PLC

CC-Link (MELSEC iQ-F Series)

This training course explains from construction to programming of the CC-Link system, one of FA field networks.
Click the [Go] button provided at the upper right corner of the screen to start this course.

L(NA)08811ENG

Introduction

Purpose of the Course

This training course is prepared for those who will handle CC-Link for the first time and those who will actually construct a CC-Link data link system using a programmable controller to learn the following:

- Fundamental knowledge
- Basic framework of data link
- Basic parameter settings for each system configuration
- Programming method
- System startup
- Operations check

Those who will take this course should have finished the following courses or have equivalent knowledge:

- First FA Network Course
- MELSEC iQ-F Series Basics Course
- Programming Basics (Ladder Language) Course

Introduction Course structure

This course consists of the following chapters:

Chapter 1: Outline of CC-Link

Features and basic framework of the CC-Link system

Chapter 2: Specifications and Settings

Basis of CC-Link system construction including the CC-Link system specifications, basic terms and basic settings for operations

Chapter 3: Startup of Remote I/O System

Settings and operations required to start up a remote I/O system

Chapter 4: Extendibility and Reliability of CC-Link

Utilization of remote I/O stations not learned in this course, and framework for reliability improvement

Final Test

Passing grade: 60% or more

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	TOC	"Table of Contents" will be displayed, enabling you to navigate to the desired page.
Exit the learning	X	Exit the learning.

Cautions for Use

Safety precautions

When you learn based on using actual products, please carefully read the safety precautions in the corresponding manuals, and handle such products correctly while paying rigid attention to safety.

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 1.047Z

Chapter 1 Outline of CC-Link

■ Range explained in this course

The latest version as of September 2018 is Ver. 2, whose functions are extended from those of Ver. 1.1.
This course explains CC-Link Ver. 1.1 so that you can understand the basis.
Refer to the corresponding manual for the specifications of Ver. 2.

■ Role of CC-Link

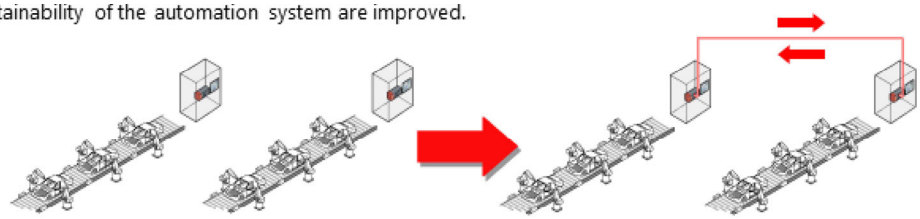
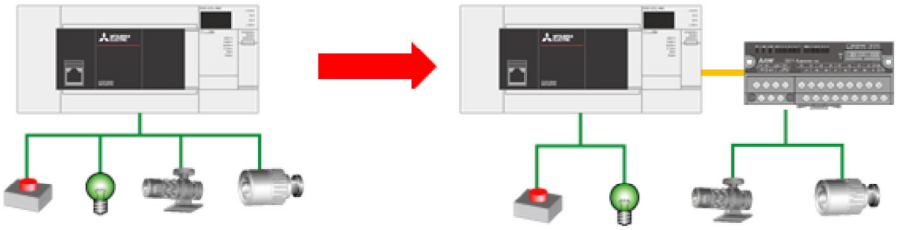
CC-Link stands for "Control & Communication Link", and aims at fusion of control and communication.
CC-Link is an open network whose specifications are widely disclosed to vendors of sensors, valves, etc. used in the FA environment.
You can construct a system suitable for your purpose by combining products of many participating vendors (partner manufacturers).

■ Background where FA networks are required

Demand for rafactorytionalization promotes the trends of increased scale and integration.
At such FA (automation) sites, networks are essential to transmission and sharing of information.

1.1 Necessity of FA networks

Let's review FA networks before starting this course.
FA networks are used for two purposes shown below.

Purpose of network	Description
Sharing of information (Cyclic transmission by the master station and local stations)	Information is shared among PLC systems. By connecting distributed equipment (controllers) via a network, the flexibility, extendibility and maintainability of the automation system are improved. 
Distributed arrangement of inputs and outputs (Cyclic transmission by the master station and remote stations)	Simple extension of I/O cables can cause troubles, and thick I/O cables are bulky when bundled together. Distributed I/O arrangement does not extend I/O cables, but transfers the I/O status via a network. Sequence programs are stored in one CPU module. Failure positions can be checked easily, and a system can be constructed at a relatively low cost. 

CC-Link corresponds to the both purposes.
This course explains the most basic contents, distributed arrangement of inputs and outputs using CC-Link.

1.2 CC-Link family and position of CC-Link

The table below shows differences in the CC-Link family.

Type	Features	Speed	Wiring characteristics
CC-Link IE Controller Network	High speed and high reliability (highly resistant to noise and failure)	1 Gbps*1	Optical fiber cables Ring connection
CC-Link IE Controller Network	High speed and highly flexible wiring	1 Gbps*1	Twisted pair cables Multiple topologies*2
CC-Link IE Field Network	High speed and highly flexible wiring	1 Gbps*1	Twisted pair cables Multiple topologies*2
CC-Link IE Field Network Basic	Easily applicable to small-scale equipment that does not require high-speed control	100 Mbps	Twisted pair cables Star connection
CC-Link	System construction at relatively low cost, many past results and various types of connectable equipment	156 kbps to 10 Mbps	Bus connection*3
CC-Link Safety	Safety field network of CC-Link to realize safe system construction	156 kbps to 10 Mbps	Bus connection*3

*1 1 Gbps:
1×10^9 bits are transferred in 1 second.

*2 Topology:
Wire configuration.
Highly flexible topologies realize more complicated wiring and system layouts.

*3 Bus connection:
Connection method that connects modules to one signal cable

1.3 Features of CC-Link

CC-Link has the following features:

- Has a long history and many past results.
- Enables construction of a remote I/O system at a relatively low cost.
- Enables construction of a system by combining I/O equipment, sensors, valves and actuators by partner manufacturers*1 in compliance with CC-Link.
- Offers distributed control*2 through communication among controllers.
- Assures high punctuality*3 of the network communication time.
- Offers satisfactory RAS*4 functions.

*1: Partner manufacturers:
Vendor companies of sensors, actuators, etc. that participate in the CC-Link Partner Association (CLPA)

*2: Distributed control:
CPU modules are distributed according to the control contents, different from centralized control in which one CPU module performs every type of control.

*3: Punctuality:
The characteristic that responses are returned in a specified period.

*4: RAS:
"RAS" stands for "reliability, availability and serviceability", and is used as an index of stable, safe and secure use.

1.4 Two data communication methods

The following two types of data communication methods are used in PLC networks:

- Cyclic transmission
- Transient transmission

The table below shows differences and advantages of each method.

Method	Data communication outline	Transmission/ reception program
Cyclic transmission	Cyclically and automatically transmits and receives the data area specified in advance by module parameters*1.	Not required. (Performs transmission and reception according to settings of module parameters*1.)
Transient transmission	Performs transmission and reception in the intervals of cyclic transmission only when a communication request is given and received between PLC modules on the network.	Not required. Enables data communication at the timing of communication request sent by GX Works3 in the iQ-F Series.

* Transient transmission is disabled in some modules.

CC-Link allows both cyclic transmission and transient transmission.

This course uses cyclic transmission that is the basis of FA networks.

*1: Setting of the network by module parameters:
The connected equipment configuration, the correspondence between devices on the network and devices on the CPU module side, etc. can be set using module parameters.

1.5 Types of components

The CC-Link system consists of the following four types of equipment.
The positions available for use and transmission methods are different in each type. Select required slave stations*1 according to your application.
The concept of the station type is required to set module parameters to be set later.

■ Station types in CC-Link

Station type		Description
Master station		This station manages and controls the data link system, and has network control information (module parameters). One master station is required for one system.
Slave station*1	Local station	This station communicates with the master station and other local stations. The module hardware is same as the master station, but is regarded as a local station by the setting.
	Intelligent device station	This station executes cyclic transmission and transient transmission. Local stations are also regarded as intelligent device stations.
	Remote station	This station is classified into a remote I/O station (that handles bit data only) and a remote device station (that handles both bit data and word data). This station executes cyclic transmission, but does not execute transient transmission.

This course explains control of remote inputs and outputs using the master station and remote stations.

