



PLC CC-Link IE Field Network (MELSEC iQ-R Series)

This course covers the configuration through programming of remote I/O control utilizing the CC-Link IE Field Network.

This fundamentals course is aimed at first-time users of the CC-Link IE Field Network.

In this course you will learn about data transfer mechanisms, network specifications, parameter settings, and the start-up procedure for CC-Link IE Field Network remote I/O control.

As prerequisites for this course, you should have already completed the following courses or possess the equivalent knowledge.

- FA Equipment for Beginners (Industrial Network)
- MELSEC iQ-R Series Basic
- Programming Basics

The contents of this course are as follows.

Chapter 1 - Overview of CC-Link IE

Necessity of FA networks and preliminary information on CC-Link IE Field Network

Chapter 2 - CC-Link IE Field Network system configuration and specifications

System configurations, specifications, and parameter settings

Chapter 3 - Cyclic transmission (for remote I/O control) by the master station and remote stations

Procedures of start-up, operation check, and troubleshooting

Final Test

Pass grade: 60% or higher

Introduction**How to use this e-Learning tool**

Go to the next page		Go to the next page.
Back to the previous page		Back to the previous page.
Move to the desired page		"Table of Contents" will be displayed, enabling you to navigate to the desired page.
Exit the learning		Exit the learning.

Safety precautions

When you learn based on using actual products, please carefully read the safety precautions in the corresponding manuals.

Precautions in this course

The displayed screens of the software version that you use may differ from those in this course.

This course uses the following software version:

- GX Works3 Version 1.032J

Chapter 1 Overview of CC-Link IE

This course covers the fundamentals of the CC-Link IE Field Network for those who have taken the "FA Equipment for Beginners (Industrial Network)" course or have the equivalent knowledge.

CC-Link is an acronym for Control & Communication Link.

CC-Link networks are designed as open networks for use in FA environments.

The IE in CC-Link IE is an acronym for Industrial Ethernet.

The types of CC-Link IE networks include the CC-Link IE Control Network and CC-Link IE Field Network.

This chapter describes an overview of CC-Link IE data exchange, data transfer, and data communication.

1.1 CC-Link IE Field Network

1.2 Necessity of FA networks

1.3 Preliminary information on CC-Link IE Field Network

1.1**CC-Link IE Field Network**

CC-Link IE is an integrated open network based on high-speed and high-capacity Ethernet that accommodates both device control data and management data.

CC-Link IE Field Network is used to connect all FA equipment such as programmable controllers, inverters, HMIs, servos, and robots onto a single network.

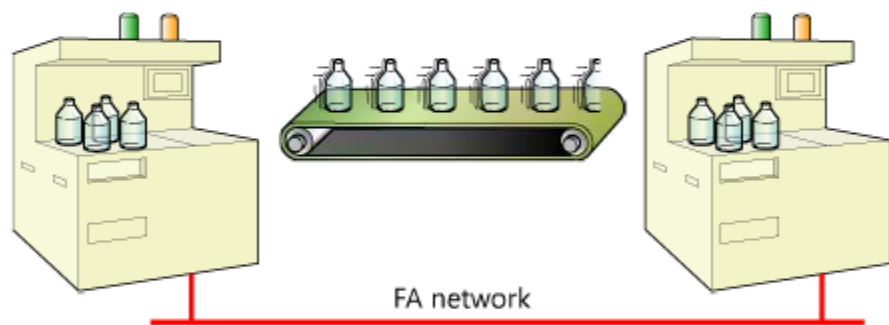


1.2


Necessity of FA networks

Before starting the main subject, let's review the reasons why we need FA networks.

Necessity of exchanging information through networks



In this way, the FA network enables convenient exchange of information between distributed devices.


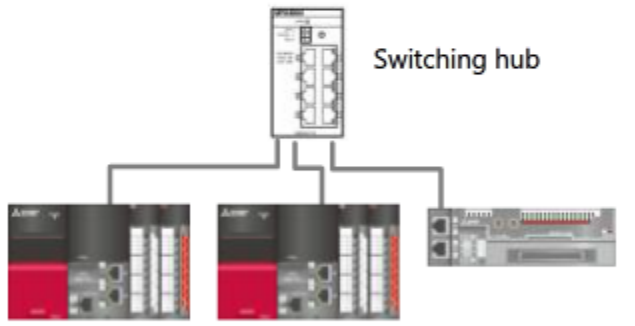

Click  to proceed.

1.3 Preliminary information on CC-Link IE Field Network

This section provides some preliminary information to help with selection of the FA network suitable for your environment.

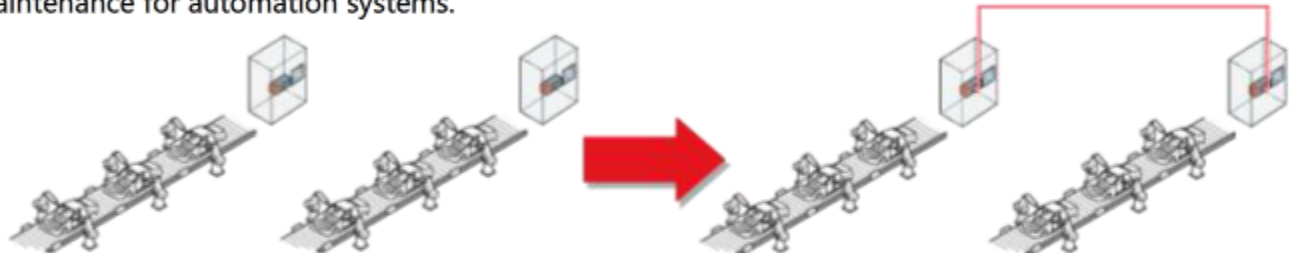
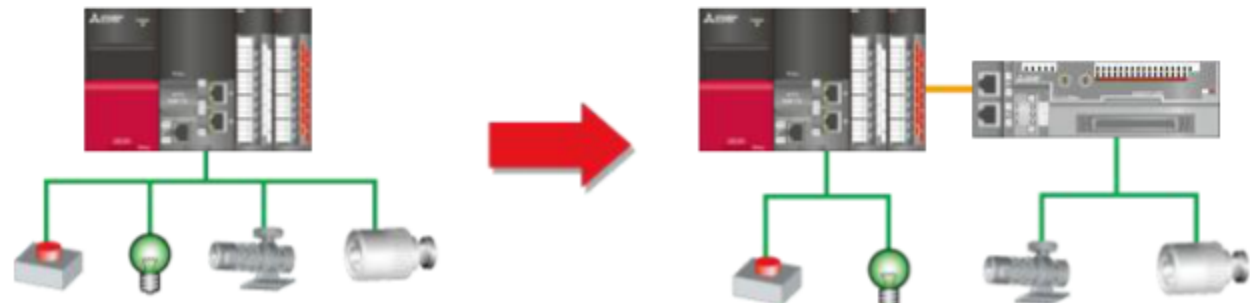
1.3.1 Network topologies

Each network topology has its own advantages and disadvantages. Select the network topology that is suitable for your environment in terms of reliability and wiring.
 CC-Link IE Field Network can be wired in any topology.

	<p>Line topology: Minimum wiring</p> <ul style="list-style-type: none"> • Network can be configured with minimum wiring • Faulty wiring and station failures are more likely to affect the entire network
 <p style="text-align: center;">Switching hub</p>	<p>Star topology: Network configuration through a central hub</p> <ul style="list-style-type: none"> • Highly scalable • More wiring and equipment are required • Combinable with line topologies • Faulty wiring and station failures are less likely to affect the entire network
	<p>Ring topology: Highly reliable</p> <ul style="list-style-type: none"> • Network is configured as a ring • Faulty wiring and station failures are less likely to affect the entire network

1.3.2 FA network applications

FA networks are primarily used in the following two applications. Select the optimal configuration in accordance with the desired features.

Network application	Description
<p>Information exchange (Cyclic transmission by the master station and local stations)</p>	<p>This configuration is used to exchange information between programmable controller systems. Connecting distributed equipment (controllers) via a network improves flexibility, scalability, and ease of maintenance for automation systems.</p> 
<p>Distributed I/O (Cyclic transmission by the master station and remote stations)</p>	<p>Simply extending I/O cables throughout a system can be susceptible to noise, which can cause operational errors. In addition, bundling many thick I/O cables can be cumbersome. Instead of routing I/O cables, distributed I/O uses a network to exchange input/output states. The control program is loaded into one CPU module, which helps with troubleshooting when errors occur. This system is also relatively inexpensive to build.</p> 

CC-Link IE Field Network can be used in both of these applications. This course covers the distributed I/O control application.

1.3.3

Differences between CC-Link IE Control Network and CC-Link IE Field Network

The types of CC-Link IE networks include the CC-Link IE Control Network and CC-Link IE Field Network.

The following table summarizes the main differences between the networks.
Pressing the feature buttons highlights the items that detail each feature.

