

Mitsubishi Safety Programmable Controller

MELSEC **QS** series

MELSEC-QS CC-Link IE Field Network Master/ Local Module User's Manual

-QS0J71GF11-T2



● SAFETY PRECAUTIONS ●

(Read these precautions before using this product.)

Before using this product, please read this manual and the relevant manuals carefully and pay full attention to safety to handle the product correctly.

The precautions given in this manual are concerned with this product only. For the safety precautions of the programmable controller system, refer to the user's manual for the CPU module used.

In this manual, the safety precautions are classified into two levels: " ⚠ WARNING" and " ⚠ CAUTION".



Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.



Indicates that incorrect handling may cause hazardous conditions, resulting in minor or moderate injury or property damage.

Under some circumstances, failure to observe the precautions given under " ⚠ CAUTION" may lead to serious consequences.

Observe the precautions of both levels because they are important for personal and system safety. Make sure that the end users read this manual and then keep the manual in a safe place for future reference.

[Design Precautions]

⚠ WARNING

- When a safety programmable controller detects an error in an external power supply or a failure in programmable controller main module, it turns off all the outputs. Create an external circuit to securely stop the power of hazard by turning off the outputs. Incorrect configuration may result in an accident.
- To inhibit restart without manual operation after safety functions was performed and outputs were turned off, create an interlock program which uses a reset button for restart.
- If CC-Link IE Field Network error has been detected, create a sequence program that turns off the outputs in the program. If the CC-Link IE Field Network is restored with the outputs on, it may suddenly operate and result in an accident.

[Design Precautions]

⚠ CAUTION

- Do not bunch the wires of external devices or communication cables together with the main circuit or power lines, or install them close to each other. They should be installed 100 mm (3.94 inch) or more from each other. Not doing so could result in noise that would cause malfunctions.

[Installation Precautions]

CAUTION

- Use a safety programmable controller in the environment that meets the general specifications described in the QSCPU User's Manual (Hardware Design, Maintenance and Inspection). Using this programmable controller in an environment outside the range of the general specifications could result in electric shock, fire, erroneous operation, and damage to or deterioration of the product.
- While pressing the installation lever located at the bottom of module, insert the module fixing tab into the fixing hole in the base unit until it stops. Then, securely mount the module with the fixing hole as a supporting point. Incorrect loading of the module can cause a failure or drop. Secure the module to the base unit with screws. Tighten the screw in the specified torque range. If the screws are too loose, it may cause a drop of the screw or module. Overtightening may cause a drop due to the damage of the screw or module.
- Completely turn off the external supply power used in the system before mounting or removing the module. Not doing so could result in damage to the product.
- Do not directly touch the module's conductive parts or electronic components. Doing so may cause malfunctions or a failure.

[Wiring Precautions]

WARNING

- Be sure to shut off all phases of the external supply power used by the system before wiring. Not completely turning off all power could result in electric shock or damage to the product.
- When energizing or operating the module after installation or wiring, be sure to close the attached terminal cover. Not doing so may result in electric shock.

[Wiring Precautions]

CAUTION

- Tighten a module fixing screw within the specified torque range. If the module fixing screw is too loose, it may cause a drop of the screw or module. Overtightening the screw may cause a drop due to the damage of the screw or module.
- Be sure there are no foreign substances such as sawdust or wiring debris inside the module. Such debris could cause a fire, failure, or malfunctions.
- The module has an ingress prevention label on its top to prevent foreign matter, such as wire chips, from entering the module during wiring. Do not peel this label during wiring. Before starting system operation, be sure to peel this label because of heat dissipation.
- Be sure to fix the communication cables or power cables by ducts or clamps when connecting them to the module. Failure to do so may cause damage of the module or cables due to a wobble, unintentional shifting, or accidental pull of the cables, or malfunctions due to poor contact of the cable.
- When removing the connected communication cables or power cables, do not pull the cable with grasping the cable part. Pulling the cable connected to a module may result in malfunctions or damage of the module or cable.
- For the cables to be used in CC-Link IE Field Network, use the ones specified by the manufacturer. Otherwise, the performance of CC-Link IE Field Network is not guaranteed. As to the maximum overall cable length and station - to station cable length, follow the specifications described in the MELSEC-QS CC-Link IE Field Network Master/Local Module User's Manual. If not following the specification, the normal data transmission is not guaranteed.

[Startup and Maintenance Precautions]

WARNING

- Turn off all phases of the external supply power used in the system when cleaning the module or retightening the module fixing screws. Not doing so could result in electric shock.
Tighten a fixing screw within the specified torque range. If the module fixing screw is too loose, it may cause a drop of the screw or module. Overtightening the screw may cause a drop due to the damage of the screw or module.

[Startup and Maintenance Precautions]

CAUTION

- Do not disassemble or modify the modules. Doing so could cause a failure, malfunctions, injury, or fire. If the product is repaired or remodeled by other than the specified FA centers or us, the warranty is not covered.
- Completely turn off the external supply power used in the system before mounting or removing the module. Not doing so may result in a failure or malfunctions of the module.
- Restrict the mounting/removal of a module, base unit, and terminal block up to 50 times (IEC61131-2 compliant), after the first use of the product.
Failure to do so may cause the module to malfunction due to poor contact of connector.
- Before touching the module, always touch grounded metal, etc. to discharge static electricity from human body, etc. Not doing so may result in a failure or malfunctions of the module.

[Disposal Precautions]

CAUTION

- When disposing of this product, treat it as industrial waste. When disposing of batteries, separate them from other wastes according to the local regulations. (For details of the Battery Directive in EU member states, refer to the QSCPU User's Manual (Hardware Design, Maintenance and Inspection).)

● CONDITIONS OF USE FOR THE PRODUCT ●

- (1) Although MELCO has obtained the certification for Product's compliance to the international safety standards IEC61508, EN954-1/ISO13849-1 from TUV Rheinland, this fact does not guarantee that Product will be free from any malfunction or failure. The user of this Product shall comply with any and all applicable safety standard, regulation or law and take appropriate safety measures for the system in which the Product is installed or used and shall take the second or third safety measures other than the Product. MELCO is not liable for damages that could have been prevented by compliance with any applicable safety standard, regulation or law.

- (2) MELCO prohibits the use of Products with or in any application involving, and MELCO shall not be liable for a default, a liability for defect warranty, a quality assurance, negligence or other tort and a product liability in these applications.
 - (a) power plants,
 - (b) trains, railway systems, airplanes, airline operations, other transportation systems,
 - (c) hospitals, medical care, dialysis and life support facilities or equipment,
 - (d) amusement equipments,
 - (e) incineration and fuel devices,
 - (f) handling of nuclear or hazardous materials or chemicals,
 - (g) mining and drilling,
 - (h) and other applications where the level of risk to human life, health or property are elevated.

INTRODUCTION

Thank you for purchasing the Mitsubishi MELSEC-QS series programmable controllers.