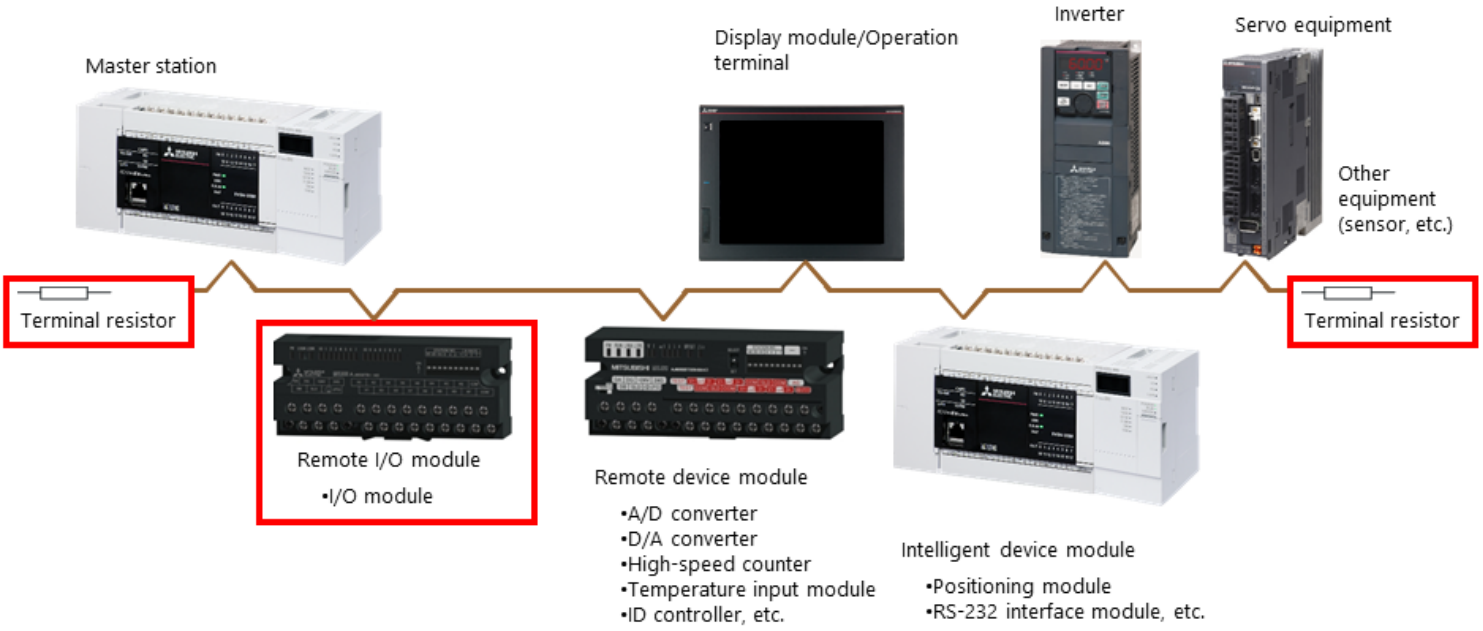
When FX5-CCL-MS is selected as the master station, intelligent device stations and remote stations can be connected as slave stations. Local stations cannot be connected.

*1: Slave station:
All stations other than the master station are called slave stations.

1.6 CC-Link configuration

■ Example of CC-Link system configuration

Perform wiring to connected equipment as shown in the figure below.
A terminal resistor is required at each end of the wiring to stable signals.



Various equipment can be connected to CC-Link as shown in the figure. This course explains control of remote I/O modules that is the most basic.

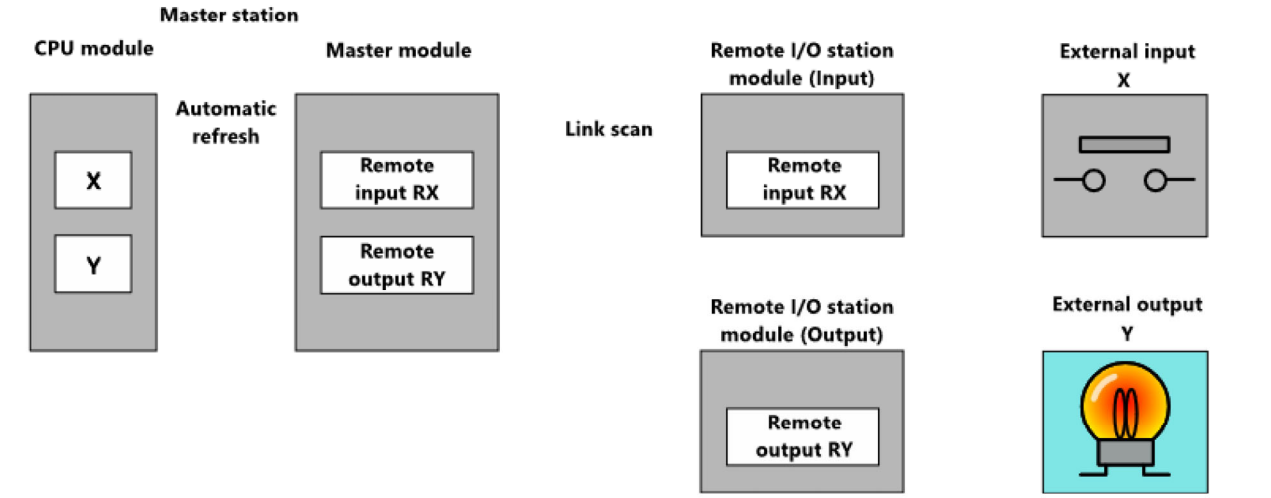
1.7 Relationship between remote I/O devices and devices in the CPU module

■ Communication with remote I/O stations

- Bit information (ON/OFF) is transmitted using remote input devices (RX) and remote output devices (RY).
- Remote I/O devices (RX and RY) cannot be described directly in sequence programs.
- Remote I/O devices and devices in the CPU module are updated automatically according to the assignment set in module parameters. This update operation is called automatic refresh.

By automatic refresh, you can make programs as if you are actually accessing modules mounted on the base.

Click the [Reproduce] button to reproduce animation.



Link scan:
The operation in which the master station scans the slave station status via the network (link). The master station executes a series of operations; it transmits data and receives data from slave stations. As the number of total connected stations becomes smaller, the scan time generally becomes shorter, and the response of remote inputs and outputs is higher.

1.8 Summary

You have learned the following contents in Chapter 1:

- Outline of CC-Link
- Necessity of FA networks
- CC-Link family and position of CC-Link
- Features of CC-Link
- Two data communication methods
- Types of components
- CC-Link configuration
- Relationship between remote I/O devices and devices in CPU module

Points

Station type	- There are four types: master station, remote I/O stations, remote device stations and intelligent device stations (including local stations). - Remote I/O stations and remote device stations are collectively called "remote stations".
Data communication method	There are two types: cyclic transmission (that executes communication cyclically) and transient transmission (that executes communication upon request).
Automatic refresh	Devices on the network are automatically transferred to devices in the CPU module according to module parameters.

Chapter 2 Specifications and Settings

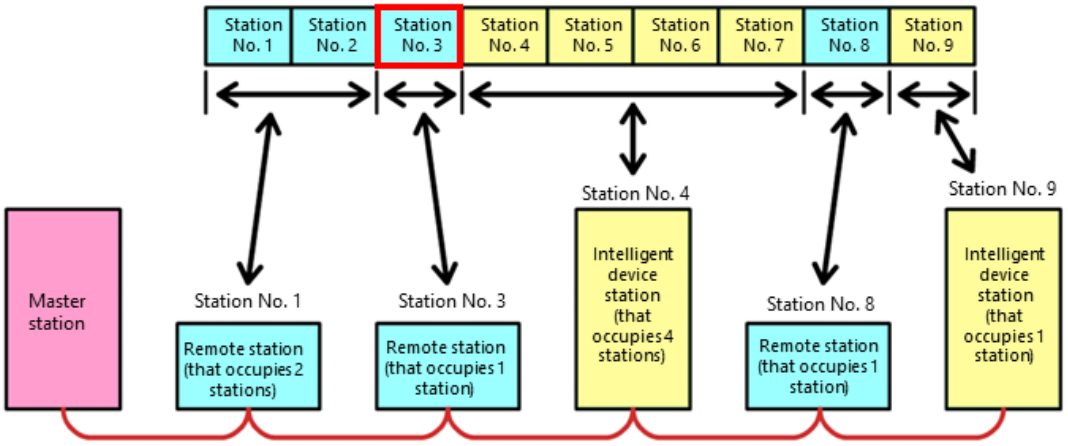
This chapter explains the specifications and settings of CC-Link.
Refer to the manual of the module to be used for the details.

2.1 Concept of number of occupied stations, station number and number of modules

This section explains basic terms related to the CC-Link system.
This concept is required for module parameters to be set later.

Number of occupied stations	The number of occupied stations is determined in advance according to the number of I/O points of used slave stations.
Station number	The station number is a unique number assigned to each piece of connected equipment. The station number "0" is fixed to the master station. The station number begins with "1". The next assigned number is "Previous station number + Number of stations occupied by previous station".

Example: In the case of a module set to "station No. 3" shown in the figure below,
Own station number (Station No. 3) = Beginning of previous station number (Station No. 1) +
Number of stations occupied by previous station (2 stations)



Each module is counted as "1, 2, ..." The number of modules indicates the total number of slave stations.
A general remote I/O station is 1 station/module.

2.2 Hardware settings and software settings

The following settings are required in each module to run the CC-Link system.

■ Hardware settings

- Set the station number and transmission speed*1 using switches in each slave station.

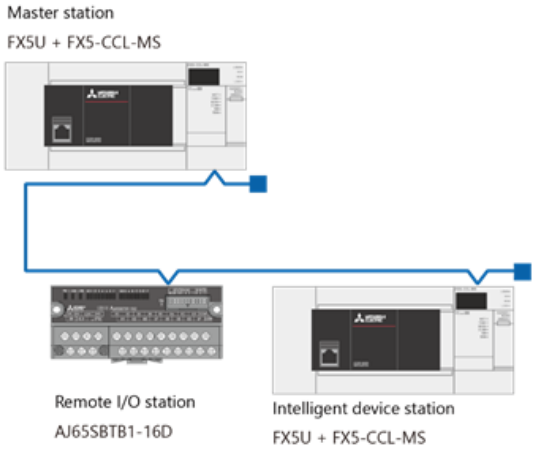
■ Software settings

- Set operations of the master station and slave stations using module parameters.

*1: Transmission speed:
In CC-Link, the transmission speed is variable step by step within the rage from 156 kbps to 10 Mbps. However, the transmission speed has an inverse relationship with the transmission distance and noise resistance. As the transmission speed becomes higher, the available transmission distance becomes shorter and the noise resistance becomes worse. It is recommended to calculate the total extension distance based on the CC-Link installation layout, and select the highest transmission speed that satisfies the calculated distance. If noise gives a bad effect in actual operations, take countermeasures against noise, and decrease the transmission speed.

The contents of settings vary depending on the module types used and station types.
The configuration example shown below is explained here.

Configuration example:



■ Settings when FX5-CCL-MS is used as the master station

Hardware settings ⇒ Not required

Software settings ⇒ Set the mode and transmission speed using module parameters in GX Works3.

■ Settings for the remote I/O station

Hardware settings ⇒ Set the station number and transmission speed using DIP switches.