	CC-Link IE Control Network		CC-Link IE Field Network
Features	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; border-radius: 10px; padding: 2px 5px;">Large Capacity</div> <div style="border: 1px solid black; border-radius: 10px; padding: 2px 5px;">High Reliability</div> <div style="border: 1px solid black; border-radius: 10px; padding: 2px 5px;">Long Distance</div> </div>		<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; border-radius: 10px; padding: 2px 5px;">Multipurpose</div> <div style="border: 1px solid black; border-radius: 10px; padding: 2px 5px;">Flexible Cabling</div> </div>
Network purpos	Distributed control		Distributed control, remote I/O control
Max. number of device points	Word: 128k points; Bit: 32k points		Word: 16k points; Bit: 32k points
Fault tolerance	Control station: Operating even when the control station fails		Submaster function: Operating even when the master station fails.
Physical communication medium	Optical fiber cable: Expensiv and requires skill for cabling High noise tolerance	Twisted paired cable: Less expensive and relatively easy cabling	Twisted paired cable: Less expensive and relatively easy cabling
Topology	Ring: Featuring higher reliability than dual loop	Star, line, ring: Featuring a high degree of freedom for cabling	Star, line, ring: Featuring a high degree of freedom for cabling
Max. station-tostation distance	550m	100m	100m
Max. total distance	550 (m) × 120 (maximum number of connected stations) = 66 (km)	Line topology: 100 (m) × 120 (maximum number of connected stations) = 12 (km)	Line topology: 100 (m) × 120 (maximum number of connected stations) = 12 (km)

This course covers the CC-Link IE Field Network.

1.3.4 Two data communication methods

The following two data communication methods are used in FA networks.

- Cyclic transmission
- Transient transmission

The following table summarizes each method.

Method	Data communication overview	Send/receive program
Cyclic transmission	Data specified by module parameters is exchanged cyclically and automatically.	Not required (Data is exchanged based on the setting of module parameters.)
Transient transmission	Data is exchanged in between cyclic transmission intervals only when a communication request is issued between programmable controllers in the network.	Required (Data is exchanged through execution of dedicated instructions in a program.)

The simultaneous use of cyclic transmission and transient transmission is supported in both CC-Link IE Control Network and CC-Link IE Field Network.

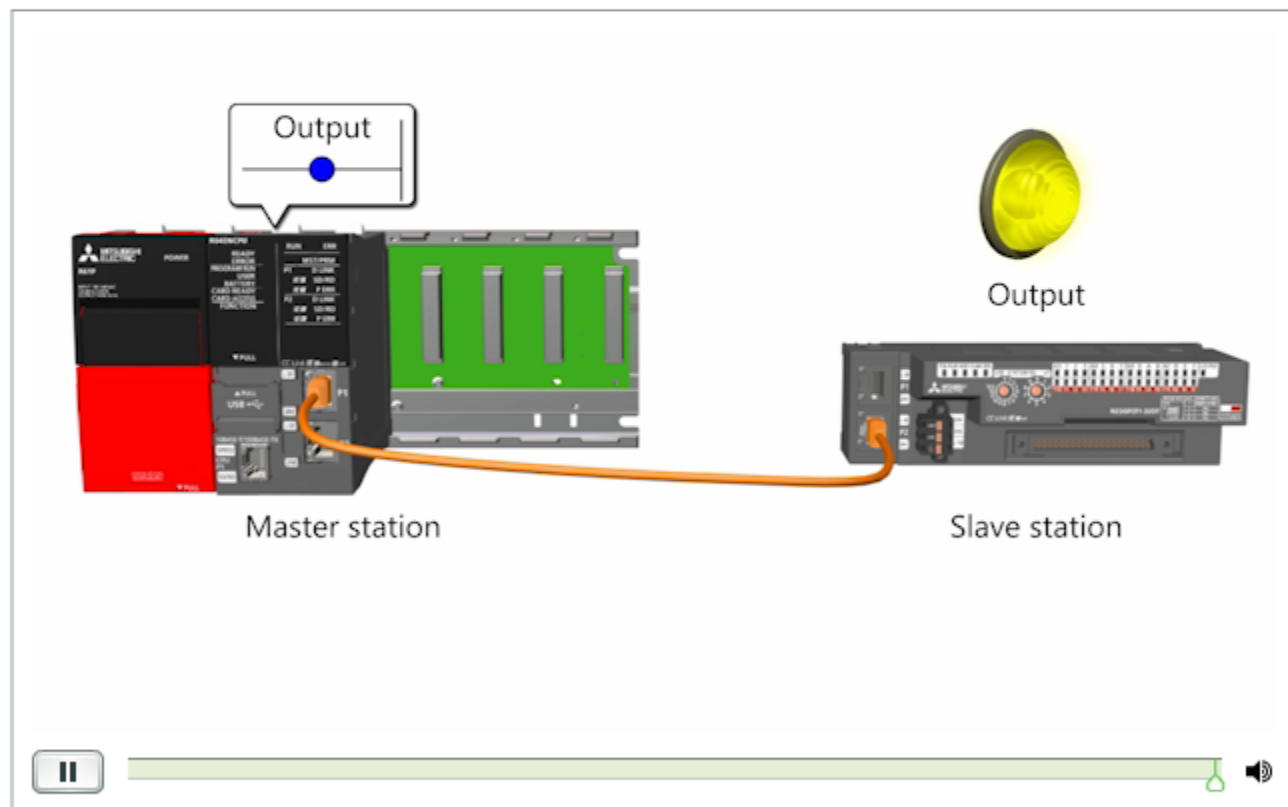
This course focuses specifically on cyclic transmission, which is the primary type of communication performed in FA networks.

1.3.5 Cyclic transmission operation

The following video shows how device data is changed by using the CC-Link IE Field Network.

When the slave station input turns on, this state change is transferred to the master station over the network.
When the master station output turns on, this state change is transferred to the slave station over the network.

Click the play button to start the video.



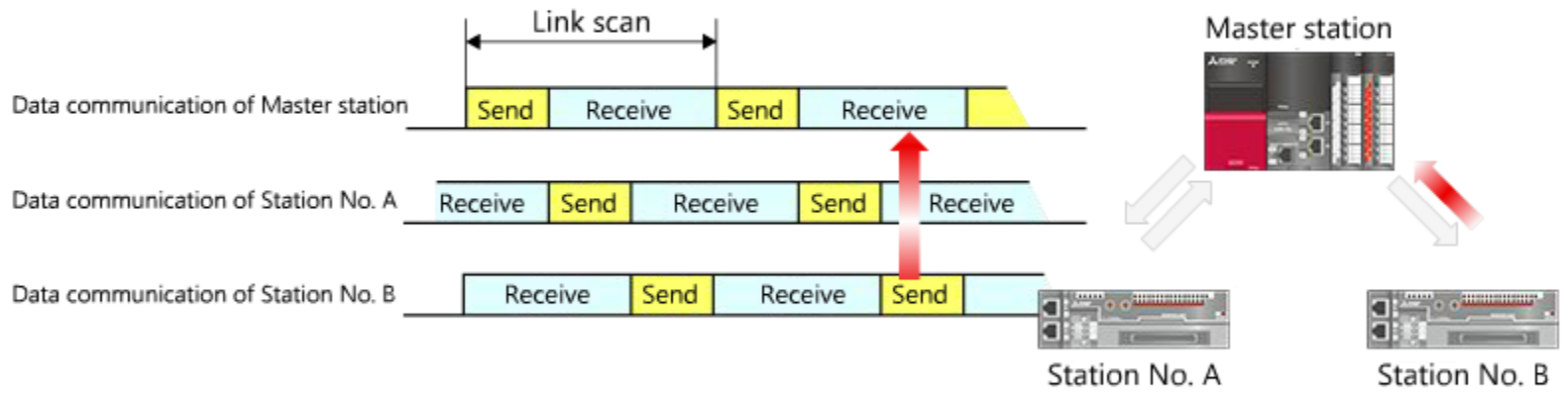
This operation is performed automatically. Programmers can create programs for the programmable controller without worrying about communication details.

1.3.6 Cyclic transmission timing

Data is not transmitted at the same time.

Each module on the network takes turn sending the data in its send area. In this way, each module waits for its turn to send so that data is sent cyclically. This transmission method is referred to as "cyclic transmission" because data updates cyclically. "Link scan" refers to the period during which each module sends data at a predetermined interval. Each device has the opportunity to send once per link scan. The time taken for each of these cycles is referred to as the "link scan time".

