**



■ **CONNECTION DIAGRAM**



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

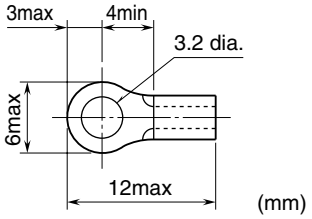
WIRING INSTRUCTIONS

■ **M3 SCREW TERMINAL (RUN contact output)**

Torque: 0.5 N·m

■ **SOLDERLESS TERMINAL**

Refer to the drawing below for recommended ring tongue terminal size. Spade tongue type is also applicable. Solderless terminals with insulation sleeve do not fit.
Recommended manufacturer: Japan Solderless Terminal MFG.Co.Ltd, Nichifu Co.,ltd
Applicable wire size: 0.75 to 1.25 mm^2



TRANSMISSION DATA DESCRIPTIONS

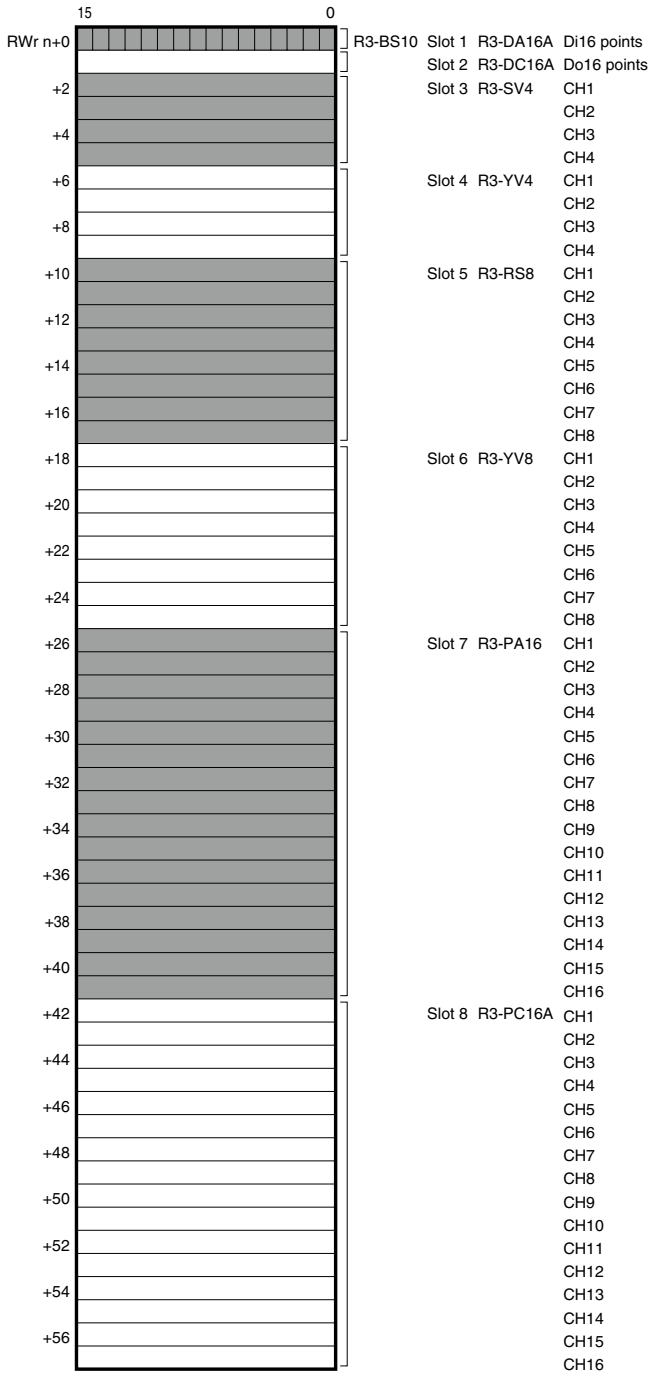
Number of transmission data (data allocation) for each I/O module is set with the DIP switch on the side of the unit. Data allocation is assigned from slot 1 in sequence.
Keep number of transmission data of I/O module under 64, because max. number of transmission data is 64 per a node.
Station type: Remote device station
Link device: RX/RY 128 points, RWw/RWr 64 points

E.g. I/O data is assigned as shown below in the case of following configuration.

BASE	SLOT NO.	MODEL	NUMBER OF TRANSMISSION DATA
R3-BS10	1	R3-DA16A	1
	2	R3-DC16A	1
	3	R3-SV4	4
	4	R3-YV4	4
	5	R3-RS8	8
	6	R3-YV8	8
	7	R3-PA16	16
	8	R3-PC16A	16
	9	R3-NCIE1	----
	10	R3-PS1	----

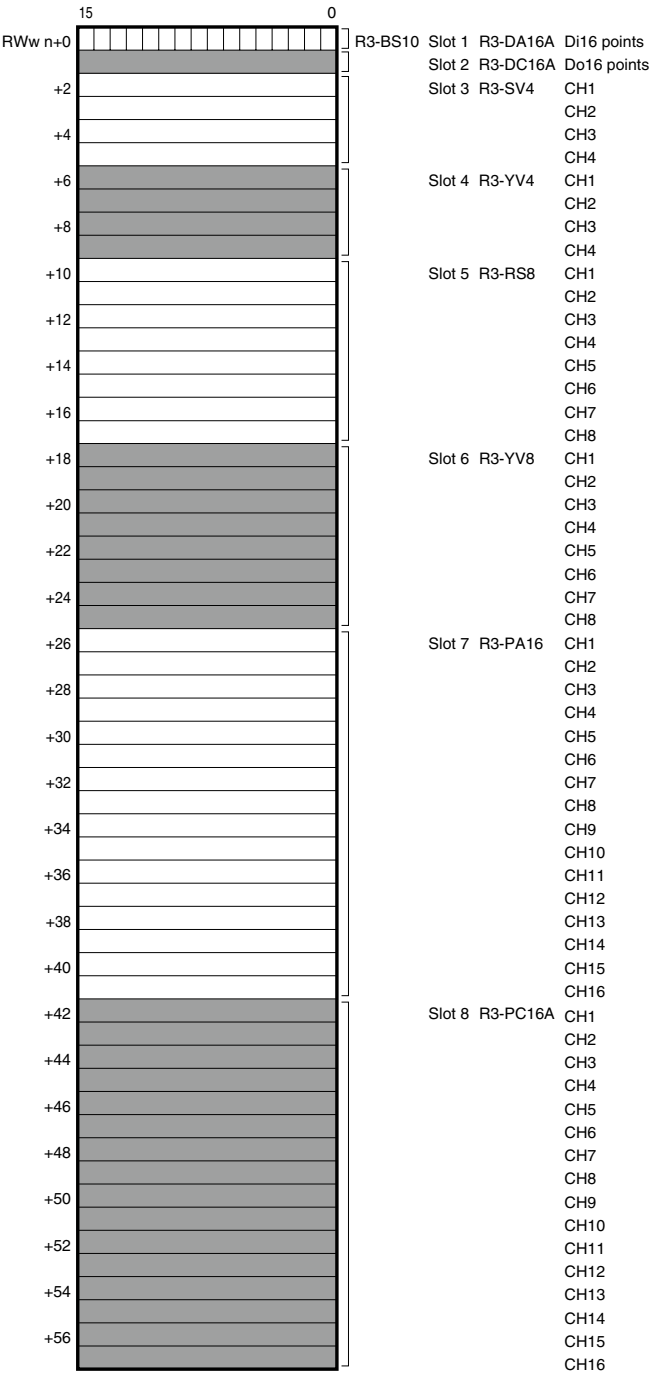
■ INPUT DATA

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

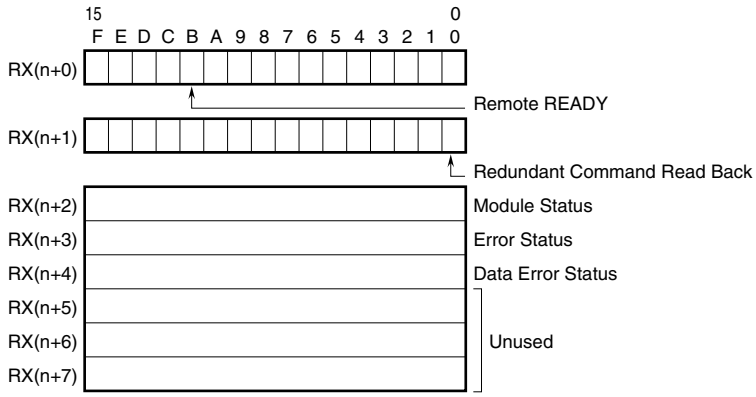


■ OUTPUT DATA

The figure below shows the data received from the master.