This manual describes the overview of the CC-Link IE Field Network, and operating procedure, system configuration, parameter setting, functions, programming, and troubleshooting of the QS0J71GF11-T2, CC-Link IE Field Network master/local module (hereafter abbreviated as master/local module).

Before using this product, please read this manual and the relevant manuals carefully and develop familiarity with the functions and performance of the MELSEC-QS series programmable controller to handle the product correctly.

When applying the program examples introduced in this manual to the actual system, ensure the applicability and confirm that it will not cause system control problems.

Please make sure that the end users read this manual.

COMPLIANCE WITH THE EMC, LOW VOLTAGE, AND MACHINERY DIRECTIVES

(1) Method of ensuring compliance

To ensure that Mitsubishi programmable controllers maintain EMC, Low Voltage, and Machinery Directives when incorporated into other machinery or equipment, certain measures may be necessary. Please refer to one of the following manuals.

- QSCPU User's Manual (Hardware Design, Maintenance and Inspection)
- Safety Guidelines

(This manual is included with the base unit.)

The CE mark on the side of the programmable controller indicates compliance with EMC, Low Voltage, and Machinery Directives.

(2) For the product

This product complies with the EMC, Low Voltage, and Machinery Directives. Before using this product, please read this manual, the relevant manuals, the manuals for standard programmable controllers, and the safety standards carefully and pay full attention to safety to handle the product correctly.

The descriptions are based on the requirements of the Directives and the harmonized standards. However, they do not guarantee that the entire machinery constructed according to the descriptions complies with the EMC, Low Voltage, and Machinery Directives.

The manufacture of the machinery must determine the testing method for compliance and declare conformity to the EMC, Low Voltage, and Machinery Directives.

RELEVANT MANUALS

(1) Introduction Manual

Read the following manual before designing and constructing a safety system.

Manual name <manual number (model code)>	Description
Safety Application Guide <SH-080613ENG, 13JR90>	Explains the overview, construction method, laying and wiring examples, and application programs of the safety-related system.

(2) CC-Link IE Field Network (relevant) manuals

When using CC-Link IE Field Network for the first time, refer to this manual. The following table lists and describes CC-Link IE Field Network manuals.

Manual name <manual number (model code)>	Description
MELSEC-Q CC-Link IE Field Network Master/Local Module User's Manual <SH-080917ENG, 13JZ47>	Overview of CC-Link IE Field Network, and specifications, procedures before operation, system configuration, installation, wiring, settings, functions, programming, and troubleshooting of the MELSEC-Q series master/local module
MELSEC-L CC-Link IE Field Network Master/Local Module User's Manual <SH-080972ENG, 13JZ54>	Overview of CC-Link IE Field Network, and specifications, procedures before operation, system configuration, installation, wiring, settings, functions, programming, and troubleshooting of the MELSEC-L series master/local module
MELSEC-L CC-Link IE Field Network Head Module User's Manual <SH-080919ENG, 13JZ48>	Specifications, procedures before operation, system configuration, installation, wiring, settings, and troubleshooting of the head module
CC-Link IE Field Network Ethernet Adapter Module User's Manual <SH-080939ENG, 13JZ50>	Specifications, procedures before operation, system configuration, installation, wiring, settings, and troubleshooting of the Ethernet adapter module
CC-Link IE Field Network Interface Board User's Manual (For SW1DNC-CCIEF-B) <SH-080980ENG, 13JZ58>	Specifications, procedures before operation, system configuration, settings, functions, programming, and troubleshooting of the CC-Link IE Field Network interface board

(3) CPU module user's manual

Manual name <manual number (model code)>	Description
QSCPU User's Manual (Hardware Design, Maintenance and Inspection) <SH-080626ENG, 13JR92>	Explains the specifications of the QSCPU, safety power supply module, safety base unit, etc.
QSCPU User's Manual (Function Explanation, Program Fundamentals) <SH-080627ENG, 13JR93>	Explains the functions, programming methods, devices, etc. that are necessary to create programs with the QSCPU.
QSCPU Programming Manual (Common Instructions) <SH-080628ENG, 13JW01>	Explains how to use the sequence instructions, basic instructions, application instructions, and QSCPU dedicated instructions.

(4) Operating manual

Manual name <manual number (model code)>	Description
GX Developer Version 8 Operating Manual <SH-080373E, 13JU41>	Explains the online functions of GX Developer, such as the programming, printout, monitoring, and debugging methods.
GX Developer Version 8 Operating Manual (Safety Programmable Controller) <SH-080576ENG, 13JU53>	Explains the functions of GX Developer that are added or changed to support the safety programmable controller.

Memo

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MANUAL PAGE ORGANIZATION

In this manual, pages are organized and the symbols are used as shown below.

The following illustration is for explanation purpose only, and should not be referred to as an actual documentation.

Annotations on the left side of the page:

- "" is used for window names and items.
- 1. shows operating procedures.
- ☞ shows mouse operations.*1
- [] is used for items in the menu bar and the project window.
- Ex. shows setting or operating examples.
- 📖 shows reference manuals.
- 📄 shows reference pages.

Annotations on the right side of the page:

- The chapter of the current page is shown.
- The section of the current page is shown.
- Point shows notes that require attention.
- Remark shows useful information.

Table from the manual page:

Item	Description	Setting range
Type	Select the type of the connected module.	Page 74, Section 7.1.2
Model Name	Select the model name of the connected module.	Page 74, Section 7.1.3
Points	Select the number of points assigned each slot.	Page 74, Section 7.1.4
Start X/Y	Specify a start I/O number for each slot.	Page 74, Section 7.1.5
Switch Setting	Configure the switch setting of the built-in I/O or intelligent function modules.	Page 74, Section 7.1.6
Detailed Setting	Set the following: • Error Time Output Mode • PLC Operation Mode at HW Error • I/O Response Time	Page 74, Section 7.1.7

*1 The mouse operation example is provided below.



Annotations on the left side of the screenshot:

- Menu bar: Ex. ☞ [Online] ⇨ [Write to PLC...]
Select [Online] on the menu bar, and then select [Write to PLC...].
- Project data list: Ex. ☞ Project data list ⇨ [Parameter] ⇨ [PLC parameter]
In the Project data list, expand [Parameter] and select [PLC parameter].

TERM

Unless otherwise specified, this manual uses the following terms.