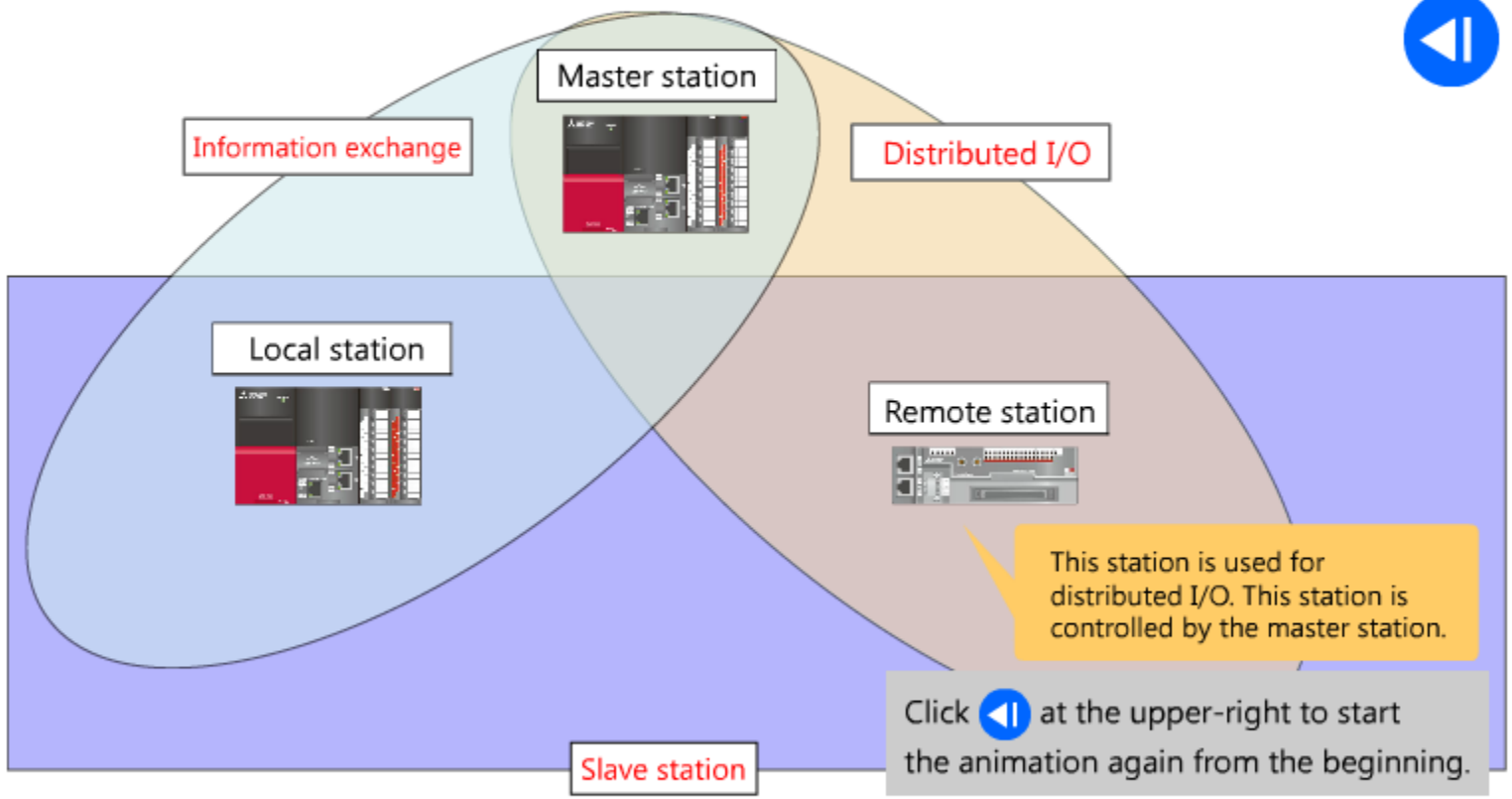
The following animation shows the timing at which each station sends data with the cyclic transmission method.



[Key feature of FA networks including CC-Link IE Field Network]
 Cyclic transmission enables each station to send data cyclically in a sequential order and ensures that data is sent reliably, regardless of the number of stations on the network or frequency of communications. For this reason, this method is suitable for control of production equipment for which cyclical transmission of data is desirable.





1.3.7 CC-Link IE Field Network configuration

This section describes network functions and the types of stations that configure the network.



1.3.8 Types of master stations

The following table describes the different types of modules that can function as master stations on CC-Link IE Field Network.

Station type	Device type	Features	Exterior appearance
Master station	Integrated CPU module type	Network functionality including CC-Link IE Field Network, CC-Link IE Control Network, and Ethernet is integrated into the CPU module. A different type of network can be used with each connection port.	
	Multi-network type	This network module supports multiple network types including the CC-Link IE Field Network, CC-Link IE Control Network, and Ethernet. A different type of network can be used with each connection port.	
	Dedicated type	This module supports only the CC-Link IE Field Network. This module is relatively inexpensive.	
	Network interface board	This board is used to connect personal computers to the CC-Link IE Field Network. This board is a PCI Express card.	

This course covers network configurations in which the integrated CPU module type is used as the master station.

1.3.9 Types of slave stations

The following table describes the different types of modules that can function as slave stations on CC-Link IE Field Network.

Station type		Device type
Slave station	Local station	Stations that function as master stations can also be used as local stations.
	Remote station	Programmable controller and input/output connections
		Integrated functionality

- Remote head module
- Block type remote module
- HMI (GOT)
- Inverters (FREQROL)
- Servo amplifiers (MELSERVO)



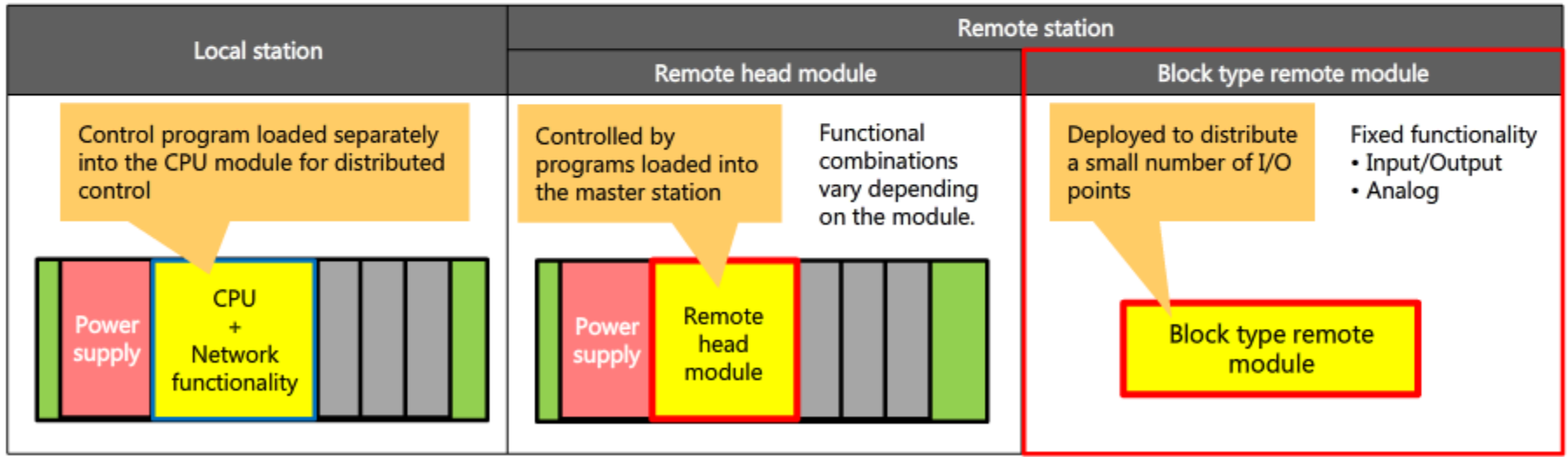
Remote head module



Block type remote module

Slave Station Module Configuration

The following three types are available. Select the configuration in accordance with the required number of I/O control points and location of the CPU module that controls I/O.

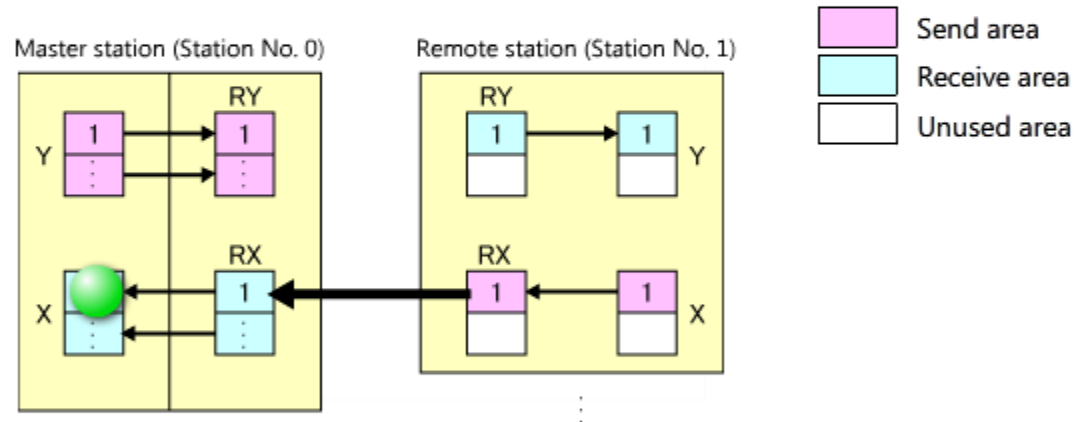


This course covers network configurations in which the block type remote module (input/output mixed type) is used as the remote station.

1.3.10 Link devices

Link devices are FA network devices that are not directly controlled by programs.
 Link devices and CPU module devices are automatically updated (link refresh).
 Link refresh enables master stations to process I/O signals as if they were accessing I/O modules installed on the base unit.

Cyclic transmission by master and remote stations



Features:
 X and Y signals are NOT switched for master-remote communication. The master station's output signals become the remote station's outputs and the remote station's inputs become the master station's inputs.

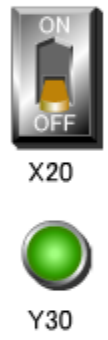
1.3.11 Programs and actual operation

Cyclic transmission by master and remote stations

Because CC-Link IE Field Network is designed for high-speed cyclic transmission, the state of station link devices are transferred to other stations instantly.

The following animation illustrates an example of the most basic communication between two stations.

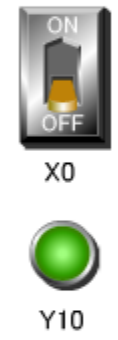
When a switch is turned on or off, this state change is transferred to the other station.