■ REMOTE INPUT



- RX(n+0)B is used as Ready signal, the bit is "1" when this module is in normal.

- Redundant Command Read Back (Opt. code: /W Available only for redundant system PLC by Mitsubishi)
  The bit written to RY(n+1)0 reads back to RX(n+1)0.

- Module Status
  RX(n+2)0 to RX(n+2)F indicate whether individual I/O modules of R3 series are mounted or not.
  The bit corresponding to the mounted slot turns to "1", and the unmounted slot to "0".

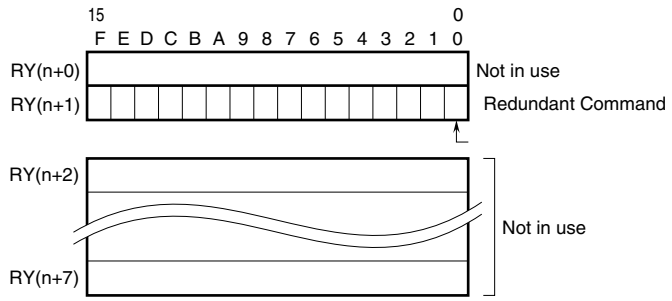
- Error Status
  RX(n+3)0 to RX(n+3)F indicate error status for each module of R3 series.
  The bit corresponding to such module turns to "1", as described below.
  R3-TSx, R3-RSx, R3-US4 input burnout
  R3-DA16A input power in error or disconnected
  R3-YSx output current error (e.g load unconnected)
  R3-PC16A external power supply in error or disconnected

- Data Error Status
  RX(n+4)0 to RX(n+4)F indicate data error status for each module of R3 series.
  The bit corresponding to such module turns to "1", as described below.
  Input value is out of -15% to +115%
  In the case of R3-US4 (voltage input) input level out of -10% to +110%.

RX(n+2)0, RX(n+3)0, RX(n+4)0	slot 1
RX(n+2)1, RX(n+3)1, RX(n+4)1	slot 2
RX(n+2)2, RX(n+3)2, RX(n+4)2	slot 3
:	:
RX(n+2)F, RX(n+3)F, RX(n+4)F	slot 16

Link devices other than the above are not in use.

■ REMOTE OUTPUT (Opt. code: /W Available only for redundant system PLC by Mitsubishi)



• Redundant Command

Bit 0 of RY(n+1) is assigned to designate control system or standby system. Set this bit from the host PLC to switch from the PLC master control system to the standby system, or vice versa. The R3 module output (slave station) is controlled according to the bit combinations as shown in the table below. No switching is required for the R3 input modules which continuously send out data to both 'main' and 'sub' network modules.

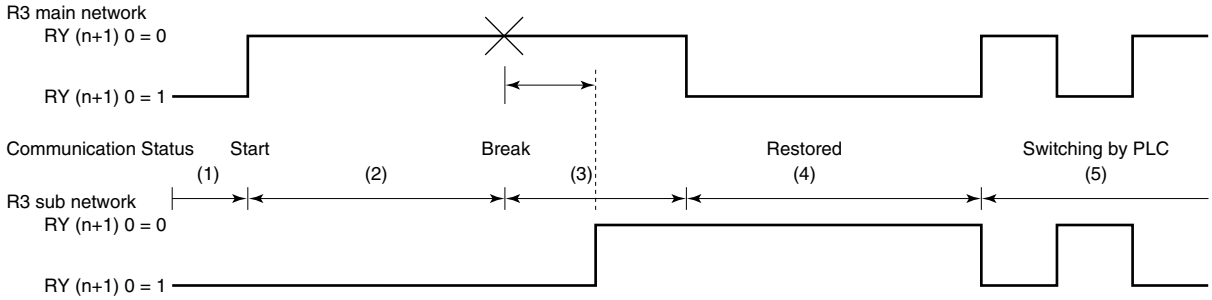
RY(n+1) 0 = 0 : PLC master control system

RY(n+1) 0 = 1 : PLC standby system

R3 MAIN (RY(n+1)0)	R3 SUB (RY(n+1)0)	CONTROL
0	0	Output from the 'main' network module
0	1	Output from the 'main' network module
1	0	Output from the 'sub' network module
1	1	Output hold or output off *1

*1. Depending on the setting for the output hold function of output module.

• Operation



1) When the redundant command bits are undefined due to no communication, the both PLCs function as standby system for each of R3 main and sub network modules.

   The output module's status turns to 'output hold' or 'output off' according to the setting for output hold function.

   During no communication just after the power supply, all the channels of the contact output modules are off-state, and analog output modules output -15%.

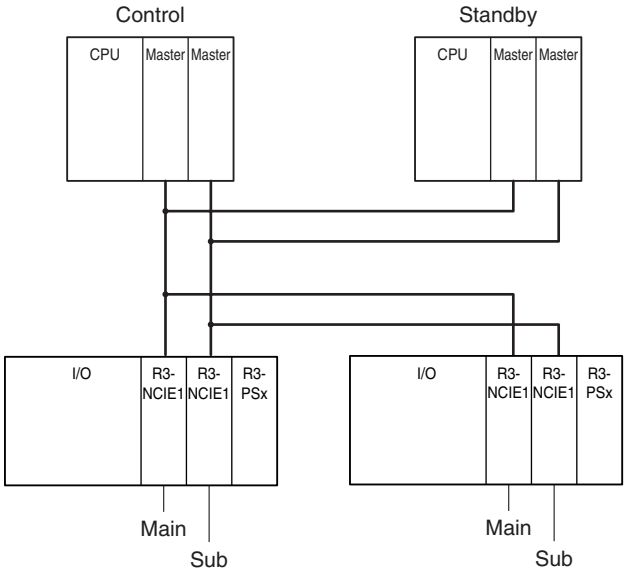
2) The master PLC communicates with the R3 main network module, while the standby PLC communicates with the R3 sub network module.

3) When a wire breakdown is detected at the R3 main network, the output signal is held for the preset time period (Timer is programmable with the PC Configurator Software, R3CON). After the time has been elapsed, the output is switched from the R3 main to R3 sub network. Be sure to set an appropriate output signal to the R3 sub network before the switching. The host PLC for the R3 main network is now functioning as standby system.

4) Once the PLC control is transferred to the standby system, it is necessary to set RY(n+1) 0 = 1 to the R3 main network in order to prevent R3 output control automatically switched to the main network when the R3 main network is restored. If it is set to RY(n+1) 0 = 0, the R3 output will be switched to the main network even when the PLC control is in the standby system.

5) When both R3 main and R3 sub network modules are in communication, the output can be switched without delay by setting RY(n+1) 0 values. Be sure to set an appropriate output signal to the network module before the control is switched to it.

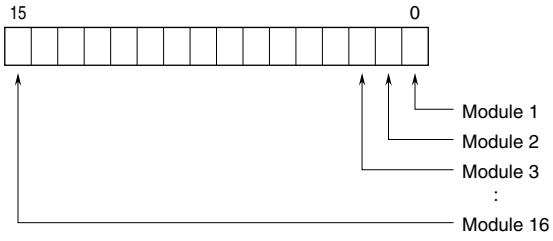
■ CONNECTION EXAMPLE



Link devices other than the above are not in use.

MODULE STATUS, ERROR STATUS, DATA ERROR STATUS

Shows each module's availability and error status.



I/O DATA DESCRIPTIONS

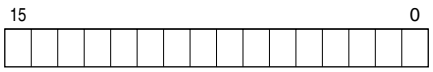
The data allocations for typical I/O modules are shown below.
Refer to the manual for each module for detailed data allocations.

■ OPERATION IN CASE OF A COMMUNICATION ERROR WITH I/O MODULES

When the communication between the network module and the I/O modules is lost due to an error in an input module, the last process values are held until the communication is re-established.

■ ANALOG DATA (16-bit data, models: R3-SV4, YV4, DS4, YS4, US4, etc.)

16-bit binary data.
Basically, 0 to 100% of the selected I/O range is converted into 0 to 10000 (binary).
-15 to 0 % is a negative range represented in 2's complement.
In case of R3-US4, -10 to 0% is a negative range represented in 2's complement.



■ TEMPERATURE DATA (16-bit data, models: R3-RS4, TS4, US4, etc.)