Term	Description
Safety programmable controller	A generic term for a safety CPU module, a safety power supply module, a safety main base unit, a CC-Link Safety master module, CC-Link Safety remote I/O modules, and a master/local module
Standard programmable controller	A generic term for MELSEC-Q series, MELSEC-L series, MELSEC-QnA series, MELSEC-A series, and MELSEC-FX series modules (This term is used to distinguish a programmable controller that uses these modules from a safety programmable controller.)
QSCPU	Another term for the MELSEC-QS series CPU module
LCPU	Another term for the MELSEC-L series CPU module
QCPU	Another term for the MELSEC-Q series CPU module
QnACPU	Another term for the MELSEC-QnA series CPU module
ACPU	Another term for the MELSEC-A series CPU module
System A CPU	A CPU module where the system A connector of a tracking cable is connected in a redundant system
System B CPU	A CPU module where the system B connector of a tracking cable is connected in a redundant system
Control system CPU	A CPU module that controls operations in a redundant system
Standby system CPU	A CPU module that stands by in case the control system fails in a redundant system
Control CPU	A CPU module that controls connected I/O modules and intelligent function modules. In a multiple CPU system, there are multiple CPU modules and each connected module can be controlled by a different CPU module.
Programming tool	A generic term for GX Works2 and GX Developer
GX Developer	The product name of the software package for the MELSEC programmable controllers
GX Works2	
CC-Link IE Field Network	A high-speed and large-capacity open field network that is based on Ethernet (1000BASE-T)
CC-Link	A field network system where data processing for control and information can be simultaneously performed at high speed
Safety CPU module	The abbreviation for the QS001CPU safety CPU module
Master/local module	The abbreviation for the QS0J71GF11-T2 CC-Link IE Field Network master/local module. This module supports safety functions.
Q series master/local module	The abbreviation for the QJ71GF11-T2 CC-Link IE Field Network master/local module
L series master/local module	The abbreviation for the LJ71GF11-T2 CC-Link IE Field Network master/local module
CC-Link Safety master module	The abbreviation for the QS0J61BT12 CC-Link Safety system master module
Head module	The abbreviation for the LJ72GF15-T2 CC-Link IE Field Network head module
Ethernet adapter module	The abbreviation for the NZ2GF-ETB CC-Link IE Field Network Ethernet adapter module
CC-Link IE Field Network interface board	The abbreviation for the Q81BD-J71GF11-T2 CC-Link IE Field Network interface board
Network module	A generic term for the following modules: <ul style="list-style-type: none"> • Module on CC-Link IE Field Network • CC-Link IE Controller Network module • Ethernet interface module • MELSECNET/H module • MELSECNET/10 module
Intelligent function module	A MELSEC-Q/L series module that has functions other than input and output, such as an A/D converter module and D/A converter module
Safety data	Data exchanged through safety communication
Safety connection	A connection established for safety communication
Safety communication	A function to exchange safety data between safety stations on the same network
Standard communication	A generic term for cyclic transmission and transient transmission
Cyclic transmission	A function by which data are periodically exchanged among stations on the same network using link devices (RX, RY, RWw, and RWr)
Transient transmission	A function of communication with another station, which is used when requested by a dedicated instruction or a programming tool
Safety station	A generic term for a station that performs safety communication and standard communication
Standard station	A generic term for a station that performs standard communication

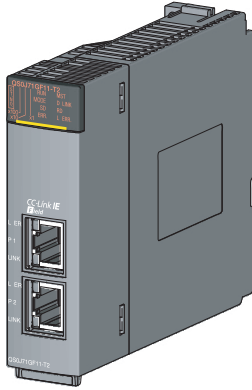
Term	Description
Master station	A station that controls the entire network. Only one master station can be used in a network. This station serves as a safety station or a standard station, and can perform cyclic transmission and transient transmission with all stations. When set as a safety station, the station can perform safety communication with another safety station on the same network.
Local station	A station that serves as a safety station or a standard station. This station can perform cyclic transmission and transient transmission with the master station and other local stations. When set as a safety station, the station can perform safety communication with another safety station on the same network. The station is controlled by programs in the CPU module or other equivalent modules on the station.
Remote I/O station	A station that exchanges I/O signals (bit data) with the master station by cyclic transmission
Remote device station	A station that exchanges I/O signals (bit data) and I/O data (word data) with another station by cyclic transmission. This station responds to a transient transmission request from another station.
Intelligent device station	A station that exchanges I/O signals (bit data) and I/O data (word data) with another station by cyclic transmission. This station responds to a transient transmission request from another station and also issues a transient transmission request to another station.
Slave station	A generic term for a local station, remote I/O station, remote device station, and intelligent device station
Reserved station	A station reserved for future use. This station is not actually connected, but counted as a connected station.
Relay station	A station that includes two or more network modules. Data are passed through this station to stations on other networks.
Data link	Generic term for cyclic transmission and transient transmission
Seamless communication	Communication that allows users to access a different kind of networks without having to consider the differences as if data were exchanged within one single network.
Routing	A process of selecting paths for communication with other networks. CC-Link IE Field Network requires communication paths to be preset using routing parameters to communicate with stations on different networks.
Dedicated instruction	An instruction that simplifies programming for using functions of intelligent function modules
Link dedicated instruction	A dedicated instruction used for transient transmission with a programmable controller on another station. This instruction allows a master/local module to communicate with programmable controllers on the same network (CC-Link IE Field Network) and on other networks (Ethernet, CC-Link IE Controller Network, and MELSECNET/H).
Return	Processing that restarts data link when a station recovers from an error
Disconnection	Processing that stops data link if a data link error occurs
Loopback	A function that disconnects the station in which an error has occurred, and continues data link with the stations that are operating normally. Stations connected after the faulty station can also continue data link.
Device	A device (X, Y, M, D, or others) in a CPU module
Link device	A device (RX, RY, RWr, or RWw) in a module on CC-Link IE Field Network
Remote input (RX)	Bit data input from a slave station to the master station (For some areas in a local station, data are input in the opposite direction.)  Page 103, Section 8.2.1
Remote output (RY)	Bit data output from the master station to a slave station (For some areas in a local station, data are output in the opposite direction.)  Page 103, Section 8.2.1
Remote register (RWr)	Word data input from a slave station to the master station (For some areas in a local station, data are input in the opposite direction.)  Page 103, Section 8.2.1
Remote register (RWw)	Word data output from the master station to a slave station (For some areas in a local station, data are output in the opposite direction.)  Page 103, Section 8.2.1
Link special relay (SB)	Bit data that indicates the operating status and data link status of a module on CC-Link IE Field Network
Link special register (SW)	Word data that indicates the operating status and data link status of a module on CC-Link IE Field Network
Link scan (Link scan time)	Time required for all the stations on the network to transmit data. The link scan time depends on data volume and the number of transient transmission requests.
Link refresh	Data transfer between a link device in a module on CC-Link IE Field Network and a device in a CPU module. Link refresh is performed in the END processing of the CPU module's sequence scan.
Baton pass	A token to send data over a network
Buffer memory	A memory in an intelligent function module, where data (such as setting values and monitoring values) exchanged with a CPU module are stored

Term	Description
Buffer memory address	An address that indicates the storage location of data assigned to the buffer memory in an intelligent function module
RAS	The abbreviation for Reliability, Availability, and Serviceability. This term refers to usability of automated equipment.
READ	The abbreviation for JP.READ and GP.READ
SREAD	The abbreviation for JP.SREAD and GP.SREAD
WRITE	The abbreviation for JP.WRITE and GP.WRITE
SWRITE	The abbreviation for JP.SWRITE and GP.SWRITE
REQ	The abbreviation for JP.REQ and GP.REQ

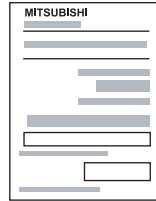
PACKING LIST

The following items are included in the package of this product. Before use, check that all the items are included.