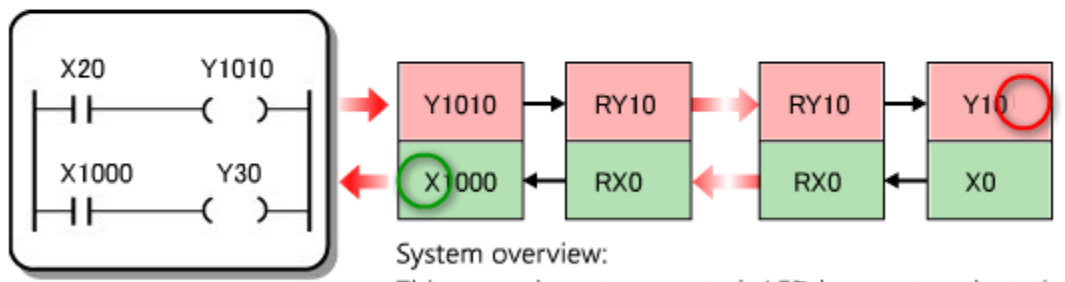
Master station (Station No. 0)



Remote station (Station No. 1)



- Output (ON)
- Output (OFF)
- Input (ON)
- Input (OFF)



System overview: This example system controls LED lamps at each station to indicate the status of link registers.

Chapter 2 CC-Link IE Field Network system configuration and specifications

This chapter covers the network configuration, specifications, and parameter settings for CC-Link IE Field Network (Distributed I/O Control).

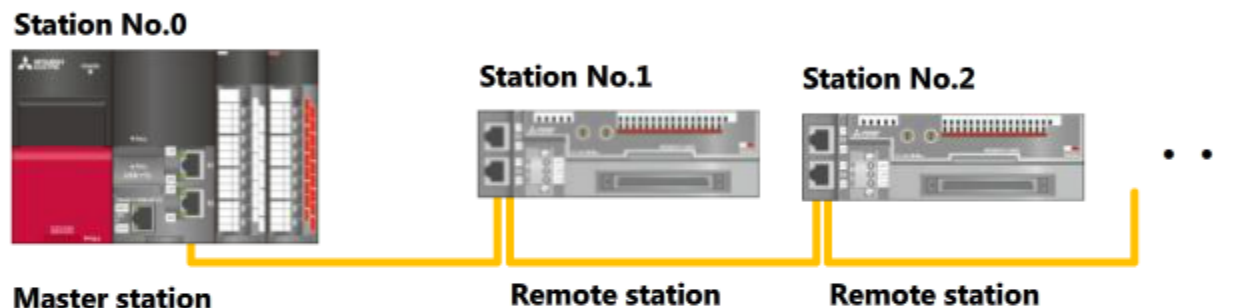
- 2.1 CC-Link IE Field Network configuration for distributed I/O control
- 2.2 CC-Link IE Field Network specifications
- 2.3 CC-Link IE Field Network module parameters

2.1 CC-Link IE Field Network configuration for distributed I/O control

This section describes the network configuration and network modules used to perform distributed I/O control.

Distributed I/O control systems are configured with one "master station" loaded with the network settings and one or more "remote stations".

The station number of the master station is fixed to 0. Station numbers are assigned to remote stations so that each station has a different number.



(1) Role of master stations

The master station contains the network settings used to control the network.

The master station is configured with the device send area and correspondence of the device and link devices. Each network can have only one master station.

(2) Role of remote stations

Remote stations output the signals received from the master station CPU module and send input signals to the master station CPU module.

Remote stations do not have CPU modules.

This section describes the basic specifications of CC-Link IE Field Network.

[Confirmation of specifications]

The following table summarizes some of the more important specifications to check before choosing the CC-Link IE Field Network.

CC-Link IE Field Network specifications are defined to ensure sufficient performance for common use scenarios. For large systems, make sure that the following specifications are satisfactory for your environment.

Item	Description
Size of network: Number of connected stations	<p>Add the total number of local stations and remote stations that will connect to the network and consider if one master station is capable of controlling this number of stations.</p> <p>When there are too many stations for one master station to control, consider dividing the network into multiple networks and using one master station for each network.</p> <p>Take note of the "Maximum number of stations per network" specification.</p>
Size of network: Number of link points	<p>The number of link points, which represents the amount of data that each network can handle, is limited.</p> <p>Take note of the "Maximum number of link points per station" and "Maximum number of link points per network" specifications.</p>
Connection type	<p>Select the connection type based on the actual floor layout, arrangement of installed equipment, and the desired fault tolerance.</p> <p>Note that a switching hub will also need to be purchased for star topologies.</p> <p>Length of cables is also an important factor to consider when selecting the connection type.</p> <p>The "Maximum station-to-station distance" represents the maximum length of cables between stations. The "Overall cable distance" represents the maximum length of all connected cables.</p> <p>Cable lengths can be extended with switching hubs in star topologies.</p> <p>The maximum number of interconnected switching hubs between end points is 20.</p> <p>Star topologies and line topologies can be combined to create complex topology arrangements as necessary.</p>

2.2.1

List of CC-Link IE Field Network specifications

The following table lists some of the CC-Link IE Field Network specifications. The items and descriptions are limited to the ones related to this course.

Item	Description
Maximum number of link points per network	RX/RY: 16384 points RWr/RWw: 8192 points
Maximum number of link points per station	RX/RY: 2048 points RWr/RWw: 1024 points
Maximum number of stations per network	120 stations excluding the master station
Maximum number of networks	239 networks
Maximum station-to-station distance	100 m
Overall cable distance	Line topology: 12 km Star topology: Depends on the system configuration
Transmission cable	Double-shielded Ethernet cable, category 5e or higher, straight cable

2.3

CC-Link IE Field Network module parameters

Module parameters are set in accordance with the system specifications.

Module parameters are set with engineering software and then written to CPU modules. CPU modules transfer these set parameters to the other network modules.

[Minimum required parameters]

The following table lists the parameters that must be set or checked to use the CC-Link IE Field Network.

Parameter	Purpose/Function	Typical setting
Station Type	Sets the function of the network module.	Master station
Network Configuration Setting	Sets the range of station send areas.	RX/RX range
Refresh Settings	Sets the assignment of link devices for when data is transferred to CPU module devices.	Example • RX0000H to RX01FFH ← X1000H to X11FFH • RY0000H to RY01FFH → Y1800H to Y19FFH

Chapter 3 Cyclic transmission (for remote I/O control) by the master station and remote stations

This chapter describes the procedures of start-up, operation check, and troubleshooting of cyclic transmission (for remote I/O control) by the master station and remote stations on CC-Link IE Field Network.

The engineering software MELSOFT GX Works3 is used in the description of these procedures.

- 3.1 Hardware start-up in the example system
- 3.2 Setting master station module parameters
- 3.3 Setting slave station parameters
- 3.4 Master station control programs
- 3.5 Troubleshooting

3.1 Hardware start-up in the example system

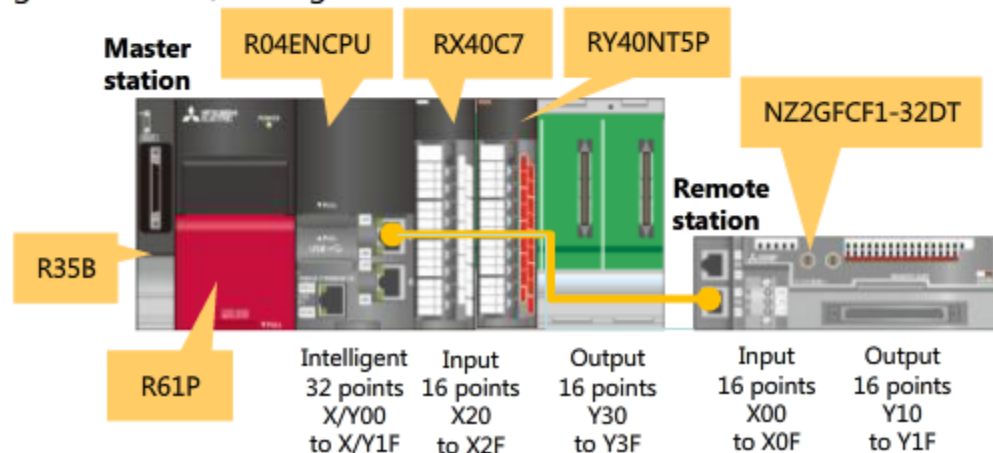
This section describes the most basic cyclic transmission for remote I/O control between the master station and a remote station.

3.1.1 System configuration and specifications

The following section describes the specifications of the system configured in this course. This system includes the master station and one remote station.

Specification			Description	
Connection method			Line topology	
Network module	Master station	Station No.0	R04ENCPU	Programmable controller CPU module with built-in CC-Link IE
	Remote station	Station No.1	NZ2GFCF1-32DT	Block type remote module, I/O combined module 16-point DC input (X00H to X0FH), 16-point transistor output (Y10H to Y1FH)
Link device assignment			Device areas accessible by the remote station (station No.1) Bit devices: RY10H to RY1FH → Y10H to Y1FH RX00H to RX0FH ← X00H to X0FH	The master station can send/receive data to/from all areas. Remote stations can send/receive data to/from only assigned areas. The send area of the master station corresponds to the receive areas of remote stations. The send areas of remote stations correspond to the receive area of the master station. (Refer to 1.3.10 for more information.)