Software settings ⇒ Not required

■ Settings when FX5-CCL-MS is used as a slave station (intelligent device station)

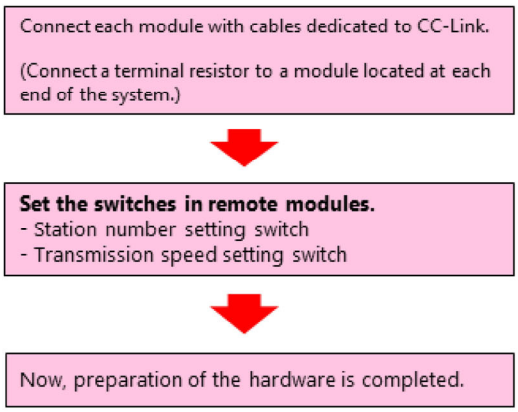
Hardware settings ⇒ Not required

Software settings ⇒ Set the mode, station number and transmission speed using module parameters in GX Works3.

2.2 Hardware settings and software settings

■ Hardware settings

Perform the following procedure:



2.2 Hardware settings and software settings

■ Software settings

Set the CPU module that controls the master station and intelligent device stations from the engineering tool.
Use module parameters for setting.
Major items to be set using module parameters are as follows:

- Station type setting, mode setting, station number setting and transmission speed setting
- Number of times of retry[*1] and network configuration setting[*2] related to the basic operations of the network
- Link refresh setting that associates devices in the CPU module with link devices[*3] of CC-Link

*1: Number of times of retry:
CC-Link secures the data reliability against data loss caused by noise, etc. by detecting such loss and retrying data transmission (retransmission).
The number of retries indicates the number of times detection of data loss is allowed consecutively for a specific station. As the number of times increases, the probability of continuing communication with the corresponding station becomes higher. However, the reason retries occur frequently is problems such as noise. It is recommended to solve such problems at the same time.

*2: Network configuration setting:
Set the attribute of equipment (slave stations) connected to CC-Link. The attribute includes the station type and number of occupied stations explained before.

*3: Link devices:
Generic name of RX, RY, RWr and RWw.
RWr and RWw are word devices used in the link.

2.3 Summary

You have learned the following contents in Chapter 2:

- Meaning of number of occupied stations, station number and number of modules
- Settings required for operations – hardware settings and software settings

Points

Number of occupied stations	- Each remote I/O module generally occupies 1 station. - The station number is affected by the number of occupied stations. - The number of modules indicates the number of slave stations.
Transmission speed	- The transmission distance has an inverse relationship with the transmission speed. - Determine the transmission speed based on the required response speed and use environment.

Chapter 3 Startup of Remote I/O System

This chapter explains the contents required until start up of the CC-Link system.
Settings and operations of modules are explained through system construction.

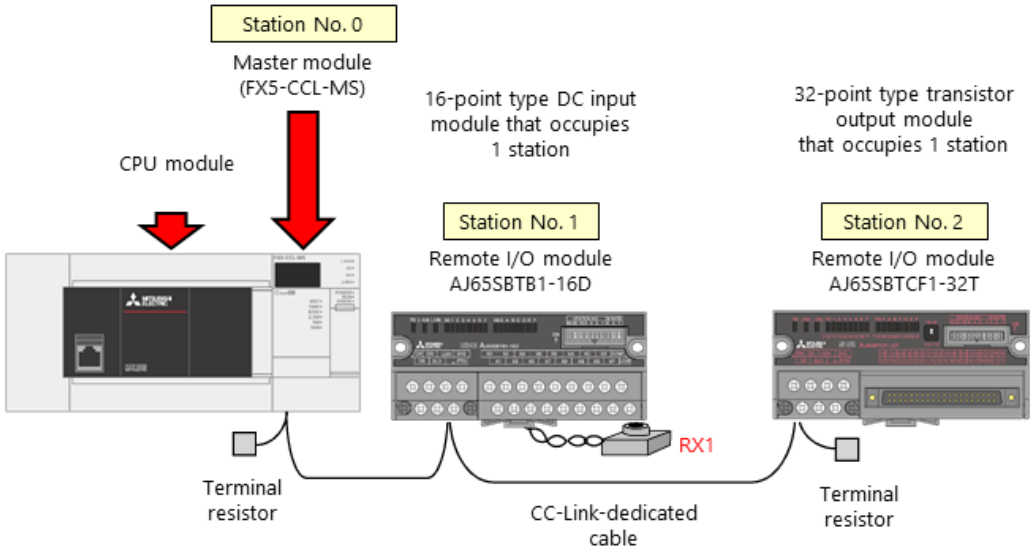
3.1 Outline of system example

■ Outline of operations of system example

- The status of RX1 in slave station No. 1 is displayed by output from the master station.
- When X2 in the master station turns ON, RY2 in the slave station No. 2 is turned ON.
- The communication status of slave stations is displayed by output from the master station.
- When something is wrong in the master module, remote input/output processing is disabled.

■ Whole configuration

The figure below shows the system configuration.

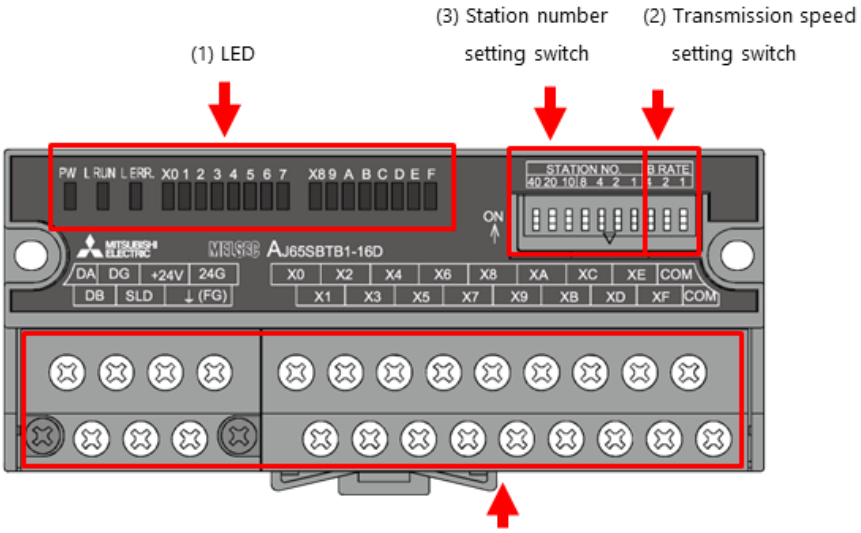


3.2 Hardware settings in remote I/O module

■ Input module

An input module is explained here as an example.

■ Settings



	Setting contents
(1)	This area displays the operation status to enable primary diagnosis for malfunction.
(2)	Set "156 kbps (B RATE: OFF)".
(3)	Set a unique station number different from the setting in any other station.
(4)	Connect the CC-Link-dedicated cable to the left end. Terminals on the right side are available to connect inputs and outputs.

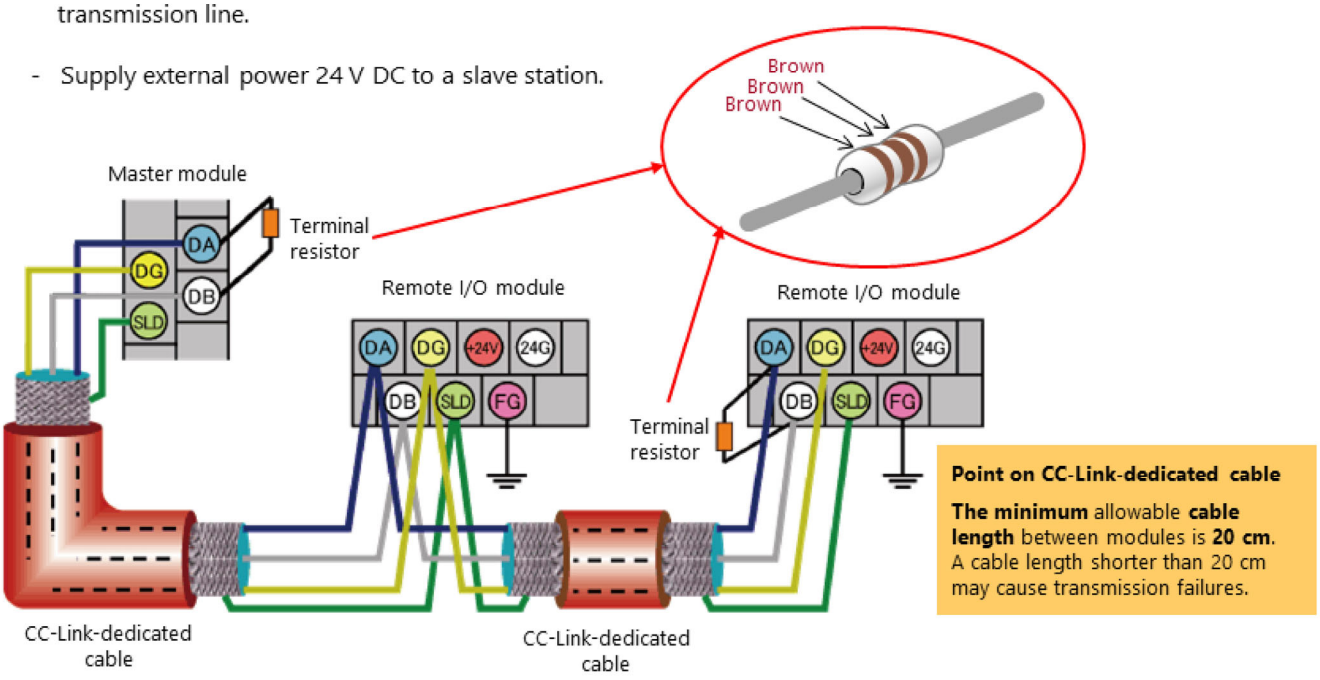
3.3 Wiring

Perform required wiring as follows:

- Wire each module in the CC-Link system.
  The order of wiring may be different from the order of station number.