QS0J71GF11-T2



QS0J71GF11-T2



MELSEC-QS CC-Link IE Field Network
Master/Local Module
User's Manual (Hardware)

CHAPTER 1 CC-Link IE FIELD NETWORK

1.1 CC-Link IE Field Network

CC-Link IE Field Network is a high-speed and large-capacity open field network that is based on Ethernet (1000BASE-T).

(1) Data communication

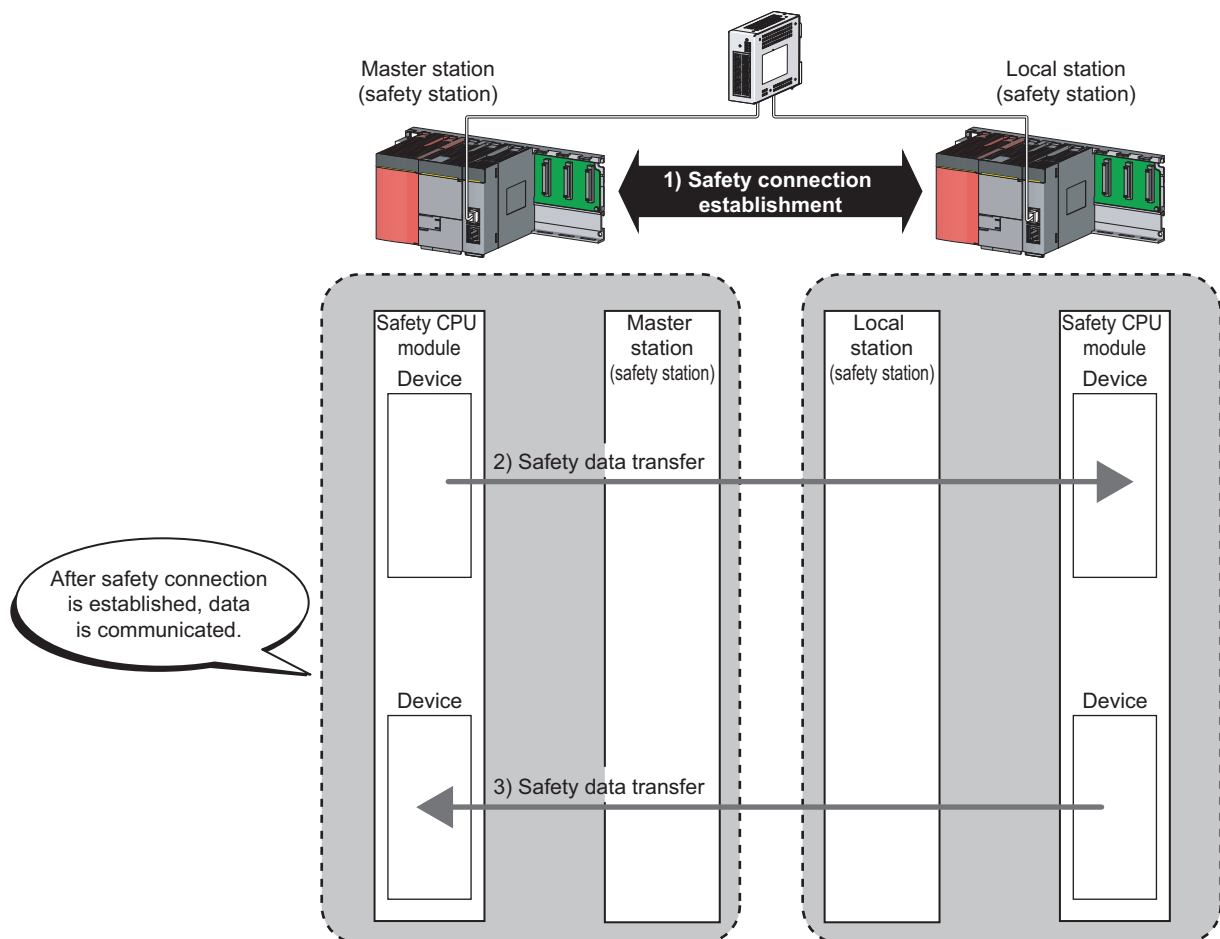
High-speed and large-capacity data communication is available between a master station and slave stations on CC-Link IE Field Network. A safety station can operate safety communication and standard communication simultaneously.

(a) Safety communication

Data communication ensuring high safety (safety communication) can be performed.

Data is communicated after a safety connection is established between safety stations on the same network.

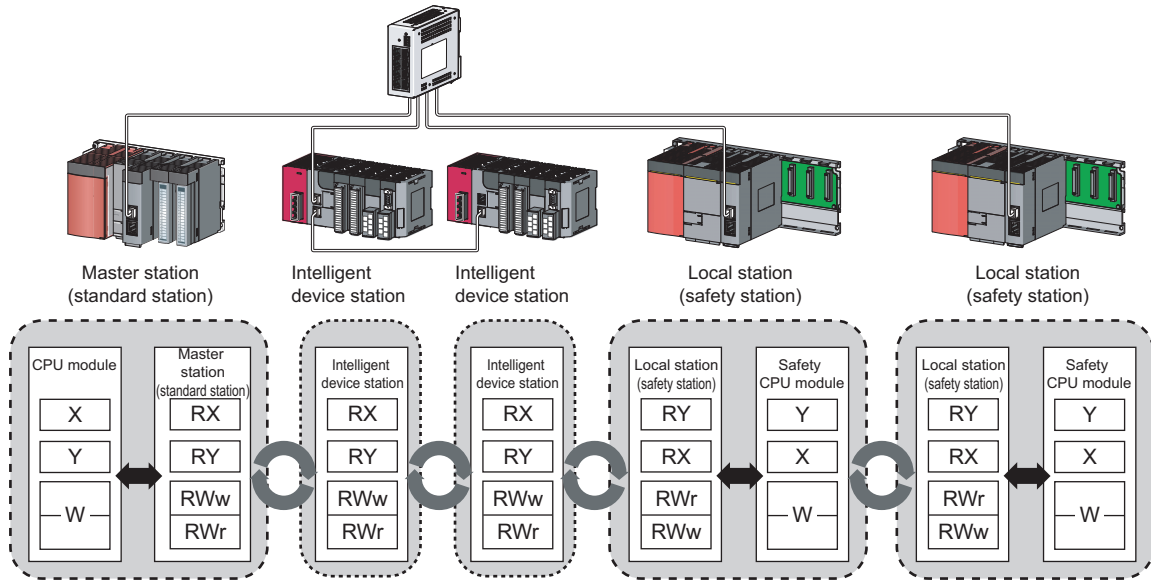
(☞ Page 96, Section 8.1)