The module configuration and I/O assignment are shown below.



3.1.1 System configuration and specifications

Link device area assignment

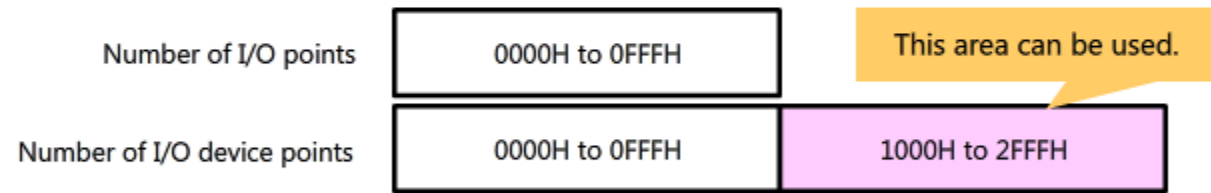
When the link devices are assigned to the CPU module devices, the area is determined based on the CPU module specifications. Check the following two items.

- Number of I/O points: Number of points that can be used by the module installed on the base unit
- Number of I/O device points: Range of usable devices including CC-Link IE Field Network and other networks

MELSEC iQ-R Series CPU modules have the following specifications.

- Number of I/O points: X/Y0000H to X/Y0FFFH
- Number of I/O device points: X/Y0000H to X/Y02FFFH

Thus, the area between 1000H to 2FFFH can be assigned for refresh of link devices as they do not conflict with area used for modules installed on the base unit.

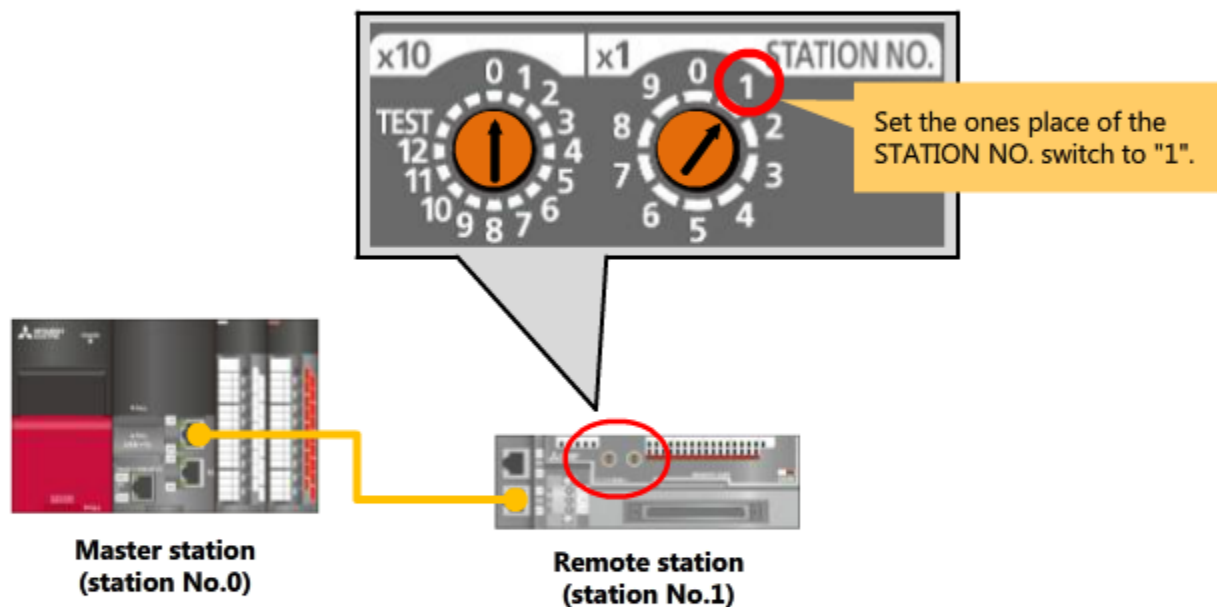


3.1.2

Setting the station number for the remote station

Remote stations need to be configured with a station number. Block type remote modules have a rotary switch on the front side to set the station number.

Set the STATION NO. switch to 1 as this remote station has been assigned the station number of 1.*



*Station numbers for remote stations are always set to 0 at the factory.

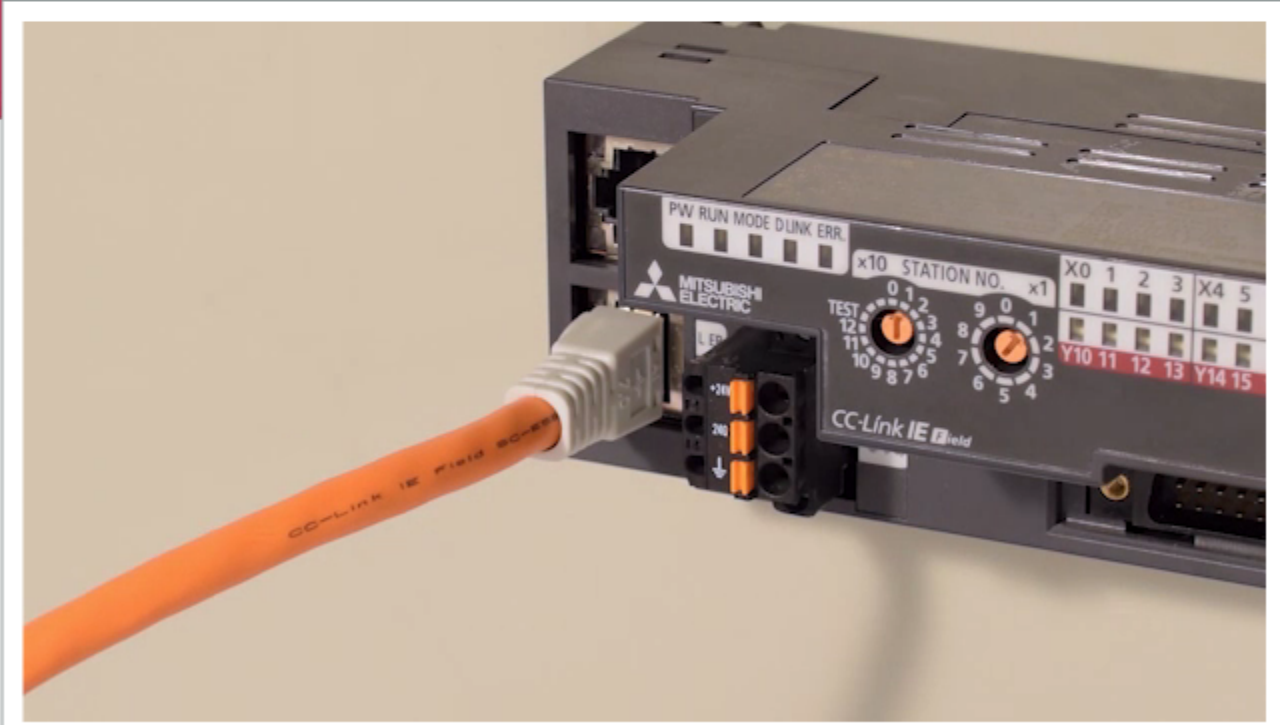
3.1.3 Connecting transmission cables

CC-Link IE Field Network modules have two connection ports labeled P1 and P2. Network modules operate in the same manner regardless of which port is used for cable connections. However, determining a particular connection policy, such as connecting from port P1 to port P2 of the next device in the chain, helps make cable laying and post-installation operation checks more efficient.

R04ENCPU



NZ2GFCF1-32DT

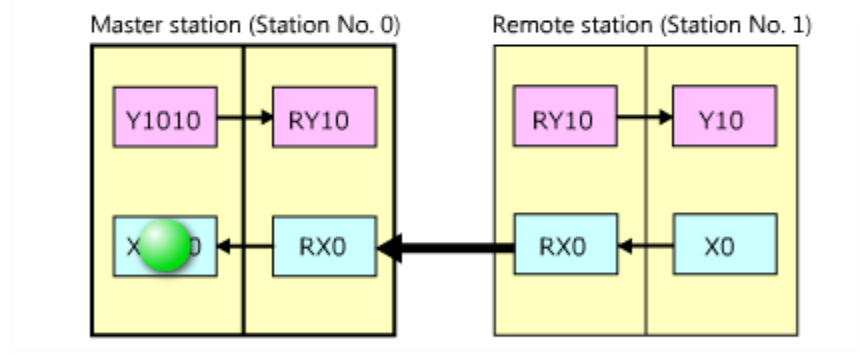


3.2 Setting master station module parameters

Master station module parameters must be set in accordance with the system configuration.

Parameter	Purpose/Function	Settings
Station Type	Sets the function of the network module.	Master station
Network Configuration Settings	Sets the range of remote station send areas.	NZ2GFCF1-32DT: RX/RX0000H to RX/RX001FH
Refresh Settings	Sets the assignment of link devices for when data is transferred to CPU module devices.	<ul style="list-style-type: none"> • Y1010H to Y101FH → RY0010H to RY001FH (16 points) • RX0000H to RX000FH ← X1000H to X100FH (16 points)

Cyclic transmission (remote I/O control) by the master station and a remote station



The devices shown in this animation represent only those used in the system for this course.

3.2.1 Network module arrangement

This system configured in this course uses a CPU module with built-in network functionality. In the module configuration diagram, configure a CPU extension module that provides the network functionality to the slot next to the CPU module.