- Connect a terminal resistor (110 Ω, 1/2 W (Color code: Brown, brown, brown)) to a station at each end of the transmission line.

- Supply external power 24 V DC to a slave station.



Point on CC-Link-dedicated cable

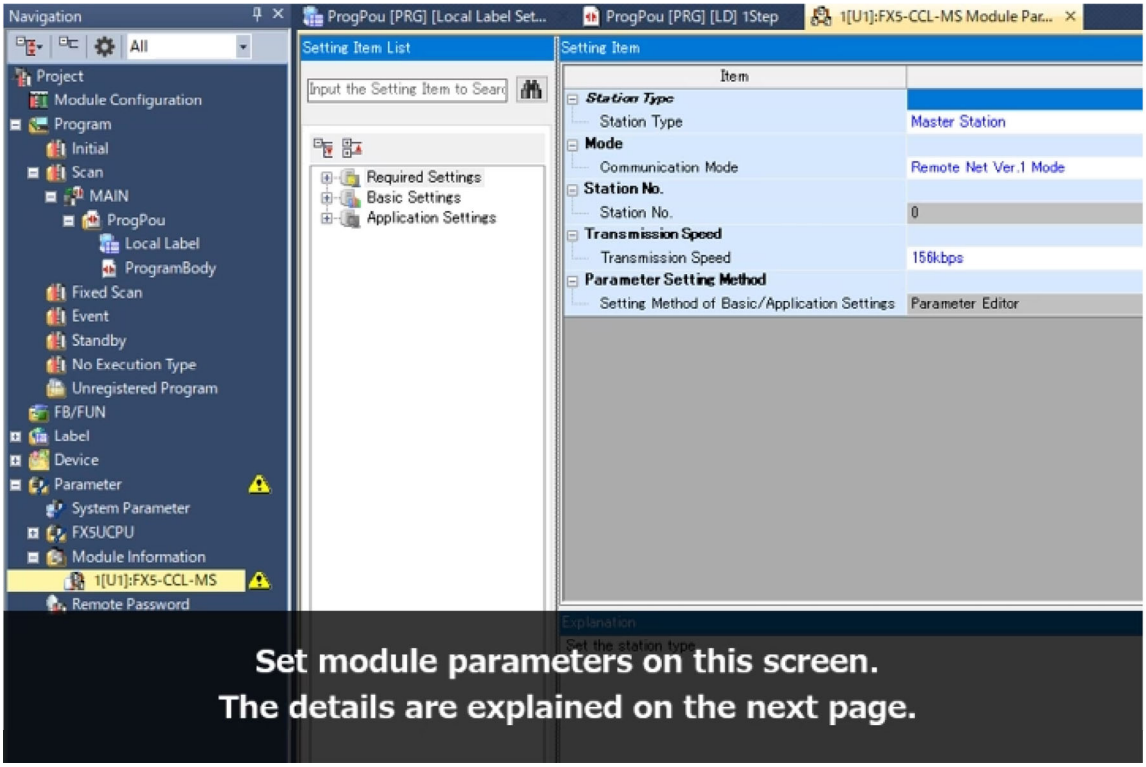
The minimum allowable **cable length** between modules is **20 cm**. A cable length shorter than 20 cm may cause transmission failures.

3.4 Settings of module parameters

After setting the station number of remote I/O modules, set module parameters using the engineering tool MELSOFT GX Works3.
Module parameters can also be set using sequence programs, but this chapter explains how to use a method that is easy to understand visually.

FX5-CCL-MS has both functions as the master station and functions as an intelligent station. The station type to be used can be changed over by the station type setting. In this example, FX5-CCL-MS is used as the master station.

First, add module parameters of FX5-CCL-MS (that operates as the master station) to MELSOFT GX Works3. Check the animation below for the addition procedure.



3.4.1 Setting of operations of a master station

Set the station type of the CC-Link master module as well as the operation mode and transmission speed of CC-Link.

Open the setting screen from "Module Parameter" of "FX5-CCL-MS", and set "Required Settings" in the item list.

Item	
Station Type	
Station Type	Master Station
Mode	
Communication Mode	Remote Net Ver.1 Mode
Station No.	
Station No.	0
Transmission Speed	
Transmission Speed	156kbps
Parameter Setting Method	
Setting Method of Basic/Application Settings	Parameter Editor

Leave the initial value "Master Station".

Leave the initial value "Remote Net Ver. 1 Mode".
This is the most common mode.
*Change the mode according to the system scale and purpose.

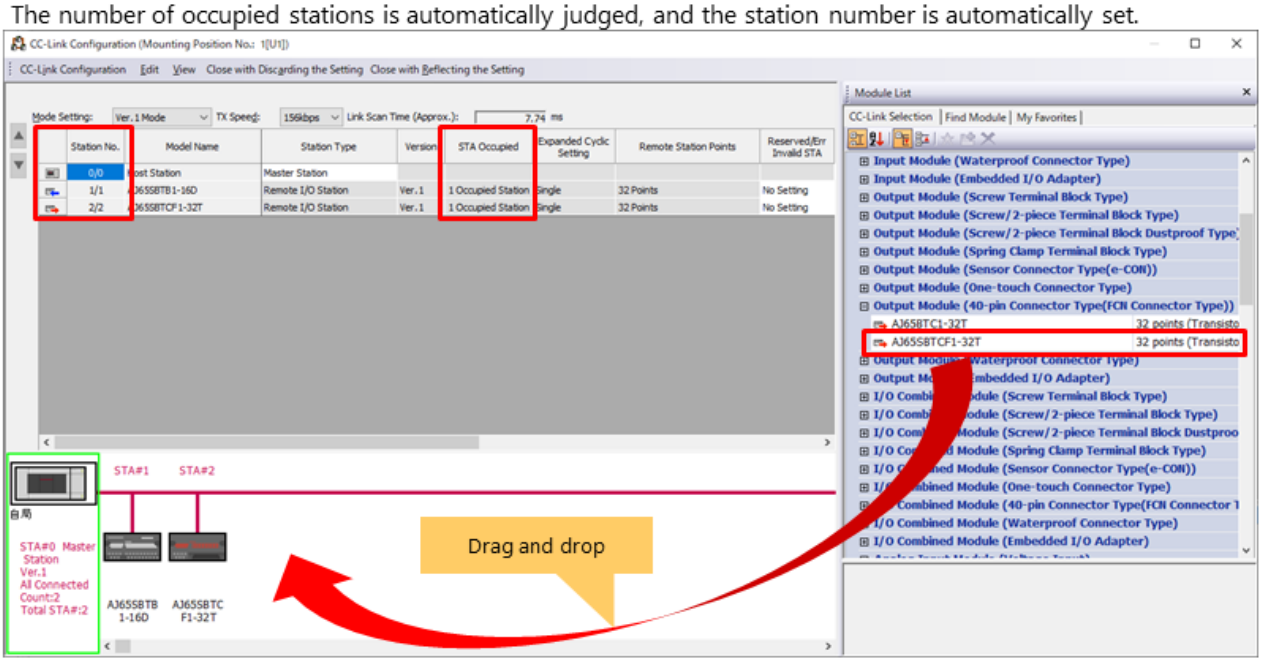
Leave the initial value "156 kbps".
(This transmission speed is same as that in slave stations.)

3.4.2 Setting of network configuration

Set the configuration of stations connected to the network.

From the module parameter setting screen, select "Basic Settings"- "Network Configuration Settings"-"CC-Link Configuration"-"Detailed Settings" to open the "CC-Link Configuration" screen.

Select corresponding modules from the module list on the right side, and drag and drop them in order from the station No. 1.
The number of occupied stations is automatically judged, and the station number is automatically set.



"CC-Link Configuration" screen

3.4.3 Assignment of link devices

For determining the device range whose data will be transferred by link refresh, set assignment of devices in the CPU module and link devices.
From the module parameter setting screen, select "Basic Settings"- "Link Refresh Settings"-"Detailed Setting".

Select link devices to be used.

Set the range of link devices to be used.

Set devices in the CPU module to which the contents of link devices will be transferred.

Set the range of devices in the CPU module.

Link special relays (SB) and link special registers (SW) are available to communicate the information on the network module operation status and others. Use these relays and registers for interlock in programs.

	Link Side					CPU Side				
	Device Name	Points	Start	End		Target	Device Name	Points	Start	End
	SB	512	00000	001FF	⇔	Specify Devic	SB	512	00000	001FF
–	SW	512	00000	001FF	⇔	Specify Devic	SW	512	00000	001FF
1	RX	64	00000	0003F	⇔	Specify Devic	X	64	100	177
2	RY	64	00000	0003F	⇔	Specify Devic	Y	64	100	177
3					⇔					
4					⇔					

"Link Refresh Settings" screen

The remote station occupies 32 remote inputs (RX) and 32 remote outputs (RY). Assign 64 points (0 to 3F) in total as targets of automatic refresh.

Station No.	Model Name	Station Type	Version	STA Occupied	Expanded Cyclic Setting	Remote Station Points
0/0	Host Station	Master Station				
1/1	AJ65SBTB1-16D	Remote I/O Station	Ver.1	1 Occupied Station	Single	32 Points
2/2	AJ65SBTCF1-32T	Remote I/O Station	Ver.1	1 Occupied Station	Single	32 Points

"CC-Link Configuration" screen

When specifying "X" as the device name on the CPU side, it is necessary to set terminal numbers not mounted in the CPU module and I/O module actually constructing the configuration.

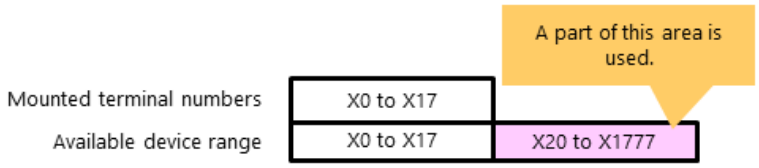
The head device is set to "X100" here according to the configuration example. (See the next page for the details.)