(b) Standard communication

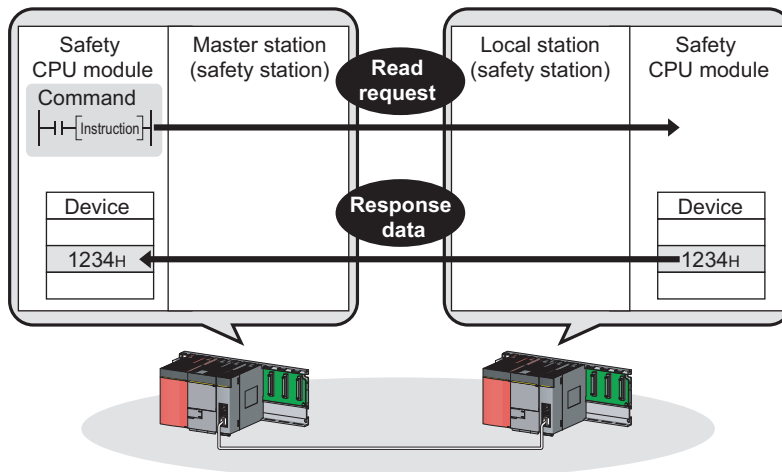
- Periodic communication (cyclic transmission)

Data is periodically communicated among stations within the same network. (👉 Page 102, Section 8.2)



- Non-periodic communication (transient transmission)

Data is communicated upon request. (👉 Page 117, Section 8.3)

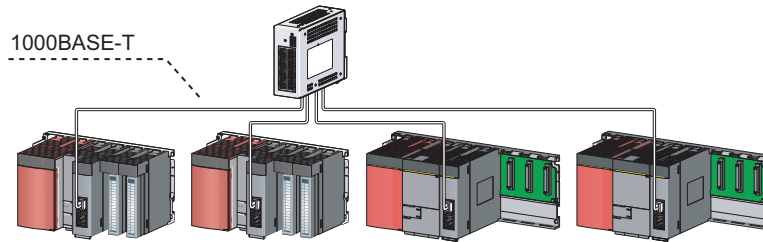


(2) 1Gbps communication speed

1Gbps communication speed allows high-speed communication. Also, the takt time can be reduced due to the improved performance of communication response.

(3) Use of Ethernet cable

A 1000BASE-T-compliant Ethernet is used for the connection interface. The wiring cost can be reduced because 1000BASE-T-compliant Ethernet cables are commercially available. (☞ Page 56, Section 5.2)

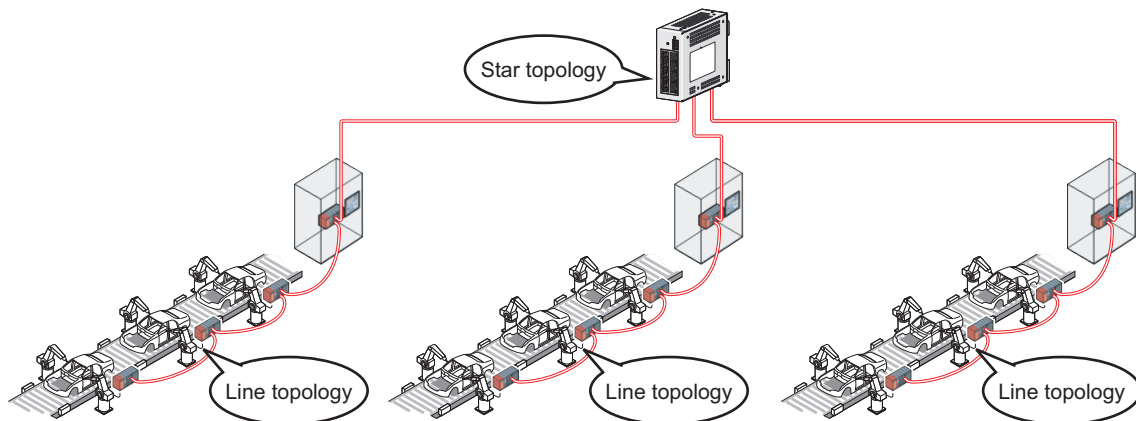


(4) Flexible wiring for system arrangements

The network can be wired into star topology, line topology, and ring topology. (☞ Page 47, Section 5.1.1)

For star topology, a 1000BASE-T compliant switching hub can be used. (☞ Page 57, Section 5.2.2)

Wiring is highly flexible because a network can consist of a combination of star and line topologies. For example, the control panels can be connected through a star topology and the production lines through a line topology.



1.2 Master/Local Modules

A master/local module is used to connect a safety programmable controller to CC-Link IE Field Network. The module is used being mounted on a safety base unit.

The module can be used as the following stations on CC-Link IE Field Network.

- Master station (safety station)
- Local station (safety station)
- Local station (standard station)

(1) Communication that ensures safety (safety communication)

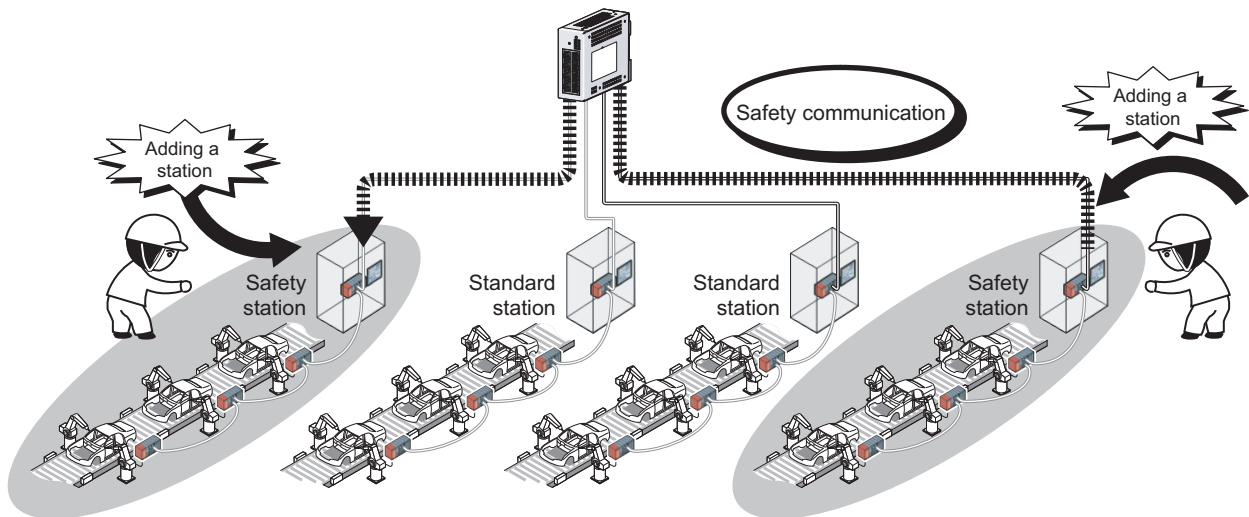
Data communication ensuring high safety (safety communication) can be performed.

Data is communicated after a safety connection is established between safety stations on the same network.