The information within the parentheses in network module model names, such as "_RJ71EN71(CCIEF)", indicates the type of network.

As we are using the CC-Link IE Field Network in this course, select "_RJ71EN71(CCIEF)".

Module Configuration

Element Selection

(Find POU)

Display Target: All

Motion CPU

NCCPU

Power Supply

CPU Extension

R6RFM

R6SFM

_RJ71EN71(CCIEF) Ethernet (1000BASE-T/100BASE-TX/10BASE-T: 2 channels)

_RJ71EN71(CCIEF) Ethernet (1000BASE-T/100BASE-TX/10BASE-T: 2 channels)

_RJ71EN71(I(E+IEC)) Ethernet (1000BASE-T/100BASE-TX/10BASE-T: 2 channels)

_RJ71EN71(E+IEF) Ethernet (1000BASE-T/100BASE-TX/10BASE-T: 2 channels)

Input

Output

_RJ71EN71(CCIEF)

[Overview]

CC-Link IE Function Built-in CPU Ethernet interface module [Port 1/Port 2: CC-Link IE Field]

[Specifications]

CC-Link IE Function Built-in CPU,1000BASE-T/100BASE-TX/10BASE-T: 2 channels

[Number of I/O Points]

32

[SV DC Consumption Current (A)]

0.820

[Number of Occupied Slots]

1

POW CPU 0 2 3 4

STA# 0

R04ENCPU

Configure the slot next to the CPU module with [_RJ71EN71(CCIEF)] under "CPU Extension".

Select the proper type of network, such as "(E+IEF)" for example, when you desire to use different network functionality.

*E+IEF: **E**thernet and CC Link **IE** Field

3.2.2

Setting the station type and station number on the master station

The station type for the CPU module with built-in CC-Link IE must be set to the master station.

From the [Navigation] window, select [Parameter], then [Module Information], then [0000:_RJ71EN71(CCIEF)], and then [Module Parameter (CC-Link IE Field)]. From here, open the [Module Parameter Setting] window and configure [Required Settings] as follows.

Item	Setting
Station Type	
Station Type	Master Station
Network Number	
Network Number	1
Station Number	
Setting Method	Parameter Editor
Station Number	0
Parameter Setting Method	
Setting Method of Basic/Application Settings	Parameter Editor

Set the station type to [Master Station].

Complex systems should be divided into multiple, smaller networks. The system configured for this course is a simple network, so this setting can be left at the initial value of 1.

The station number of the master station is 0. Setting the station type to [Master Station] will set the number to 0.

3.2.3 Creating the network configuration

The configuration of stations that connect to the network and the range for link devices used by remote stations must be set.

On the [Module Parameter Setting] window, select [Basic Settings], then [Network Configuration Settings], and then [Detailed Setting] to open the [CC IE Field Configuration] window.

The configuration procedure is described in five steps that must be performed in order.

(4) Set the range of RX and RY link devices that will be used by slave stations.

The remote module in this example system uses 16 points for input and 16 points for output. Set a range of 0000H to 001FH for 32 points of devices.

(5) These link devices must be set to exchange word data. These devices are not used in this system, so this setting can be left at the initial values.

The screenshot displays the 'CC IE Field Configuration' window. At the top, it shows 'Mode Setting: Online (Standard Mode)' and 'Method: Start/End'. Below this is a table with columns: No., Model Name, STA#, Station Type, RX/Ry Setting (Points, Start, End), RWw/RWv Setting (Points, Start, End), and Reserve Switch. The table contains two rows: a Host Station (No. 0) and an Intelligent Device Station (No. 1, Model Name NZ2GFCF1-32DT). The RX/Ry Setting for the slave station is 32 points from 0000 to 001F. The RWw/RWv Setting is 20 points from 0000 to 0013. A red box highlights the entire row for the slave station.

Below the table is a graphical network diagram. It shows a 'Host Station' (STA#0) connected to a slave station (STA#1) labeled 'NZ2GFCF1-32DT'. A red arrow points from the slave station in the diagram to the corresponding row in the table above.

On the right side of the window, there is a 'Module List' showing various modules. The 'NZ2GFCF1-32DT 32 points' module is highlighted with a red box. Below the module list, there is an '[Outline]' section showing details for the selected module, including 'DC input transistor output combined module (FCN connector type)', 'DC input 32 points', '24VDC positive/negative common shared type', 'Transistor output 16 points', '24VDC (0.5A) transistor output (sink type)', 'FCN connector 1-wire', '[Manufacturer Name] Mitsubishi Electric', and '[Station Type] Intelligent Device Station'.

(3) Once modules have been arranged, the row to enter the module settings is added.

(1) Drag and drop slave station modules from the Module List onto the diagram.

(2) The network configuration is illustrated in an easy-to-understand graphical format.

3.2.4 Link device assignment

Assignment of CPU module devices and link devices must be configured to determine the ranges used for data transfer during link refresh.

On the [Module Parameter Setting] window, select [Basic Settings], then [Refresh Setting], and then [Detailed Setting] to open the refresh setting window.

Select the link devices here.

Set the range for each link device here.

Set the CPU module devices used to transfer link device data here.

SB and SW are special link devices. They store network status and other related data. These devices are not used in this course.

	Link Side					CPU Side				
	Device Name	Points	Start	End		Target	Device Name	Points	Start	End
	SB	512	00000	001FF	↔	Module Label				
	SW	512	00000	001FF	↔	Module Label				
	RX	16	00000	0000F	↔	Specify Device	X	16	01000	0100F
	RY	16	00010	0001F	↔	Specify Device	Y	16	01010	0101F
3					↔					
4					↔					

Only the RX0 and RY10 link devices are used in this system, and these devices are set to the **minimum value of 16 points**.

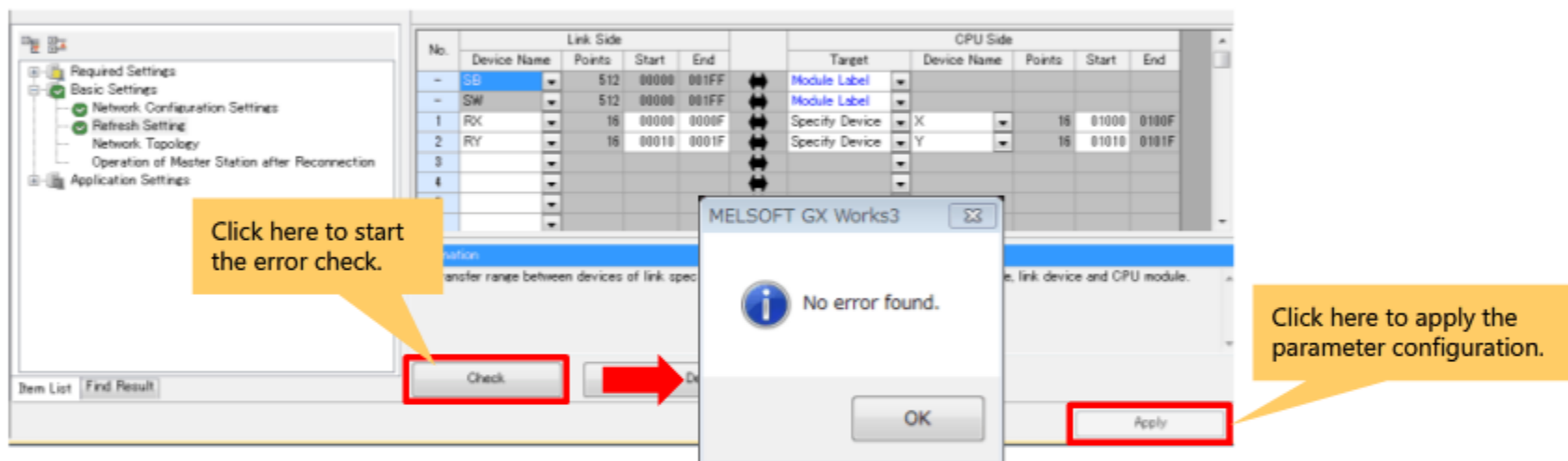
*The maximum number of link points per one network of CC-Link IE Field Network is 16384 points, which is 4000 in hexadecimal. (Refer to 2.2.1 for more information.)
To use all areas, configure this setting to 0000H to 3FFFH. However, limiting the range reduces the amount of data transferred and speeds up the transfer cycles.

Set the range for CPU module devices here. The CPU module does not use the device area from 1000H to 2FFFH for modules installed on the base unit. Assign link devices starting from 1000H. (Refer to 3.1.1 for more information.)

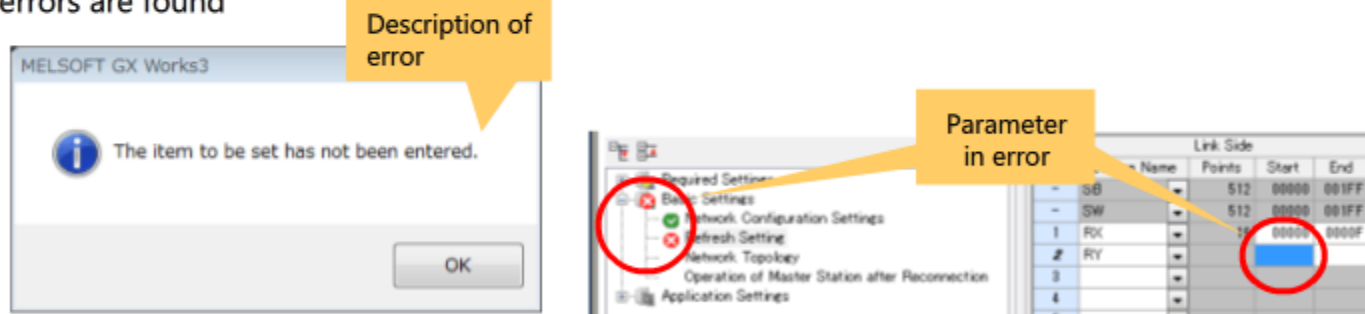
3.2.5

Error checks

After module parameters have been configured for the master station, you must check to see if there are any errors in the configuration. If any errors are found during the check, the parameter in error and a description of the error appear.