When specifying "Y" as the device name on the CPU side, it is also possible to specify mounted terminal numbers. However, "Y100" not mounted in any module is set here.

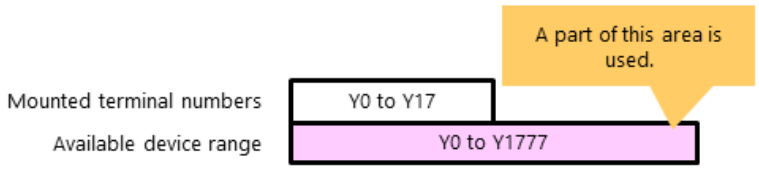
3.4.3 Assignment of link devices

In a MESLEC iQ-F Series CPU module, I/O points of user devices are X/Y0000 to X/Y1777.
When specifying link devices to X and Y, the available area is as shown below (according to the configuration example below).

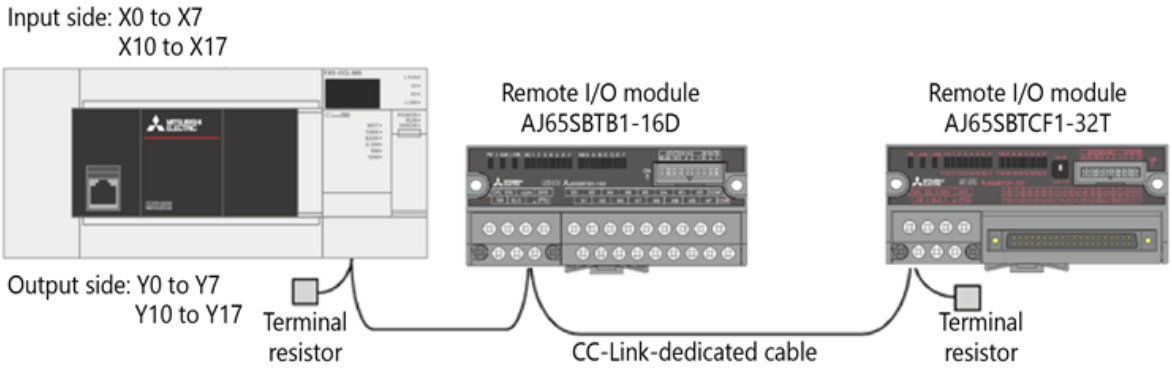
When setting the device name to "RX" on the link side, and "X" on the CPU side:



When setting the device name to "RY" on the link side, and "Y" on the CPU side:



Configuration example: Combination of "CPU module FX5U-32M + Master station FX5-CCL-MS"



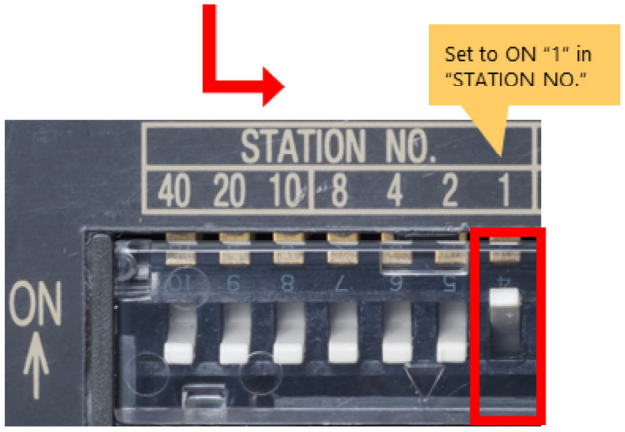
3.5 Check of specifications

Before starting actual programming, check the following contents.

■ **Checking the slave station number setting status**

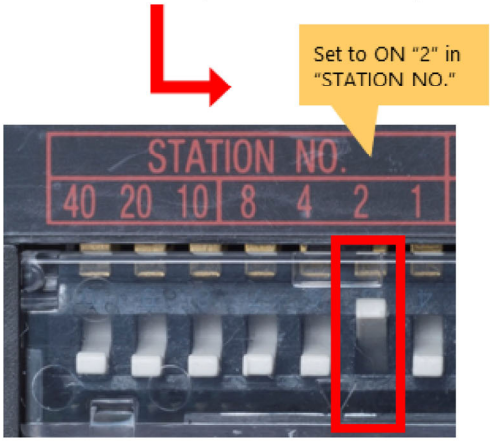
Station No. 1: Remote I/O station

(AJ65SBTB1-16D, 16 points of DC input)



Station No. 2: Remote I/O station

(AJ65SBTCF1-32T, 32 points of transistor output)



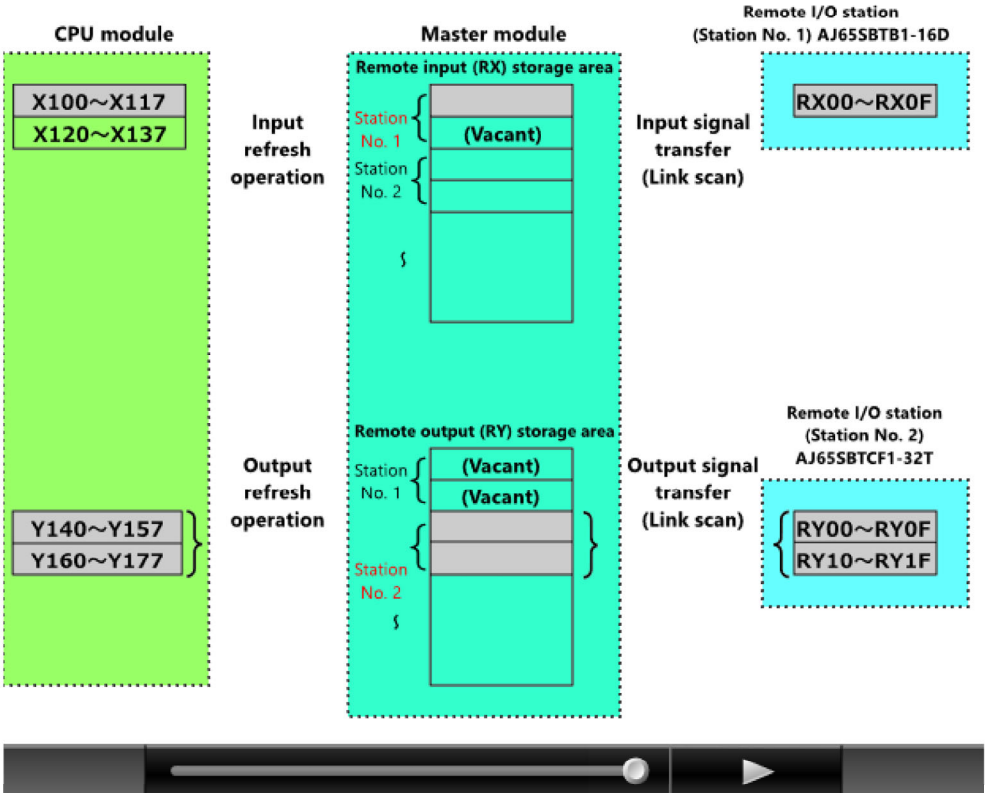
3.5 Check of specifications

■ **Check point (Device correspondence)**

Note

Thirty-two points of bit devices are secured for each station.
Because the module set to the station No. 1 has only 16 remote input points, the area from X120 to X137 is not used.

Click the [Reproduce] button to reproduce animation.



3.5 Check of specifications

■ Device correspondence check

In the system example, the head refresh device in remote inputs is set to X100, and the head refresh device in remote outputs is set to Y100.

The tables below show the correspondence between RX/RY in remote I/O stations and devices in the CPU module.

■ Assignment of remote input RX

Remote station			Master station	
			Master module	CPU module
Station No.	Module model name	Remote input (RX)	Remote input (RX)	Device (X)
1	AJ65SBTB1-16D (16 input points)	RX00 to RX0F	RX00 to RX0F	X100 to X117
		(Not used)	(Not used)	X120 to X137