(☞ Page 96, Section 8.1)

(a) Safety stations added on CC-Link IE Field Network

Safety programmable controllers and standard programmable controllers can co-exist on the same network. A network system with high safety can be easily established by adding safety stations on an existing CC-Link IE Field Network. (☞ Page 47, Section 5.1.1)

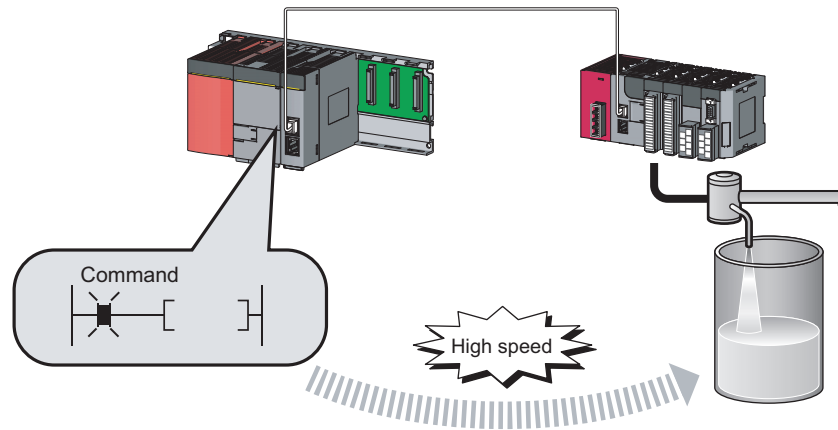


Point

The master/local module has acquired certification of the highest safety level (SIL3 of IEC 61508, Category 4 of EN 654-1, and Category 4 performance level "e" of EN ISO 13849-1) applicable to programmable controllers.

(2) High-speed periodic communication (cyclic transmission)

Since transmission delay time is short, delay caused by the network does not need to be considered (if the link scan time of each master/local module is shorter than the scan time of the safety CPU module).



Point

Master/local modules can perform cyclic transmissions in combination with the following functions:

(☞ Page 35, Section 3.3)

- Auto transfer of data between the link devices in the master/local module and the devices in the safety CPU module
- Cyclic data assurance in units of 32 bits or per station
- Status setting (hold or clear) of input data of standard communication to which a data link error has occurred
- Station reservation for future connection, and others

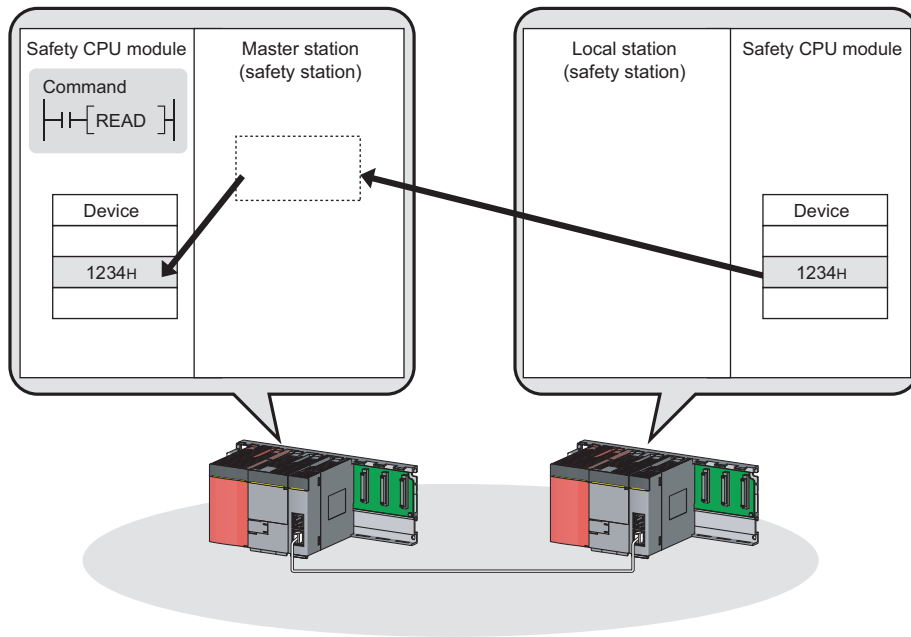
(3) Non-periodic communication (transient transmission) with programmable controllers on other stations

(a) Reading or writing data

A master/local module can access programmable controllers on other stations by dedicated instructions.

( Page 152, Section 10.1)

Seamless access of programmable controllers on other networks such as Ethernet, CC-Link IE Controller Network, MELSECNET/H, and MELSECNET/10 is also possible.



(4) Settings and diagnostics by GX Developer

(a) Setting parameters

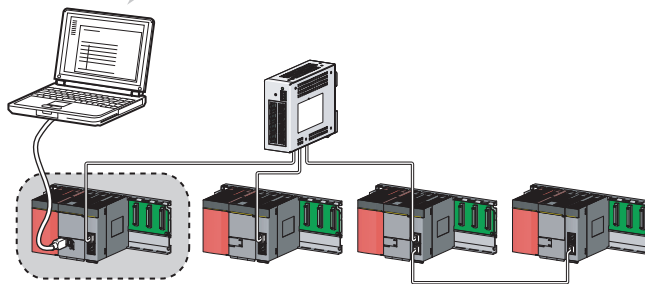
Parameters for master/local modules can be set using GX Developer. (☞ Page 77, CHAPTER 7)

The image shows two screenshots from the GX Developer software. The top screenshot displays the 'Network Parameter CC IE Field Refresh Parameter Module No: 1' dialog box. It features an 'Assignment method' section with radio buttons for 'Points/Start' and 'Start/End'. Below this is a table for configuring transfer parameters between the Link side and the PLC side.

Link side				PLC side				
Dev. name	Points	Start	End	Dev. name	Points	Start	End	
Transfer SP	SB	512	0000	01FF	SB	512	0000	01FF
Transfer SW	SW	512	0000	01FF	SW	512	0000	01FF
Transfer1	RX	256	0000	00FF	X	256	1000	10FF
Transfer2	FY	256	0000	00FF	Y	256	1000	10FF
Transfer3	RVw	256	0000	00FF	W	256	0000	00FF
Transfer4	RVw	256	0000	00FF	W	256	0100	01FF
Transfer5								
Transfer6								
Transfer7								
Transfer8								

The bottom screenshot shows the 'Network Parameter CC IE Field Safety Communication Setting Module No:1' dialog box. It includes a 'Set up safety communication' section with fields for 'Total Number of Stations' (3), 'Host Station No.' (0), and 'Transmission Interval Monitoring Time' (25 ms). Below this is a table for 'Safety Data Transfer Device Setting'.