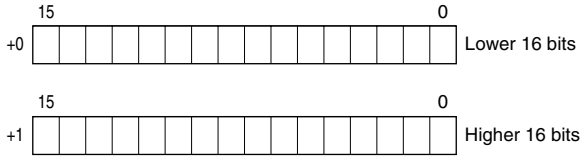
16-bit binary data.
With °C temperature unit, raw data is multiplied by 10. For example, 25.5°C is converted into 255.
With °F temperature unit, the integer section of raw data is directly converted into the data. For example, 135.4°F is converted into 135.
Minus temperature is converted into negative values, represented in 2's complements.

■ ANALOG DATA (16-bit data, models: R3-CT4A, CT4B, etc.)

16-bit binary data.
Integer obtained by multiplying unit value (A) by 100.
In case of CLSE-R5, integer obtained by multiplying unit value (A) by 1000.

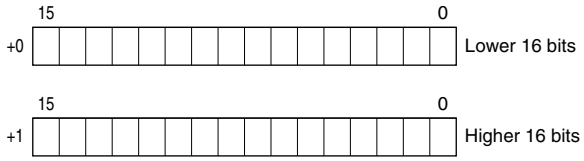
■ ACCUMULATED COUNT DATA (32-bit data, models: R3-PA2, PA4A, WT1, WT4, etc.)

32-bit binary data is used for accumulated counts and encoder positions.
Lower 16 bits are allocated from the lowest address to higher ones, higher 16 bits in turn.

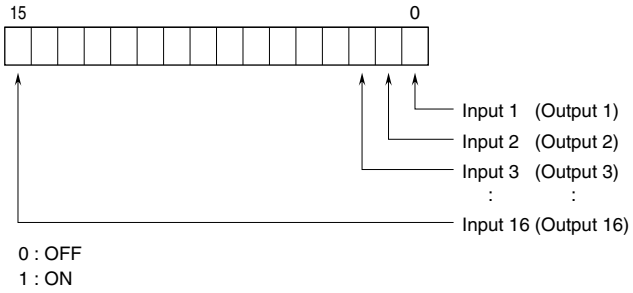


■ BCD DATA (32-bit data, models: R3-BA32A, BC32A, etc.)

32-bit binary data is used for BCD.
Lower 16 bits are allocated from the lowest address to higher ones, higher 16 bits in turn.



■ DISCRETE DATA (models: R3-DA16, DC16, etc.)



SETTING by GX Works2

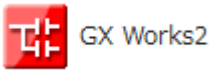
■SUMMARY

This section explains the setting of the unit on the premise of using GX Works2 made by Mitsubishi Electric (hereinafter called “GX Works2”).

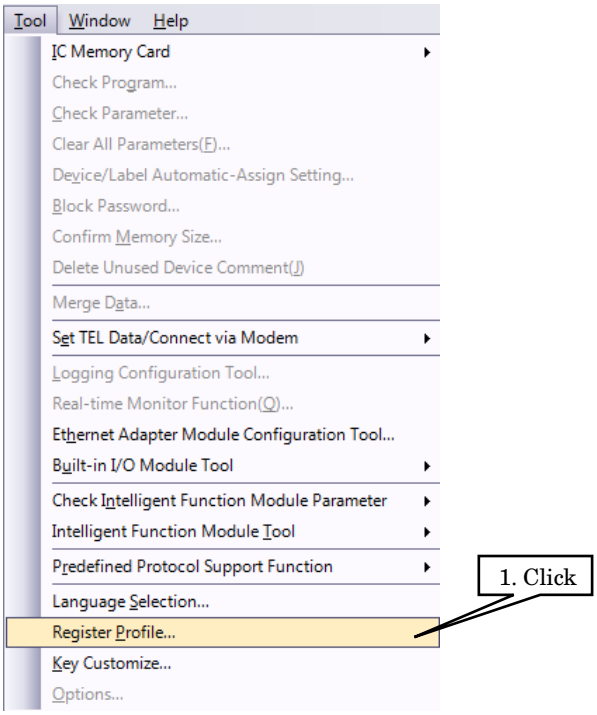
■REGISTRATION OF PROFILE

R3-NCIE1 supports CC-Link Family system profile (hereinafter called “CSP+”).
CSP+ is downloadable at CC-Link Association Home page, www.cc-link.org.
* It is not necessary to register CSP+ on a PC. If you skip this procedure, start from [CONSTRUCTION OF SYSTEM].

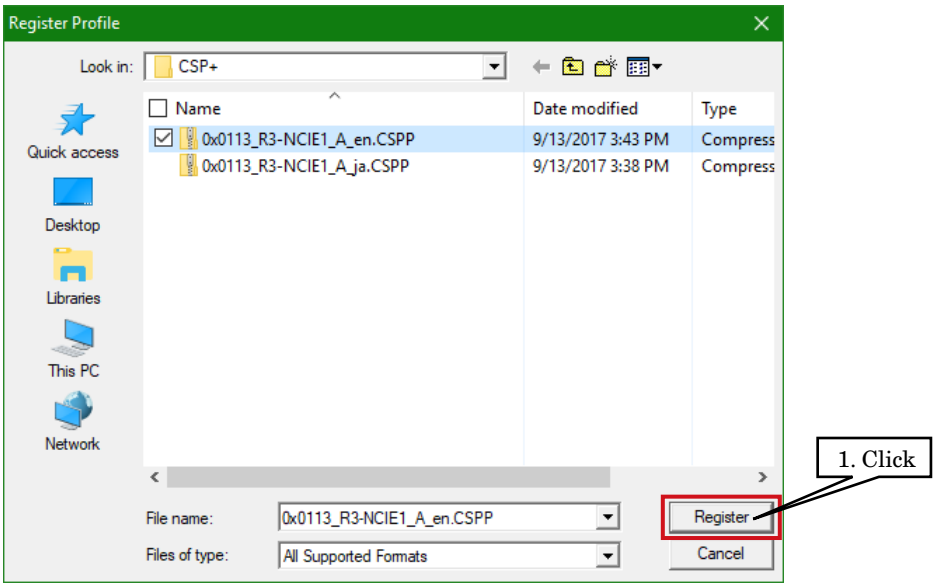
1) Start GX Works2.



2) Click [Tool] → [Resister Profile].

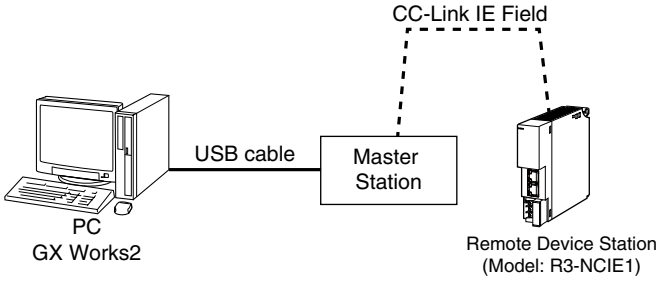


3) Select the CSP+ file downloaded, and click [Register] to complete the registration.



■CONSTRUCTION OF SYSTEM

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



1) Connect Master station and Remote Device Station (model: R3-NCIE1) 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.

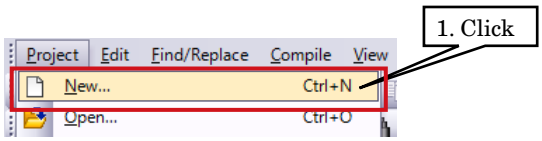
2) After finishing wiring, turn on the power of each unit.

■CREATION OF PROJECT

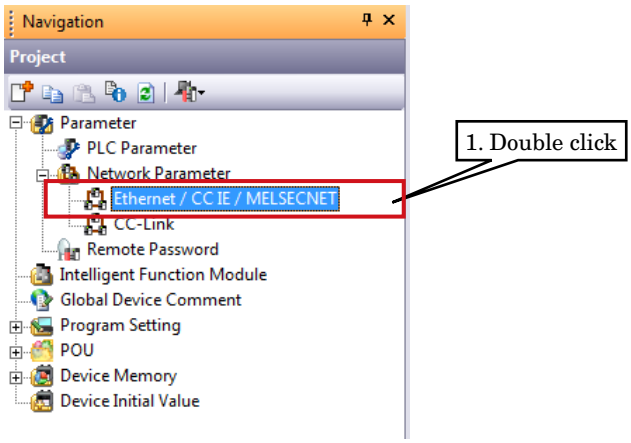
Connect the PC and the master Station, and create a project of the master station by GX Works2 installed on the PC.

1) Start GX Works2.