■ Assignment of remote output RY

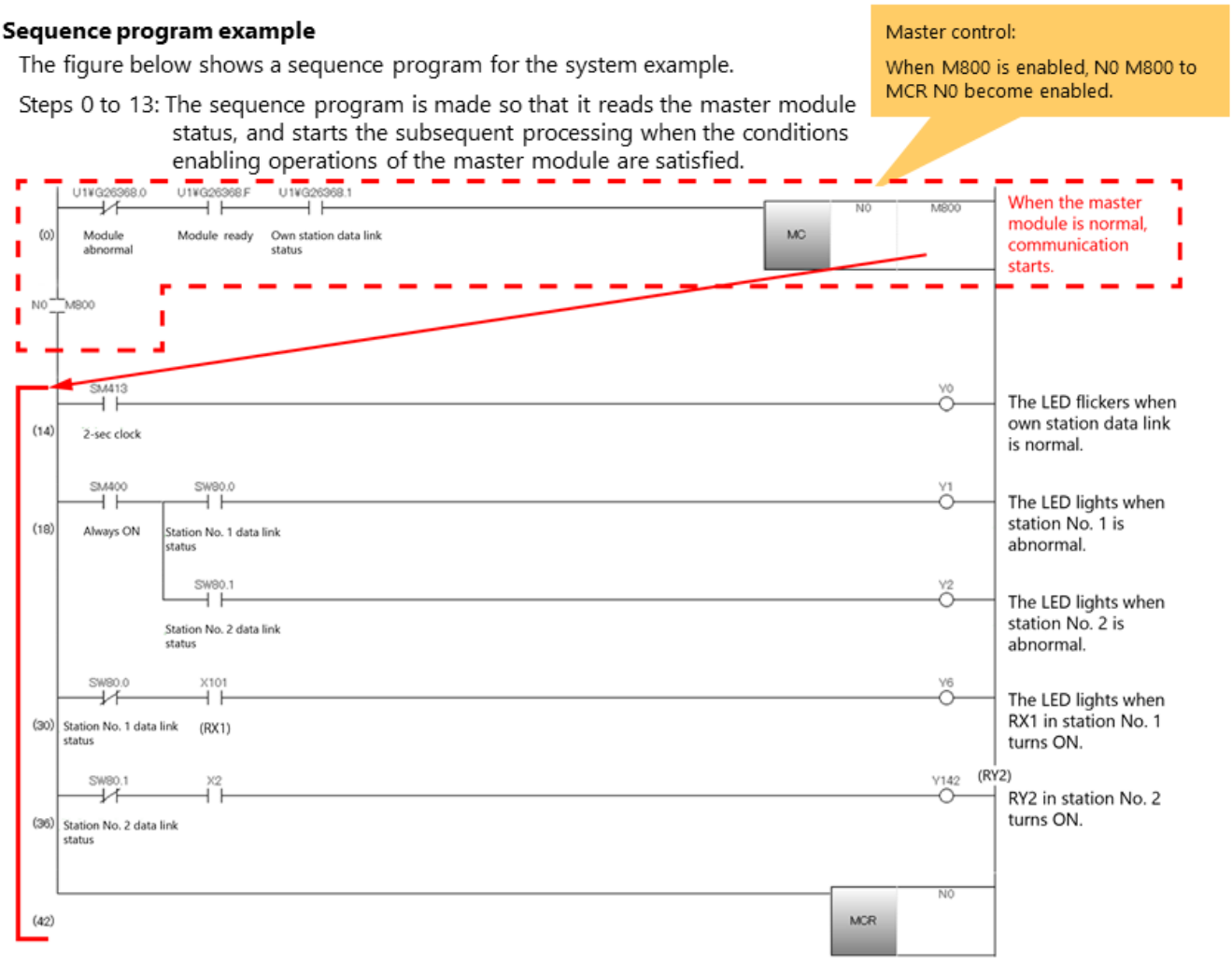
Remote station			Master station	
			Master module	CPU module
Station No.	Module model name	Remote output (RY)	Remote output (RY)	Device (Y)
2	AJ65SBTCF1-32T (32 output points)	RY00 to RY1F	RY20 to RY3F	Y140 to Y177

AJ65SBTCF1-32 is the station No. 2. The head refresh device is set to Y100, but Y100 to Y137 (32 points) are vacant numbers, and unavailable. The station No. 2 can use Y140 and later.

■ Sequence program example

The figure below shows a sequence program for the system example.

Steps 0 to 13: The sequence program is made so that it reads the master module status, and starts the subsequent processing when the conditions enabling operations of the master module are satisfied.

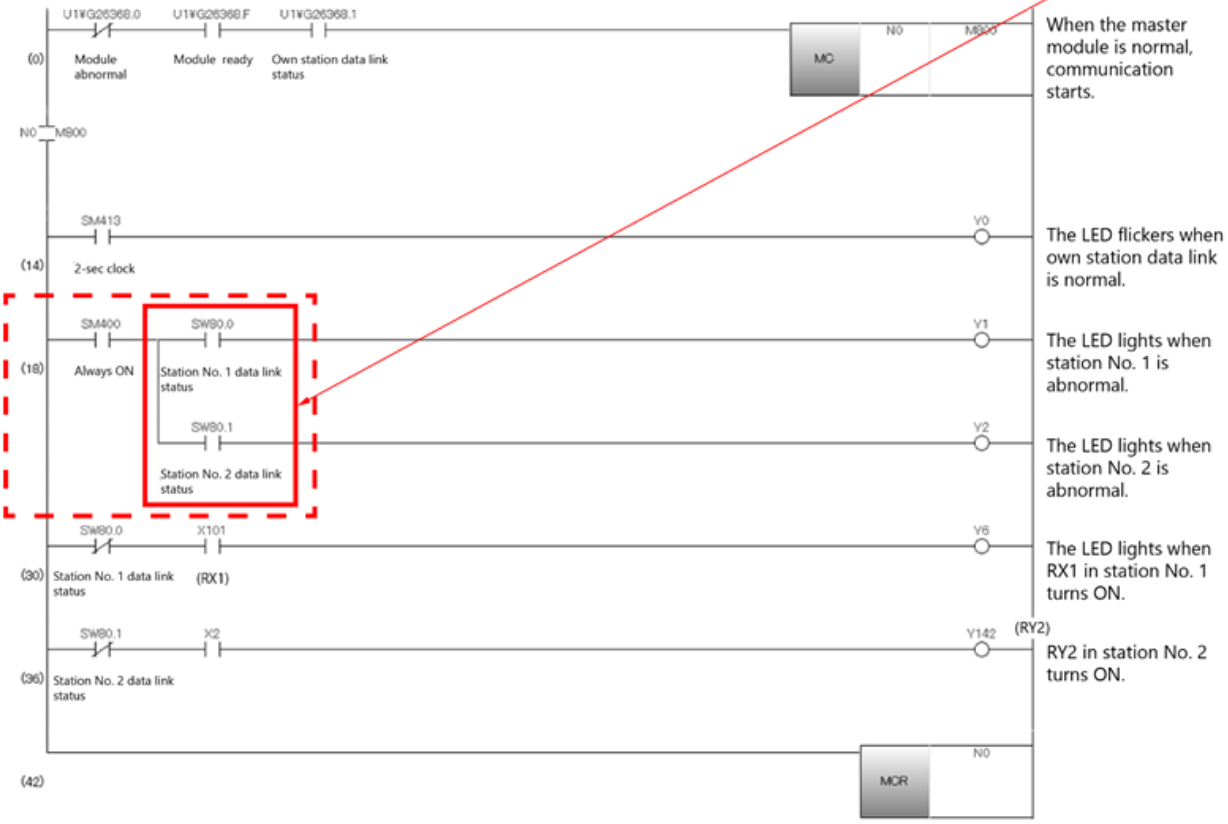


■ Sequence program example (continued)

Steps 18 to 29: The program reads the status of each station. When an error occurs in a station, the program outputs the output device Y1 or Y2 in the master module according to the station where the error has occurred.

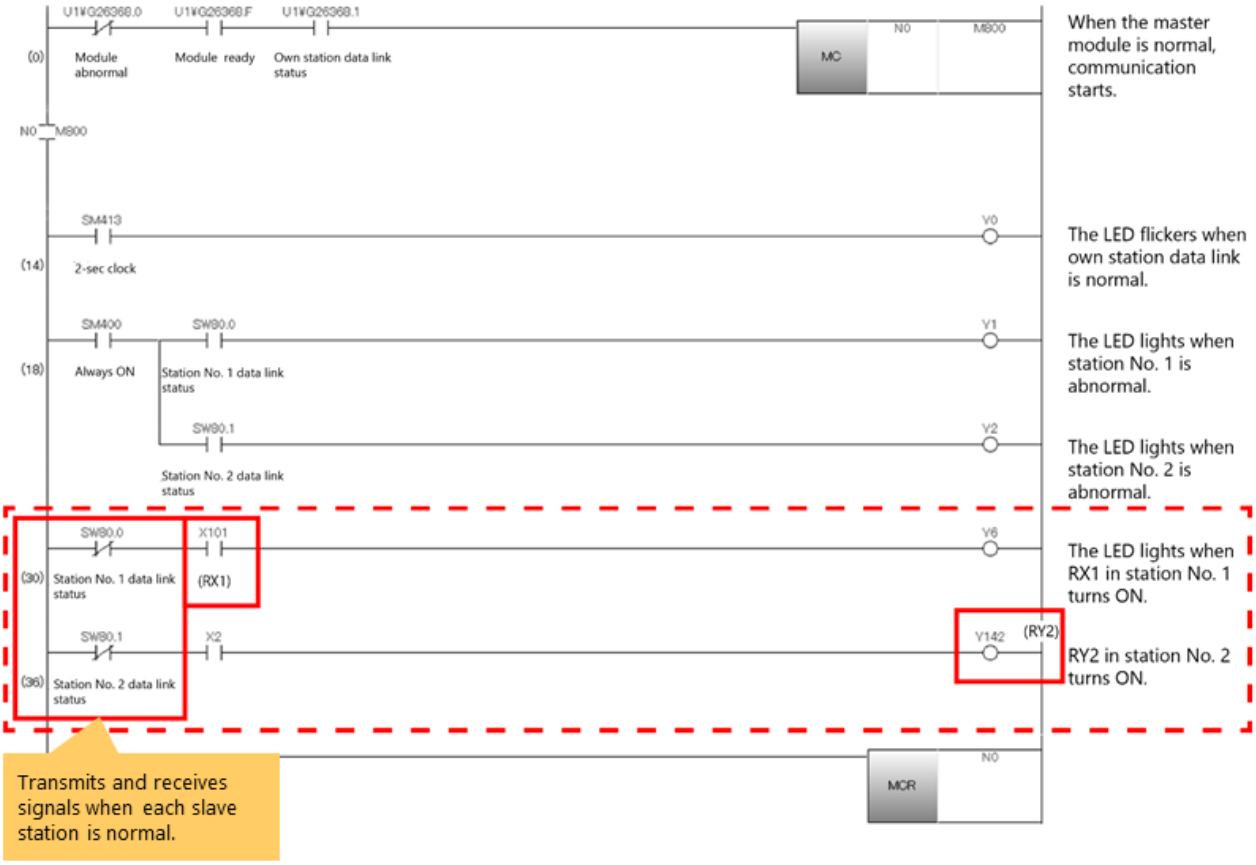
The data link status of each station is stored.
0: Normal
1: Data link error has occurred.

	b15	b14	b13	b12	to	b3	b2	b1	b0
SM0080	16	15	14	13	to	4	3	2	1
SM0081	32	31	30	29	to	20	19	18	17
SM0082	48	47	46	45	to	36	35	34	33



■ **Sequence program example (continued)**

Steps 30 to 41: The program inputs/outputs signals to/from slave stations in CC-Link.
X101: Corresponds to the input device RX1 in the station No. 1.
Y142: Corresponds to the output device RY1 in the station No. 2.