Line No.	Communication Target Station No.	Open Method	Safety Refresh Monitoring Time (ms)	Safety Data Transfer Device Setting								
				Receive Data Storage Device				Send Data Storage Device				
				Device Name	Points	Start	End	Device Name	Points	Start	End	
1	1	Active	60	Target Station >	X	64	0000	003F	Y	64	0000	003F
2	2	Active	60	Target Station >	X	64	0040	007F	Y	64	0040	007F
3	3	Active	60	Target Station >	X	64	0080	00BF	Y	64	0080	00BF



(b) Checking CC-Link IE Field Network status graphically

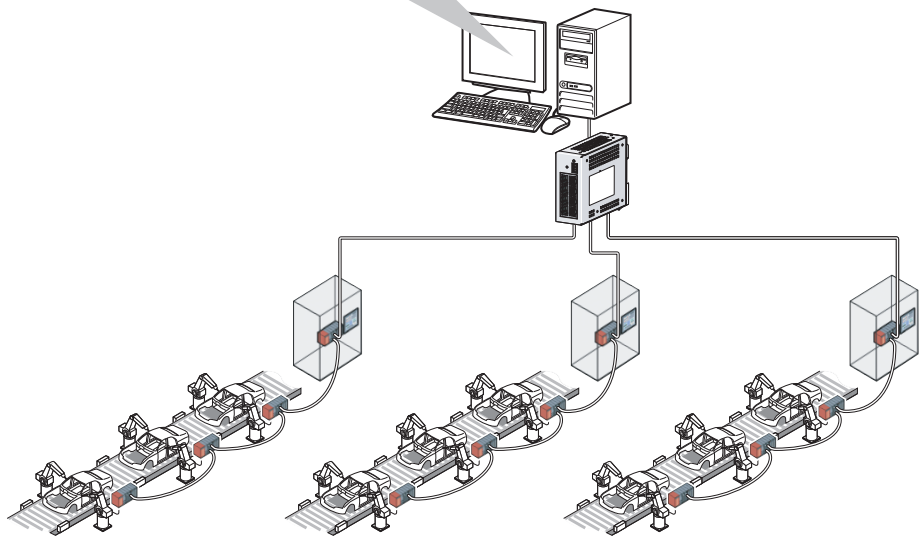
CC-Link IE Field Network status can be checked using GX Developer. Error locations, error causes, and event history are displayed on the window. This allows the system to quickly recover from errors. (☞ Page 124, CHAPTER 9)

The screenshot displays the GX Developer interface for checking CC-Link IE Field Network status. It features three main windows:

- CC-Link IE Field Diagnostics:** Shows a network topology diagram with stations like 'Loc:Station 1' and 'Loc:Station 2'. It includes sections for 'Network Status', 'Operation Test', 'Information Confirmation/Test', and 'Selected Station Operation'.
- Network Event History:** A table listing network events with columns for No., Event occurrence date and time, Event detected station, and Event history contents.
- Error Details:** A window showing specific error information for a selected station, including error factor and troubleshooting instructions.

Callouts highlight the following features:

- Displays the status of CC-Link IE Field Network:** Points to the network topology diagram in the 'CC-Link IE Field Diagnostics' window.
- Displays the network event history:** Points to the 'Network Event History' table.
- Displays error details:** Points to the 'Error Details' window.



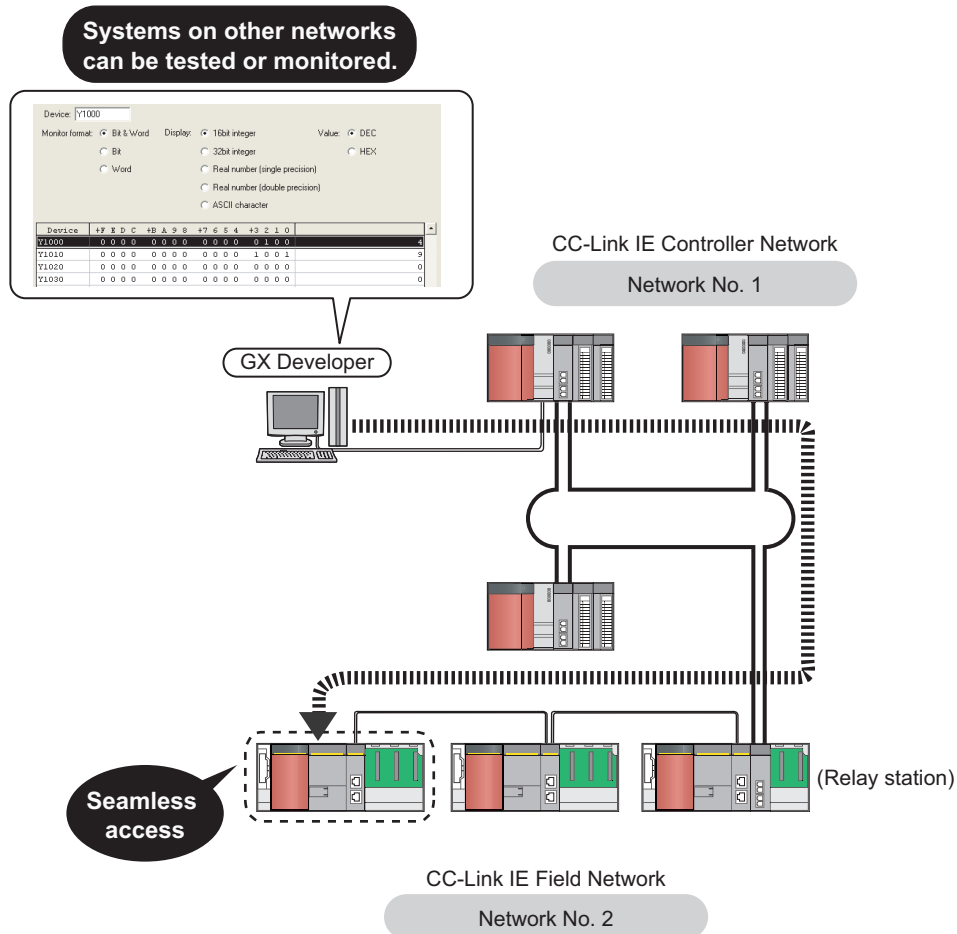
(c) Seamless access to other networks

GX Developer can seamlessly access (test or monitor) systems composed of CC-Link IE Field Network and other networks. The accessible networks are Ethernet, CC-Link IE Controller Network, MELSECNET/H, MELSECNET/10, and CC-Link.

Seamless access enables the user to change the access target without modifying the connection between the personal computer and programmable controller.

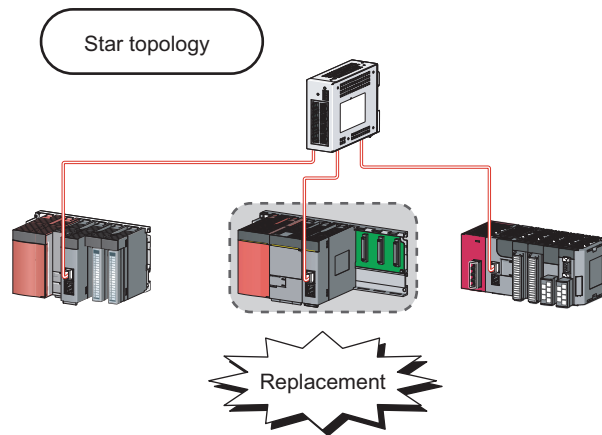
For details on access range, refer to the following.