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

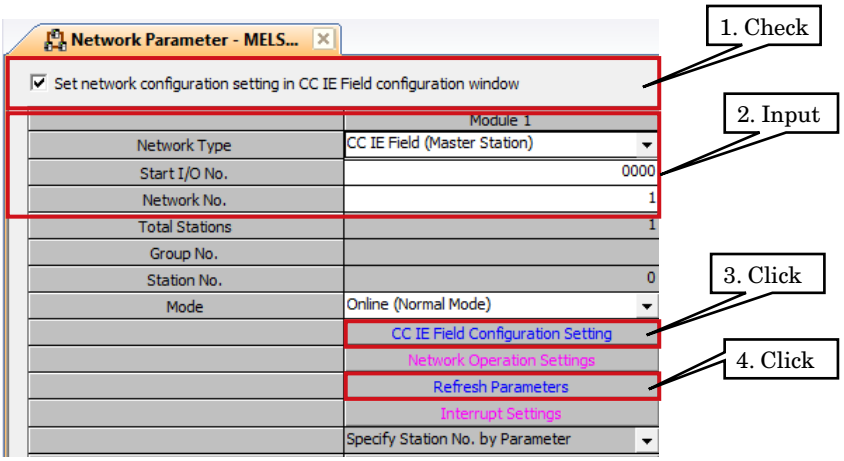


3) Double-click [Parameter] → [Network Parameter] → [Ethernet/CC IE/MELSECNET] to open the [Network Parameter Ethernet/CC IE/MELSECNET] window.



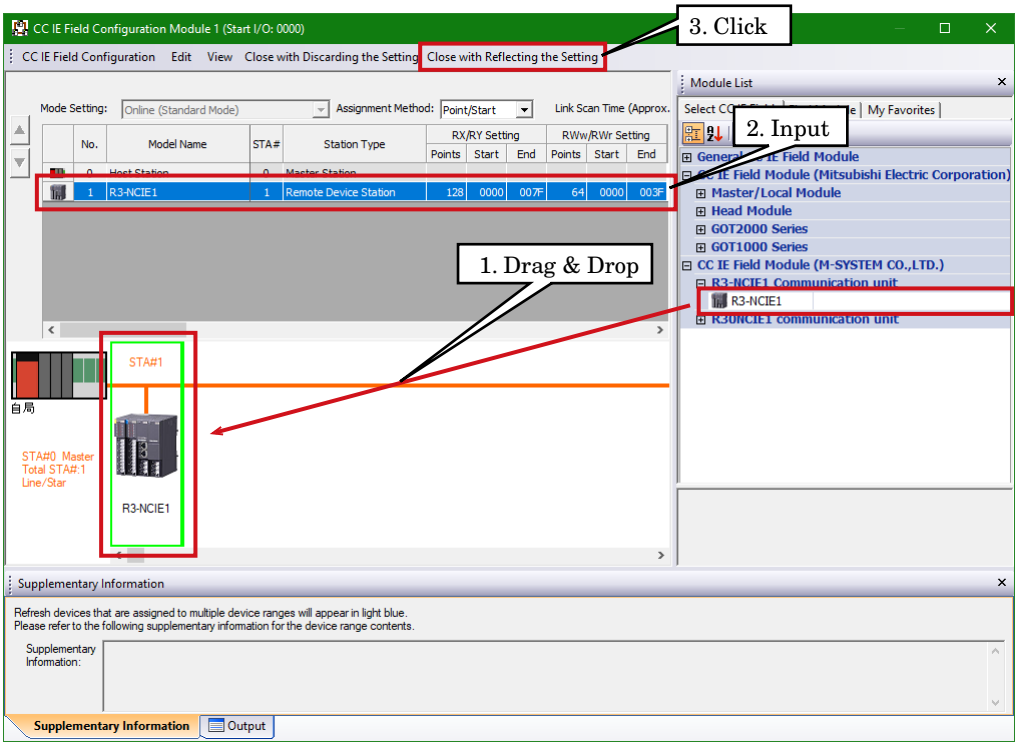
4) Check [Set network configuration setting in CC IE Field configuration window], and set as below.

SETTING ITEM	DESCRIPTION
Network type	CC IE Field (Master Station)
Start I/O No.	0000
Network No.	1

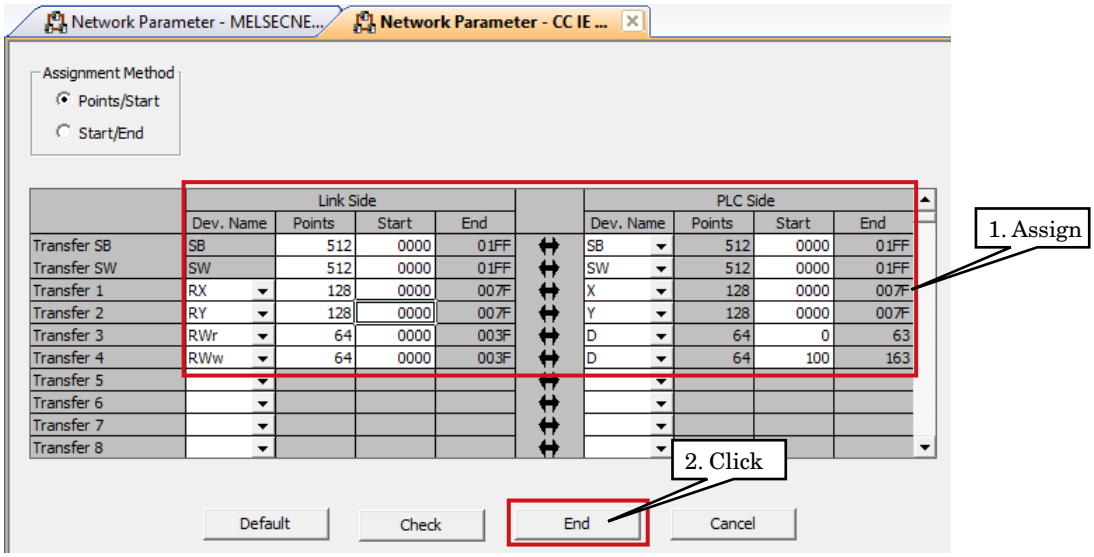


5) Click [CC IE Field Configuration Setting] to open the window of configuration setting. According to the real system configuration, select the device from [Module List], and drag and drop it to the device configuration diagram. Input the station number, RX/RY setting (128 points), RWw/RWr setting (64 points), and click [Close with Reflecting the Setting].

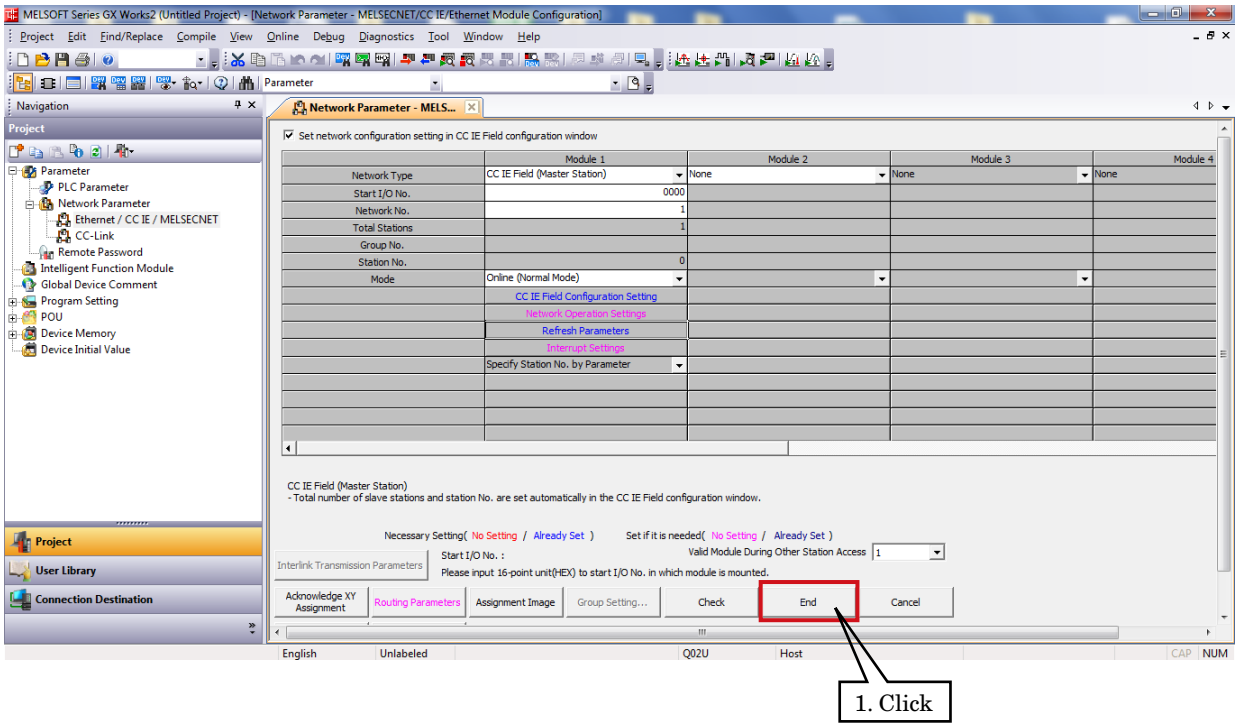
* When CSP+ not registered, select [General CC IE Field Module].