If errors are found



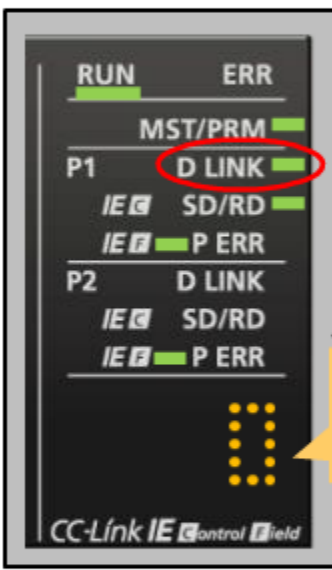
After checking that no errors were found, apply the parameters, convert all, write settings to the CPU module, and then reset the CPU module.

3.3 Setting slave station parameters

After the master station parameters have been set, parameters for slave stations (remote stations) must be set.

3.3.1 Establishing the link between master station and slave stations

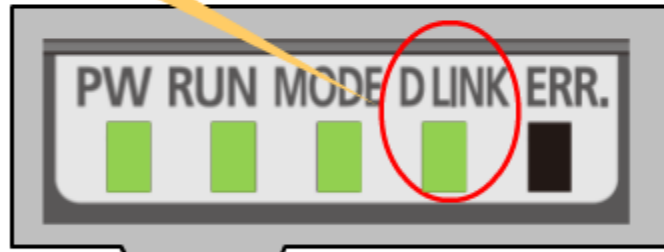
Check that the network is operational before setting remote station parameters. After resetting the CPU module, check that LEDs on modules turn on as illustrated in the following figures.



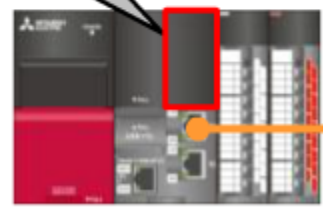
The [D LINK] LED should turn on if the network is operational.

The master station number of "0" should appear here.

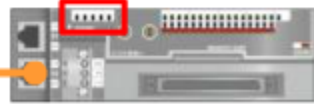
LED status of the CPU module network part



LED status of the block type remote module



Master station (station No.0)



Remote station (station No.1)



3.3.2

Automatic configuration of remote station parameters

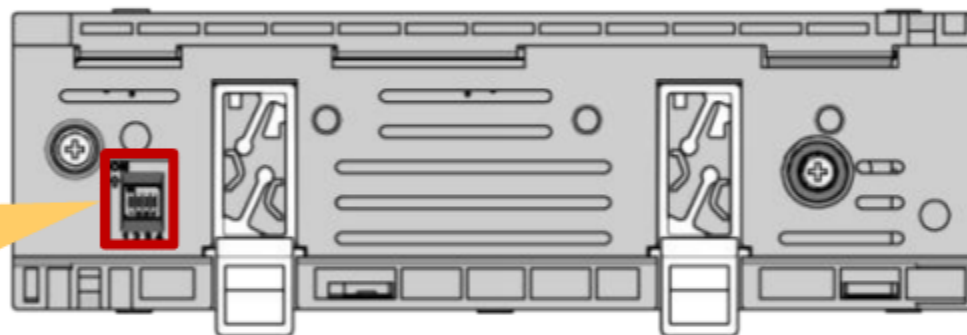
Block type I/O modules must be initialized before they will start operating.

Enable automatic initialization by changing a part of parameters.

Enable the "Automatic I/O parameter setting" to automatically set the remote station parameters that are required for basic operation.

NZ2GFCF1-32DT has function setting switches on the back of the module.

Turn on the function setting switch No.1.



Back of the remote module

In this scenario, remote station parameters were set automatically using the automatic I/O parameter setting function. However, not all models have the function setting switches.

3.3.3

Reading and writing parameters

Parameters for remote stations without functional settings switches are set by reading and writing parameters from/to remote stations.

The setting procedure is described below.

Parameter Processing of Slave Station

Target Module Information: NZ2
Sta

Method selection: Parameter write
The parameters are written to the target module.


Parameter Information
Checked parameters are the targets of selected processes.

Select All Cancel All Selections

Name	Initial Value	Unit	Read Value	Unit	Write Value	Unit	Setting Range	Description
Station parameter								
<input checked="" type="checkbox"/> Input response time setting	5: 10ms		5: 10ms		5: 10ms			The input modul
<input checked="" type="checkbox"/> Output HOLD/CLEAR setting	0: CLEAR		0: CLEAR		0: CLEAR			Set whether to t
<input checked="" type="checkbox"/> Cyclic data update								Set the cyclic d
<input checked="" type="checkbox"/> Mode switch								Set the operatio
<input checked="" type="checkbox"/> Initial operation sett								Set whether the
Basic module parameter								
<input checked="" type="checkbox"/> Number of ON times								Set the number
--- Number of ON tim								The total numbe
--- Number of ON tim								The total numbe
--- Number of ON tim								The total numbe
--- Number of ON tim								The total numbe

MELSOFT Series GX Works3

The execution of the process "Parameter write" is completed.


Click  at the upper-right to start the animation again from the beginning.

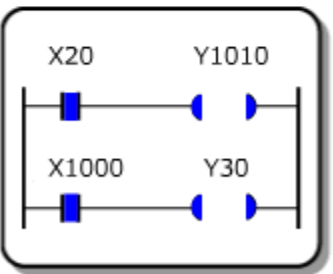
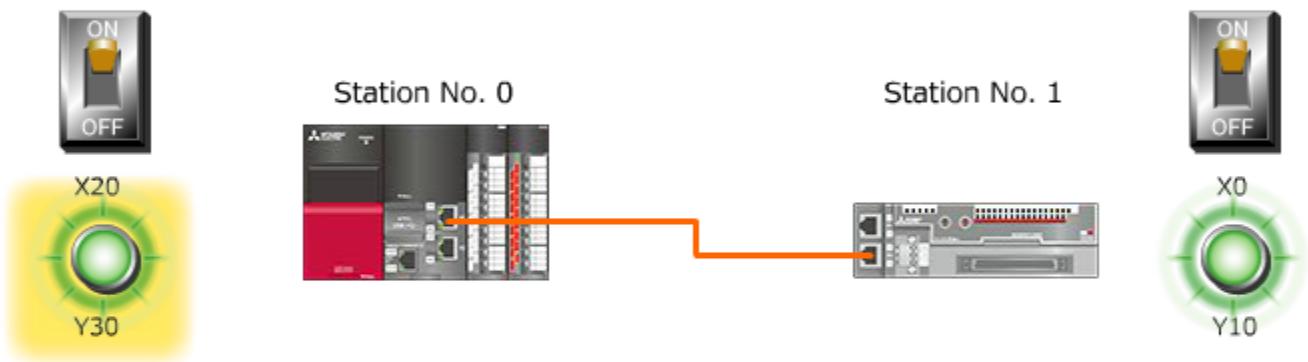
3.4 Master station control programs

Control programs of the master station must be created.

3.4.1 Control programs

This system turns on the lamp of the other station.

Press the  button to confirm the operation.

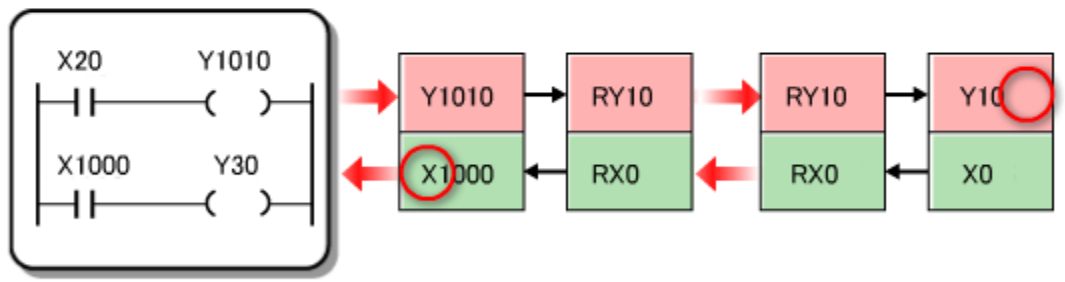
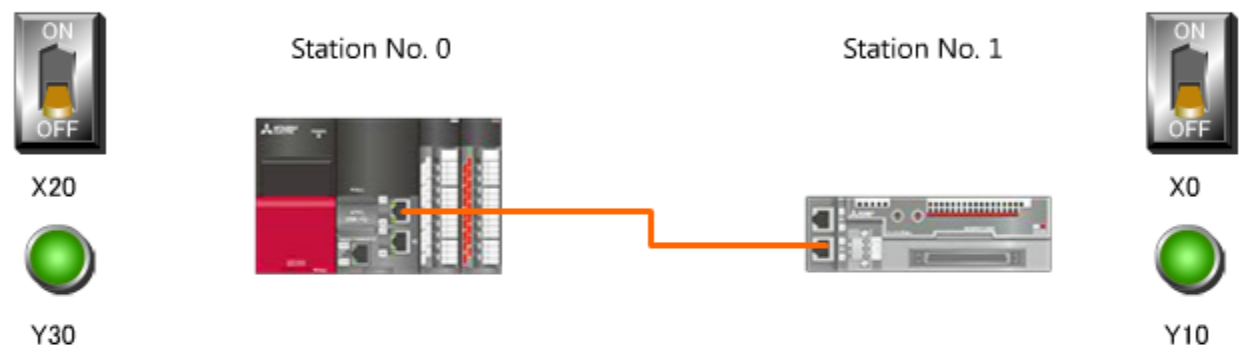


- Station No. 0
Station No. 1
- (5) Operator turns ON the X0 switch of Station No. 1.
 - (6) The status is transferred via the network.
 - (7) Control program turns Y30 ON.
 - (8) Lamp Y30 turns ON.