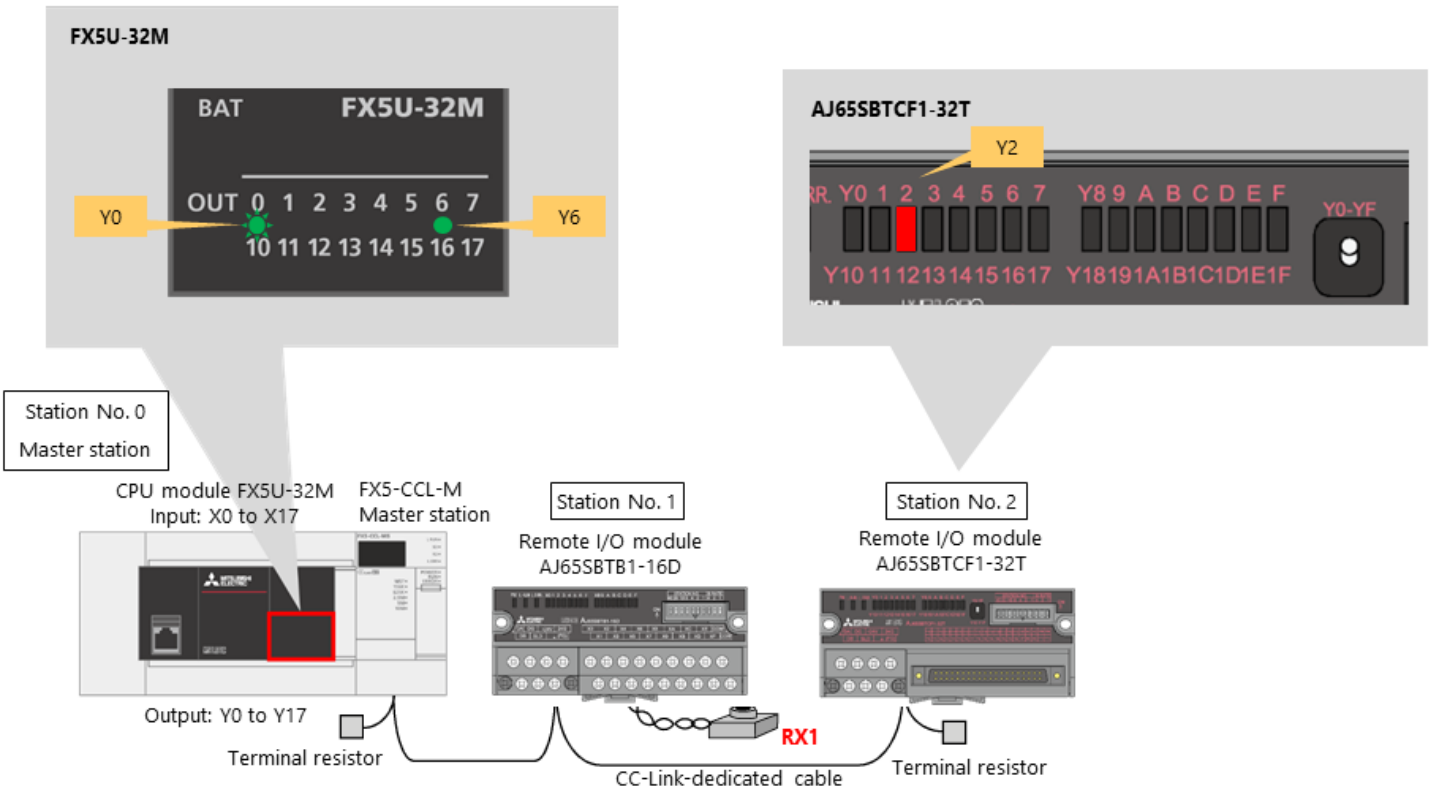


3.7 Check of operations

Check operations of the system.

■ Operation details

1. When the data link status is normal, the LED Y0 in FX5U-32M (master station) flickers at 1-second intervals.
2. When the switch RX1 in AJ65SBTB1-16D (station No. 1) is set to ON, the LED Y6 in the master station FX5U-32M lights.
3. When X2 is forcibly set to ON by the current value change function in GX Works3, the LED Y2 in AJ65SBTCF1-32T (station No. 2) lights.



3.8 Primary diagnosis

■ Primary diagnosis of operations based on LED indication

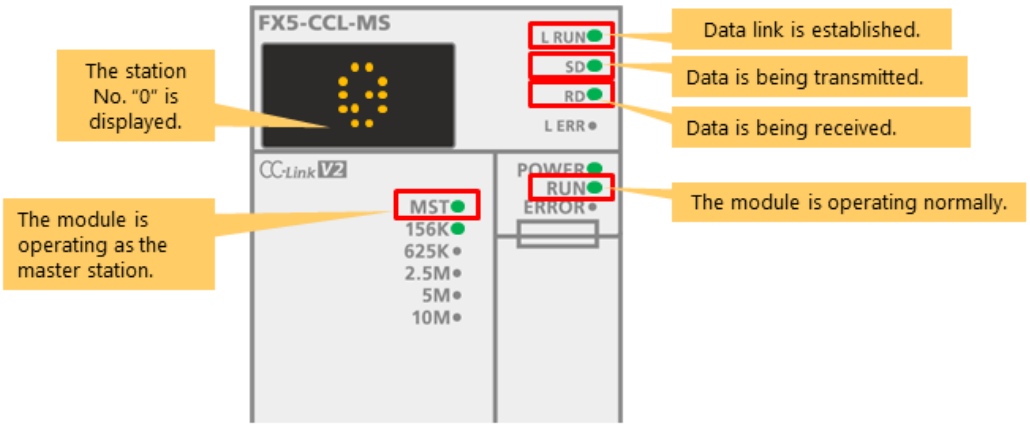
When an expected operation (such as output from a remote I/O station) is not given, you can perform primary diagnosis by checking the LED indication provided on the module surface.

■ Master station

The figure below shows the LED indication in the master station in the normal data link status.

When normal operation is not given, check whether the LED indication shown below is realized.

- When the SD/RD LED is not lit, check the wiring of CC-Link-dedicated cables including terminal resistors.
- When the L RUN LED is not lit, it is possible that something is wrong with the settings.
- When the MST LED is not lit, it is possible that the module is not set as the master station. Check module parameters.
- When the RUN LED is not lit, it is possible that the module is not operating normally.



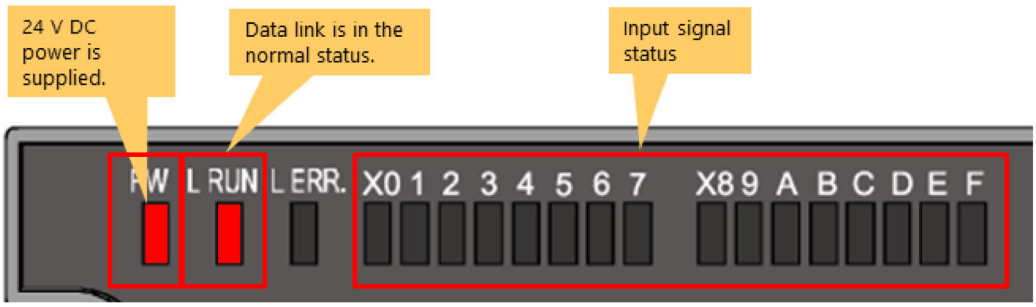
3.8 Primary diagnosis

■ Primary diagnosis of operations based on LED indication

■ Remote I/O station

The figure below shows the LED indication in the remote I/O station in the normal data link status.
When normal operation is not given, check whether the LED indication shown below is realized.

- When the L RUN LED is not lit, it is possible that something is wrong with the settings.
- When the PW LED is not lit, it is possible that power is not supplied to the module.

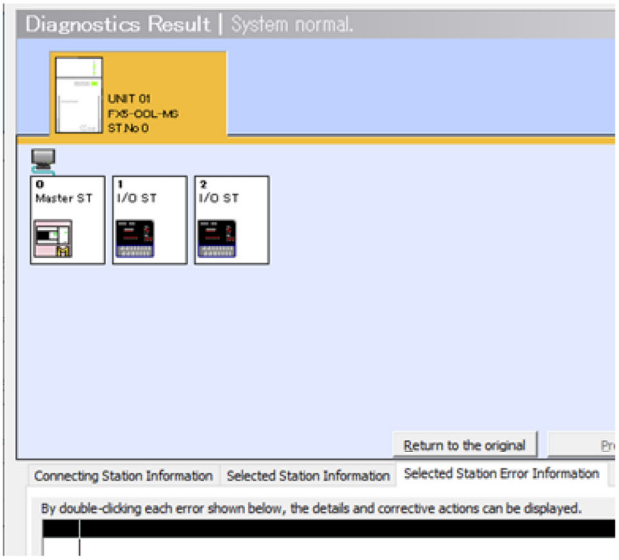


■ Diagnosis using the engineering tool

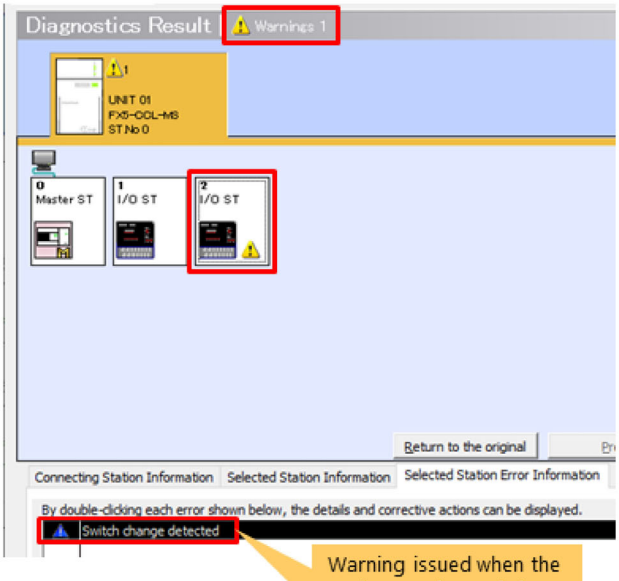
When problems cannot be solved by the primary diagnosis based on the LED indication, you can investigate problems in detail using the diagnosis function of the engineering tool GX Works3.