6) Click [Refresh Parameter] to open the [Refresh Parameter Setting] window.
After assigning link devices RX/RY/RWr/RWw to devices of the CPU unit, click [End] to close the window.



7) Click [End] to close the [Network Parameter – MELSECNET/CC IE Ethernet Module Configuration] window.

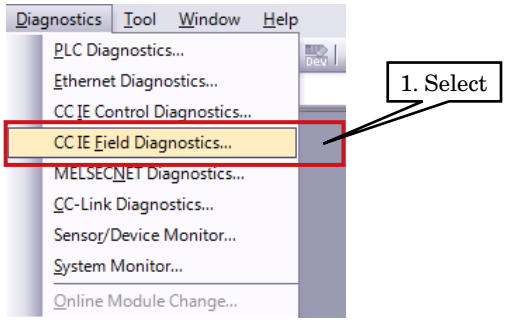


8) After creating a program as necessary, write the parameter and the program to the CPU unit.

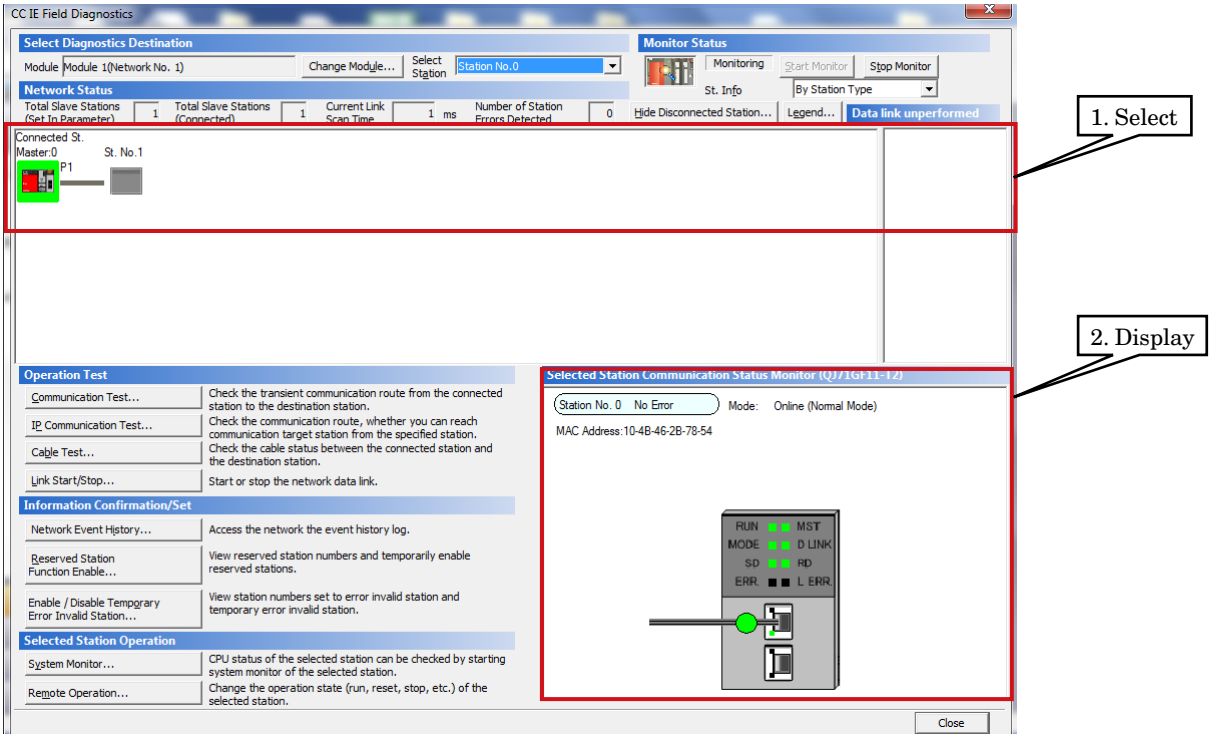
■ NETWORK DIAGNOSTICS

Diagnostics of GX Works2 CC-Link IE Field Network enables to confirm the status of total network in one glance, the location and the cause of errors and the event history, and to monitor other stations.

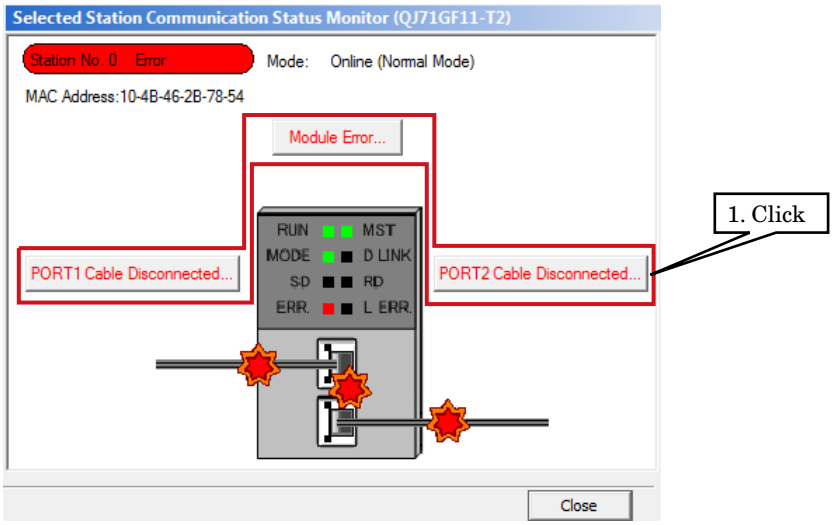
1) Select [Diagnostics] → [CC IE Field Diagnostics] to open the [CC IE Field Diagnostics] window.



2) Click the station to be diagnosed so that the station status is displayed on the [Selected Station Communication Status Monitor].



3) In the case of errors, the buttons such as [Module Error] are displayed. Click them and perform some troubleshooting according to the content displayed.



SETTING by GX Works3

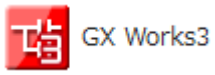
■ SUMMARY

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

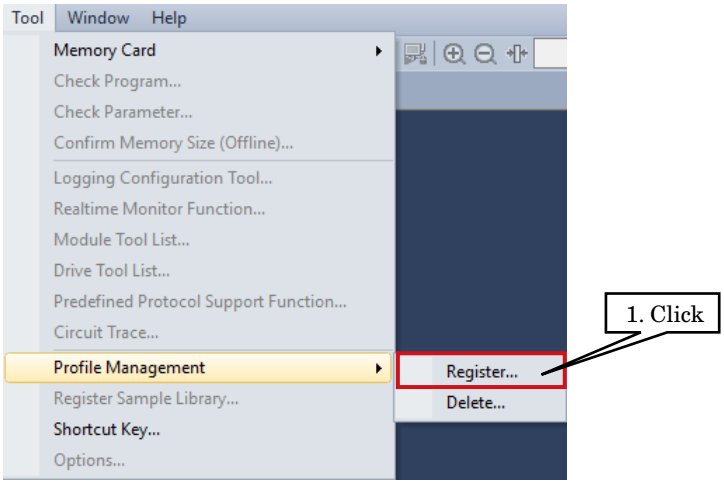
■ REGISTRATION OF PROFILE

R3-NCIE1 supports CC-Link Family system profile (hereinafter called “CSP+”).
CSP+ is downloadable at CC-Link Association Home page, www.cc-link.org.
* It is not necessary to register CSP+. If you skip this procedure, start from [CONSTRUCTION OF SYSTEM].