3.4.2 Checking operation

The CPU module handles input/output of the block type remote module as though that of a module installed on the base unit. The I/O devices assigned to the remote station are constantly and automatically refreshed by link refresh.



	Output (ON)
	Output (OFF)
	Input (ON)
	Input (OFF)

3.5

Troubleshooting

This section describes the corrective action procedures to troubleshoot errors that may occur when the network is started up after all configuration is complete.

3.5.1

Troubleshooting procedure

Use the following procedure to try resolving issues.

Check whether the [PROGRAM RUN] LED on the CPU module is turned on.



Check whether the network module LEDs are normal.



Use the CC-Link IE Field Diagnostics of engineering software to check the status.

If this LED is not turned on, this may indicate that the CPU module itself is not functioning properly (not related to network functionality).

Use "Module Diagnostics" of engineering software to check error information and then eliminate the error cause.

Check the status of LEDs on the front of the network module.

Details are described in Section 3.5.2 of this course.

If the LEDs on the front of the network module indicate that an error has occurred, use "CC-Link IE Field Diagnostics" of engineering software to check the error details and then eliminate the error cause.

Details are described in Section 3.5.3 of this course.

3.5.2

Checking the LEDs on remote station network modules

If the network does not seem to be operating normally, you can check the information below from the LEDs on the front of modules without having to access engineering software.



Block type remote module LEDs

Name of LED	Description	Status		Troubleshooting procedure
		Normal	Error	
PW	Power status	On	Off	<ul style="list-style-type: none"> • Check if the power is turned on
RUN	Operating status	On	Off	<ul style="list-style-type: none"> • Check if the power voltage is within specifications
MODE	Operation mode (Turns on when online.)	On	Off or flashing	<ul style="list-style-type: none"> • Check if the station setting switch is not set to [TEST], which is used to test hardware
D LINK	Communication status	On	Off or flashing	<ul style="list-style-type: none"> • Check for any issues in the transmission path. This includes cable length, use of improper cables, cable disconnection, switching hub failures, pathing errors. • Check the destination station for errors or failures • Check for any station number conflicts
ERR.	Error status	Off	On or flashing	<ul style="list-style-type: none"> • Use engineering software to check details of errors

3.5.3 CC-Link IE Field diagnostics

If the network does not seem to be operating normally and you have access to engineering software, execute [CC-Link IE Field Diagnostics] from the [Diagnostics] menu.

CC-Link IE Field diagnostics graphically shows the actual network wiring. This helps you to quickly identify the error location and troubleshoot the issue.

The screenshot displays the 'Actual network wiring' interface. It features a 'Network Status' window with the following data:

Total Slave Stations (Parameter)	2	Total Slave Stations (Connected)	1	Current Link Scan Time
----------------------------------	---	----------------------------------	---	------------------------

Below the status window, a diagram shows the network topology: Master:0 (P1) connected to Intelli:1, which is connected to Remote:2. A red gear icon with a red 'X' is placed on the connection between Intelli:1 and Remote:2, indicating a disconnection. A red callout bubble labeled 'Disconnection' points to this gear icon.

In the bottom left, a 'Selected Station Communication Status Monitor' window shows:

Sta. No. 1	Error	Mode: Online
MAC Address:38-E0-8E-97-53-D4		

Below this window, a physical network switch is shown with a red gear icon and 'X' on its 'PORT 1' cable, and a text label 'PORT 1 Cable Disconnected...'. The text 'The error location can be easily identified.' is overlaid on the bottom of the screenshot.

Test**Final Test**

Now that you have completed all of the lessons of the **CC-Link IE Field Network (MELSEC iQ-R Series)** course, you are ready to take the final test. If you are unclear on any of the topics covered, please take this opportunity to review those topics.

There are a total of 6 questions (10 items) in this Final Test.

You can take the final test as many times as you like.

How to score the test

After selecting the answer, make sure to click the **Answer** button. Your answer will be lost if you proceed without clicking the Answer button. (Regarded as unanswered question.)

Score results

The number of correct answers, the number of questions, the percentage of correct answers, and the pass/fail result will appear on the score page.

Correct answers : 6

Total questions : 6

Percentage : 100%

To pass the test, you have to answer **60%** of the questions correct.

Proceed

Review

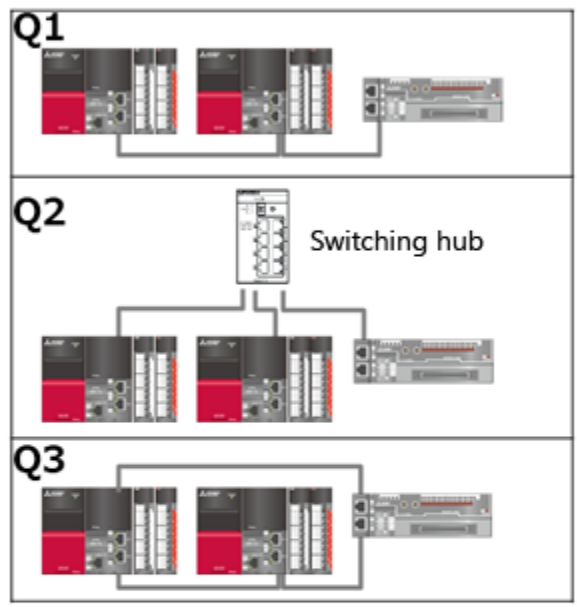
- Click the **Proceed** button to exit the test.
- Click the **Review** button to review the test. (Correct answer check)
- Click the **Retry** button to retake the test again.

Test Final Test 1

✔ Select the name of network topologies shown in the figure.

- Q1 ✔
- Q2 ✔
- Q3 ✔

Back



- Select the type of FA network communication that corresponds with the following description.

[Q1] Shares information between programmable controller systems.

[Q2] Uses networks to distribute I/O by transferring the input/output states.

Q1 ▼



Q2 ▼



Back

- ✔ Select the FA network data communication method that corresponds with the following description.

[Q1] Data in the device area specified by module parameters is exchanged automatically and cyclically.

[Q2] Data is exchanged only when a communication request is issued between programmable controllers in a network.

Q1 ▼



Q2 ▼



Back

✓ Select the correct description about the remote I/O control.

- Control is performed by loading programs into remote stations.
- ✓ Remote stations are controlled as if they were installed on the base unit.

Back

Test**Final Test 5**

Select the correct description about the diagnostic function of CC-Link IE Field Network.

- Faulty areas in the network are displayed on the engineering software window in an easy-to-understand format to help with fast recovery.
- Engineering software is required to check network status.

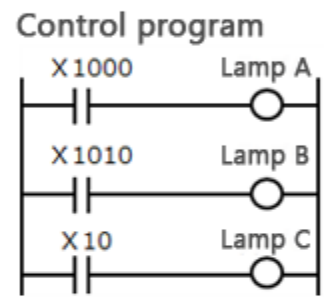
Back

Test Final Test 6

✓ The following figure shows a master station control program for remote I/O control. Select the lamp that turns on when input switch X10 at the remote station is turned on.

- Remote station: Block type input module, 32 DC input points (X0 to X1FH)
- Range for link devices used with remote stations: RX0000H to RX001FH
- Refresh settings: X1000H to X101FH (CPU side) ⇔ RX0000H to RX001FH (link side)

- Lamp A
- ✓ Lamp B
- Lamp C



Network configuration settings

STA#	Station Type	RX/RV Setting		
		Points	Start	End
0	Master Station			
1	Intelligent Device Station	32	0000	001F

Refresh settings

Link Side					CPU Side				
Device Name	Points	Start	End		Target	Device Name	Points	Start	End
SB	512	0000	001FF	↔	Module Label				
SW	512	0000	001FF	↔	Module Label				
RX	32	0000	001F	↔	Specify Devi	X	32	01000	0101F

Back

Test**Test Score**

You have completed the Final Test. Your results are as follows.
To end the Final Test, proceed to the next page.

Correct answers : **6**

Total questions : **6**

Percentage : **100%**

Congratulations. You passed the test.

You have completed the **CC-Link IE Field Network (MELSEC iQ-R Series)** course.

Thank you for taking this course.

We hope you enjoyed the lessons and the information you acquired in this course will be useful in the future.

You can review the course as many times as you want.

Review

Close