Select "Diagnostics"-"CC-Link Diagnostics" from the menu bar of GX Works3 to display the diagnosis result screen that looks similar to the following:

Normal status



Abnormal status



Warning issued when the station number switch or transmission speed switch is changed during data link.

3.10 Summary

You have learned the following contents in Chapter 3:

- Settings of remote I/O modules
- Wiring
- Settings of module parameters
- Check of the specifications
- Programming
- Check of operations
- Primary diagnosis

Points

Transmission speed	Set the same transmission speed in the same system. (Adopt the speed set in the master station.)
Station number	Set a unique number from 1 without reusing the same number.
Connection of terminal resistors	Connect a terminal resistor at each end of the transmission line.

Chapter 4 Extendibility and Reliability of CC-Link

You have learned simple procedures from startup to diagnosis of remote I/O modules.
On actual sites, you may require the following operations in addition to the communication of bit data you have learned in this course:

- Communication of analog data
- Data communication between CPU modules
- Operations and status display using display modules
- Extension of the distance

In the above cases, you can utilize CC-Link without any problem.

When actually constructing a system, you would have the need to avoid effects on the production line and system due to stoppage of CC-Link.
To meet this demand, CC-Link offers the following functions to improve network reliability:

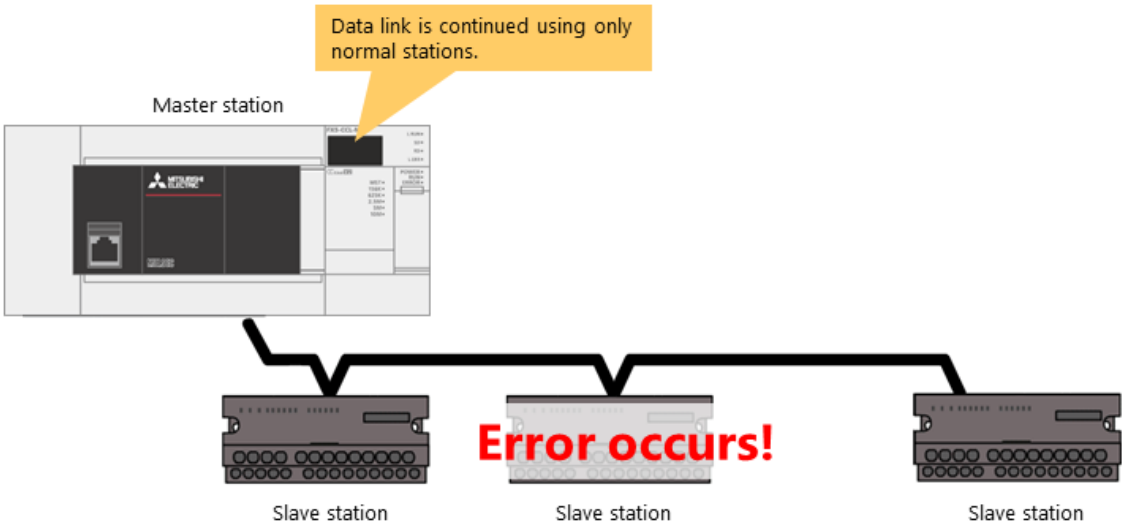
- Separation of slave stations
- Automatic return to data link

The contents are explained on the next page and later.

4.1 Separation of slave stations

When an error occurs in a slave station during data link and data link is disabled, the defective slave station is disconnected.

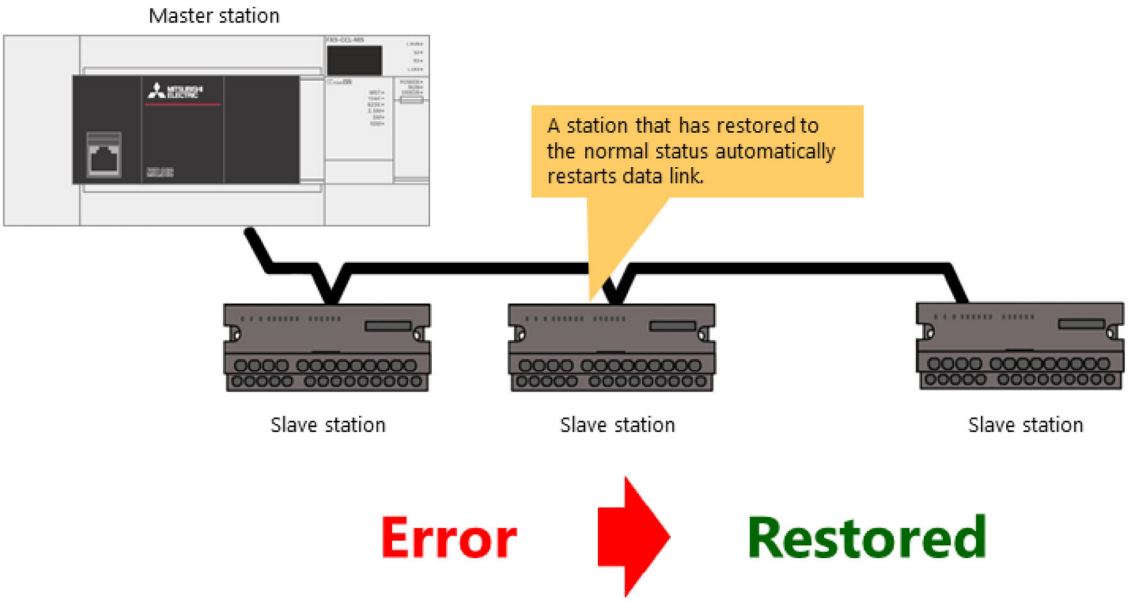
Data link is continued using only normal stations.



4.2 Automatic return to data link

When the station that was disconnected from data link due to an error has restored to the normal status, it automatically restarts the data link.

This operation is called automatic return to data link. You do not have to restart the whole system when the restored station is restored.



4.2 Summary

You have learned the following contents in Chapter 4:

- Extendibility of CC-Link
- Reliability of CC-Link

Points

Extendibility of CC-Link	• In addition to remote I/O modules explained this time, analog modules, high-speed counter modules, positioning modules and display modules can be connected. CC-Link is equipped with other functions required in FA networks including communication between PLCs. • The distance can be extended as needed.
Separation of slave stations	When an error occurs in a slave station during data link, the defective slave station is disconnected and data link is continued using only normal stations.
Automatic return to data link	A station that has restored to the normal status from the abnormal status automatically restarts data link.

Test — Final Test

Now that you have completed all of the lessons of the **CC-Link (MELSEC iQ-F 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 (6 items) in this Final Test.

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

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.

Test **Final Test 1**

Select an item that expresses the features of CC-Link most appropriately. (Select 1 item.)

Q1

- Only products by Mitsubishi Electric Corporation can be connected to CC Link.
- The functions of CC-Link are limited to remote inputs/outputs.
- **The specifications of CC-Link are disclosed. You can construct a desired system by combining many products.**

Test **Final Test 2**

There is a CC-Link system consisting of the master station FX5-CCL-MS, station No. 1 (16 input points) and station No. 2 (32 input points).

When the head refresh device of remote inputs (RX) is set to X100 in the PLC module, to which position of PLC devices is RX0 in station No. 2 (32 input points) refreshed? (Select 1 item.)

Q1

- X120
- **X140**
- X150
- M100

Remote station			CPU module
Station No.	Module model name	Remote input (RX)	Device
1	AJ65SBTB1-16D (16 input points)	RX00 to RX0F	X100 to X117
		Vacant	X120 to X137
2	AJ65SBTB1-32D (32 input points)	RX00 to RX0F	? ? ?
		RX10 to RX1F	? ? ?

[+]

Test **Final Test 3**

Select the correct data communication method available in CC-Link. (Select 1 item.)

Q1

- Cyclic transmission only
- Transient transmission only
- **Both cyclic transmission and transient transmission**

Test **Final Test 4**

Select stations that require connection of a terminal resistor. (Select 2 items.)

Q1

- [ ] Station No. 0
- [x] Station No. 1
- [ ] Station No. 2
- [x] Station No. 4

[+]

Test **Final Test 5**

Select the correct item regarding the setting of the station number. (Select 1 item.)

Q1

- ○ **The station number of the master station can be set freely.**
- ◉ **The station number of the remote I/O module can be set using the station number switch.**
- ○ **Wiring must be performed in the order of station number.**
- ○ **There is no problem even if the station number of slave stations is overlapped.**

Test Final Test 6

Select an item not handled in module parameters of CC-Link. (Select 1 item.)

Q1

- Network configuration
- Transmission speed
- Number of connected modules
- Terminal resistor connection positions
- Number of times of retry

Test **Test Score**

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

		1	2	3	4	5	6	7	8	9	10
	Final Test 1	✓									
	Final Test 2	✓									
	Final Test 3	✓									
	Final Test 4	✓									
	Final Test 5	✓									
	Final Test 6	✓									

Total questions: **6**

Correct answers: **6**

Percentage: **100** %

Clear

You have completed the CC-Link (MELSEC iQ-F 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