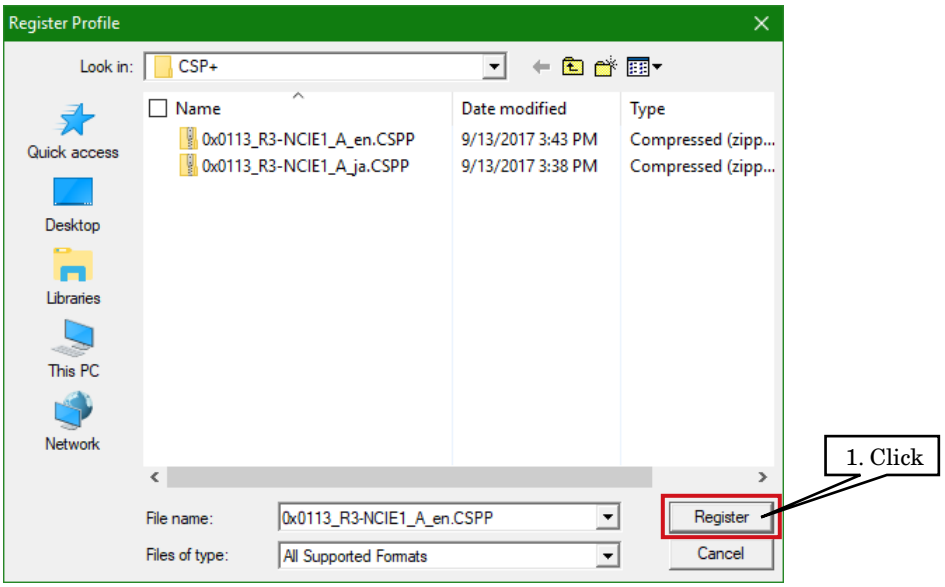
1) Start GX Works3.



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

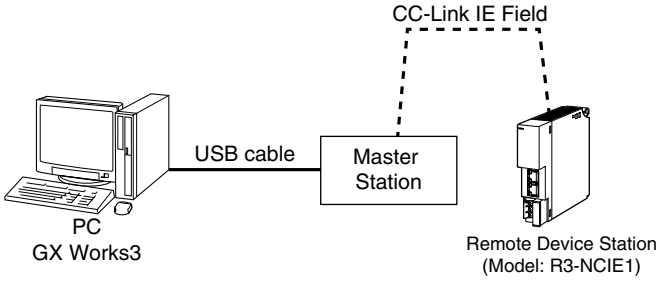


3) Select the CSP+ file downloaded, and click [Register] to complete the registration.



■CONSTRUCTION OF SYSTEM

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



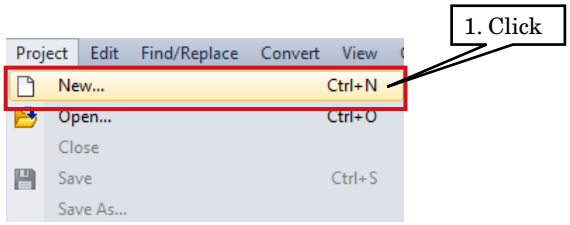
1) Connect Master station and Remote Device Station (model: R3-NCIE1) with Ethernet Cable.
   Make sure to turn off the power of each unit before wiring. CN1 and CN2 of modular jack RJ-45 for CC-Link IE Field Network have no limit of wiring connection order.
2) After finishing wiring, turn on the power of each unit.

■CREATION OF PROJECT

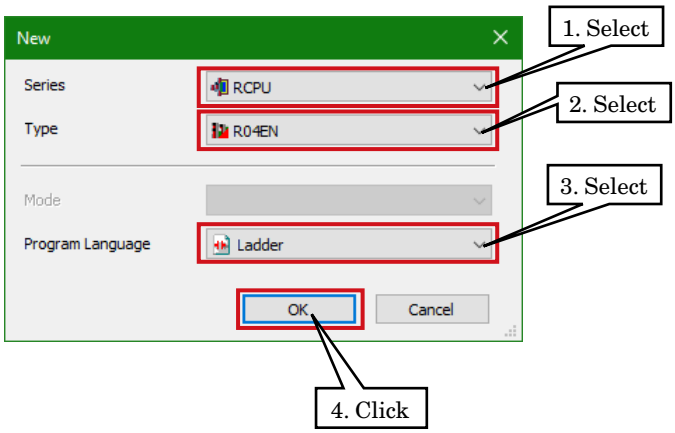
Connect the PC and the master Station, and create a project of the master station by GX Works3 installed on the PC.

1) Start GX Works3.

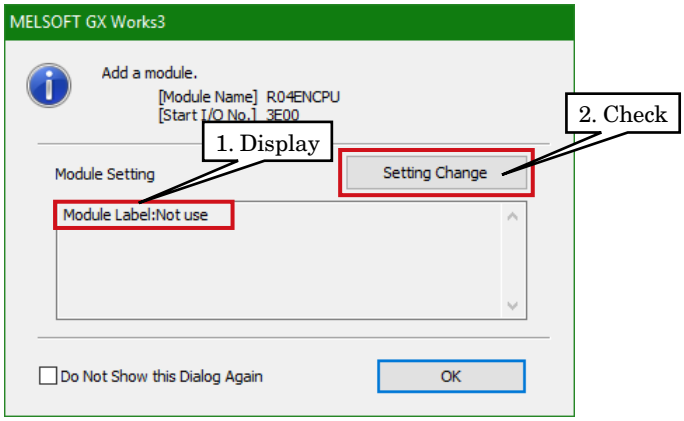
2) Click [Project] → [New] to create a new project.



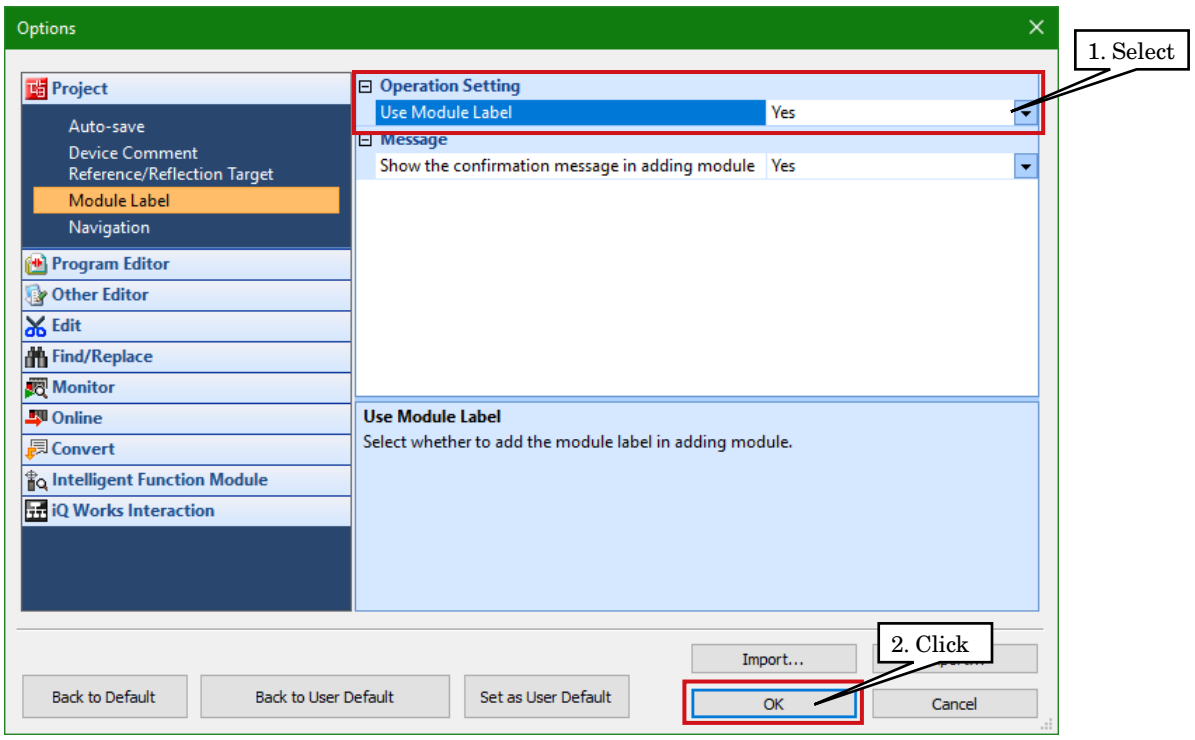
3) Select [Series], [Type] and [Program Language] of the PLC from each pull-down menu, and click [OK].



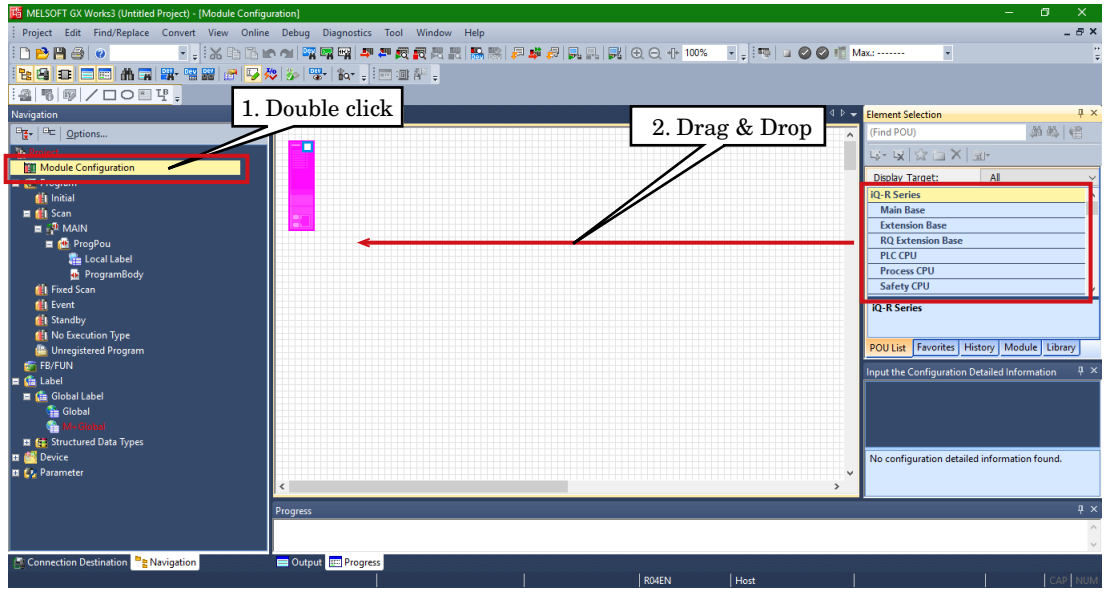
4) In the following window, when [Module Label: Not use] is displayed in Module Setting, click [Setting Change] to open the option window, and change to [Yes].



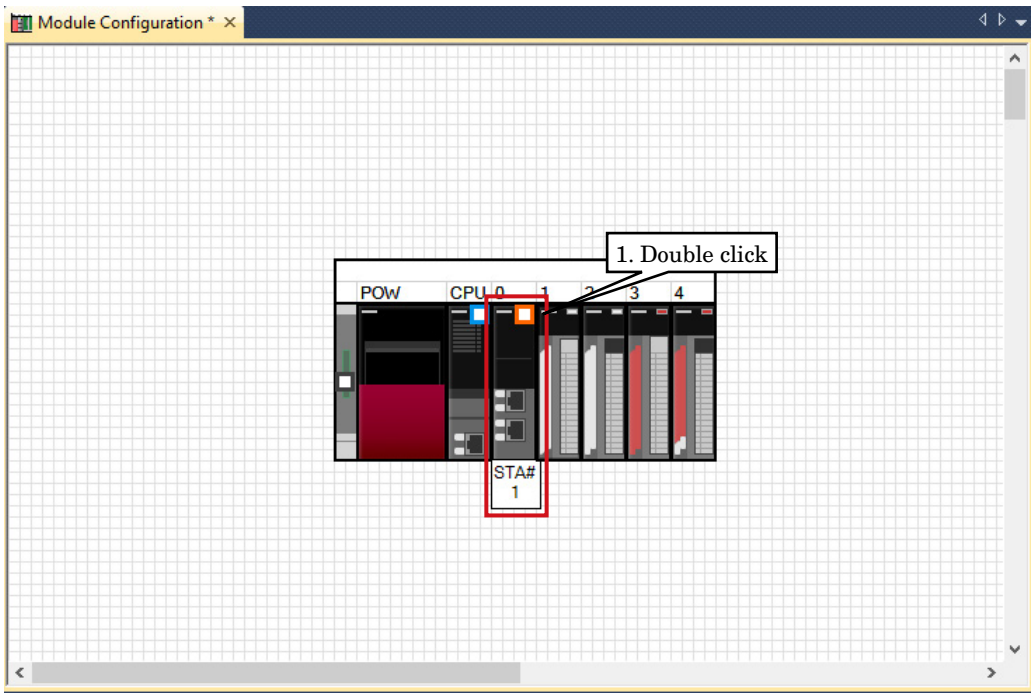
Select [Yes] for [Use Module Label] in [Operation Setting], and click [OK].



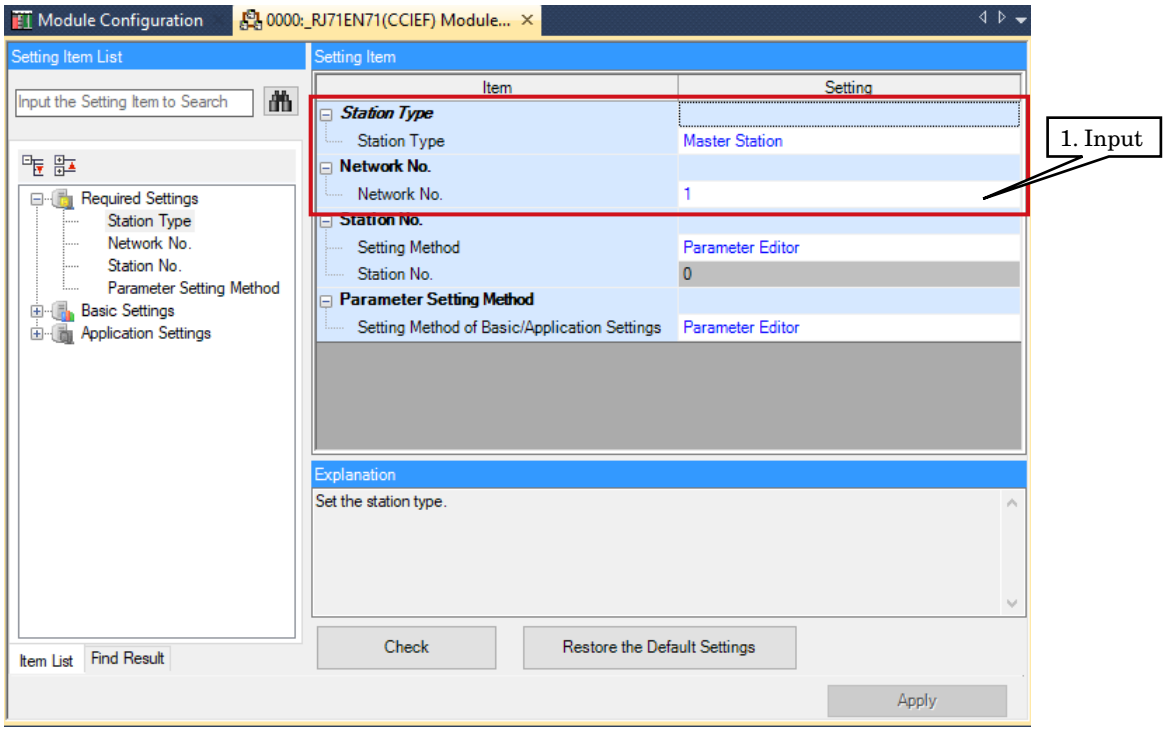
5) Double click [Module Configuration] in the Navigation window to open the [Module Configuration] window. According to the real PLC configuration, select the module from [POU List] of the [Element Selection] window, and drag and drop it to the module configuration diagram.



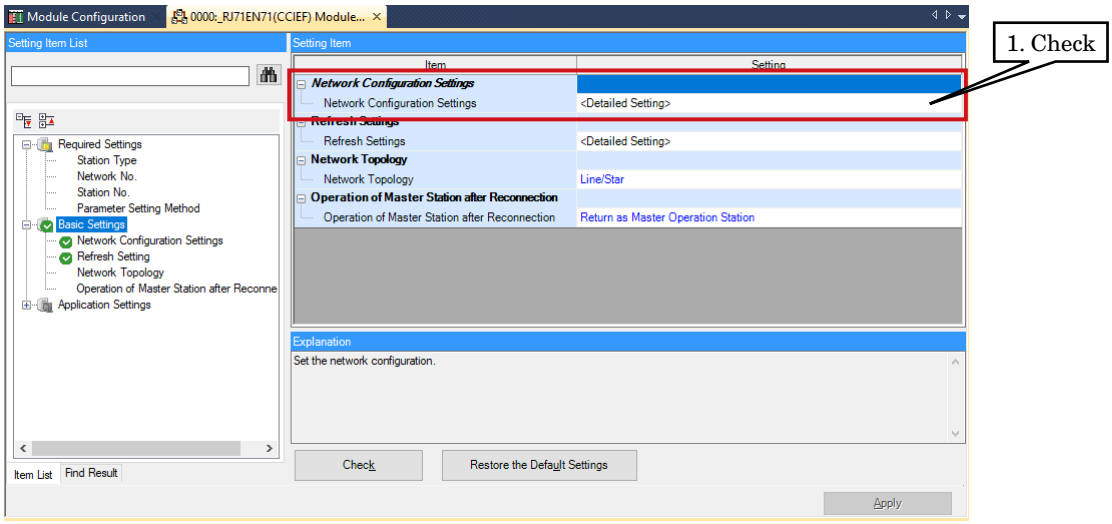
6) Double click [CC-Link IE Field network module] to open the parameter setting window.



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

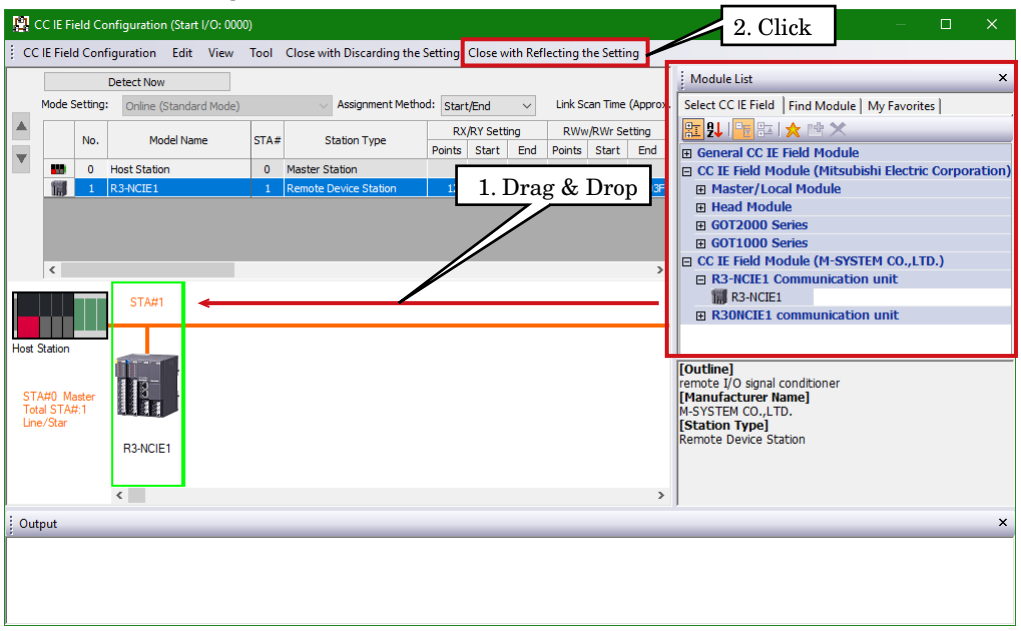


8) Click <Detailed Setting> of [Network Configuration Settings] in [Basic Settings] to display the [CC IE Field Configuration] window.



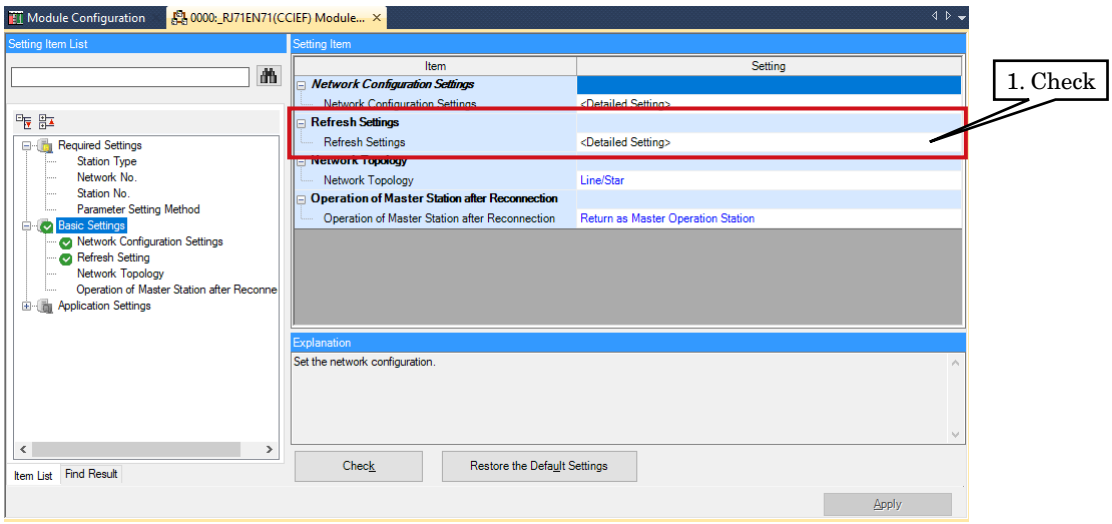
According to the real system configuration, select the device from [Module List], and drag and drop it to the device configuration diagram.

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

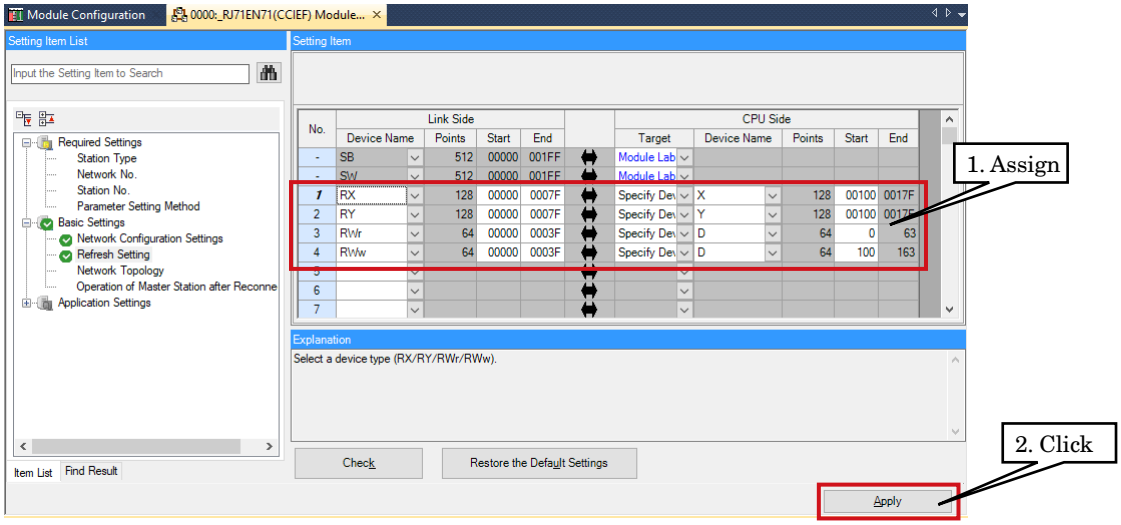


Click [Close with Reflecting the Setting].

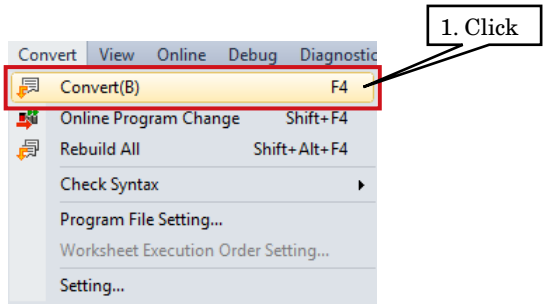
9) Click <Detailed Setting> of [Refresh Setting] to display the Refresh Setting window.



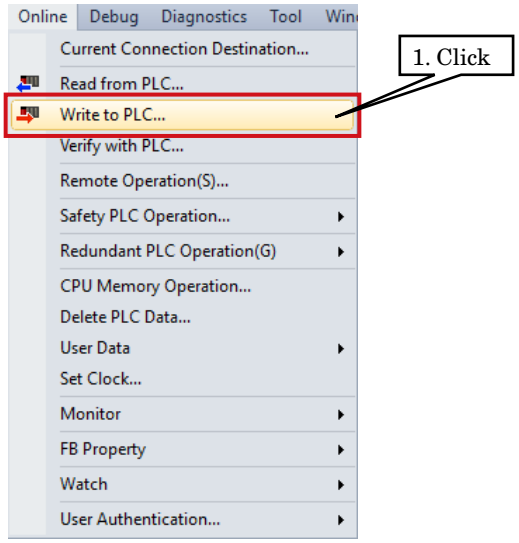
After assigning link devices RX/RY/RWr/RWw to devices of the CPU module, click [Apply] to close the window.



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



11) Click [Online] → [Write to PLC] to display the Online Data Operation window.



Check necessary items, and click [Execute].