QSCPU User's Manual (Function Explanation, Program Fundamentals)




(5) Replacing CC-Link IE Field Network devices without stopping the system

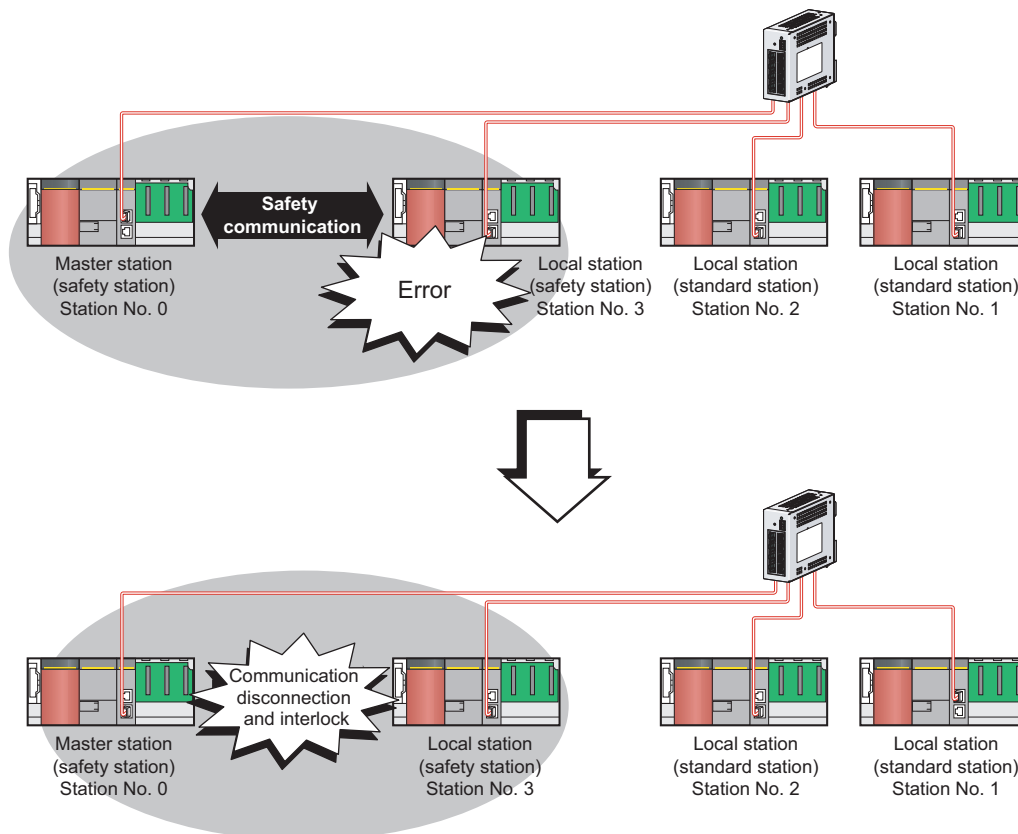
For star topology, slave stations can be replaced without powering off the whole system.



(6) RAS function when a communication error occurs

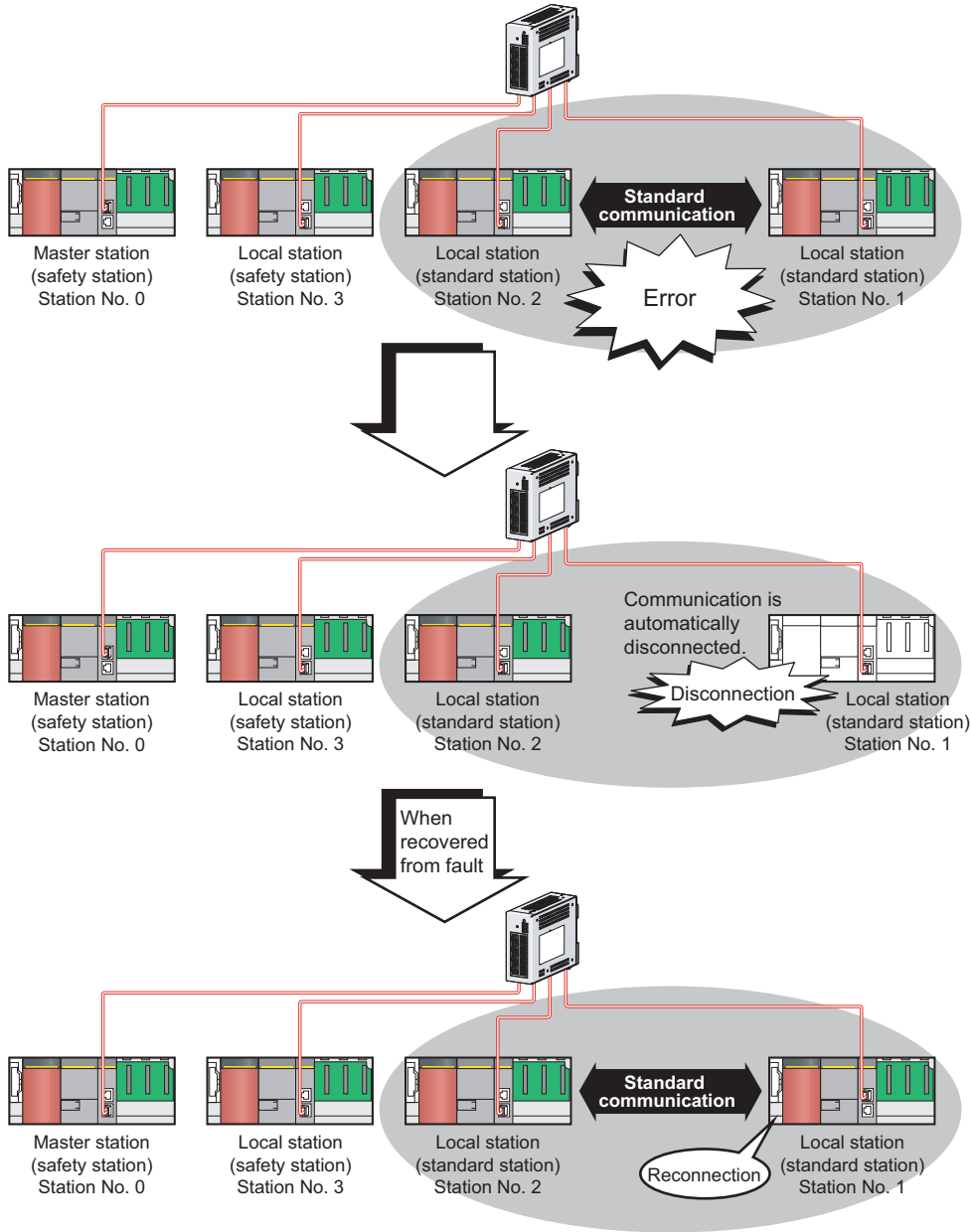
(a) During safety communication

When a communication error occurs between safety stations, communication is automatically disconnected in order to prevent incorrect input/output from/to the faulty station. ( Page 100, Section 8.1.3)



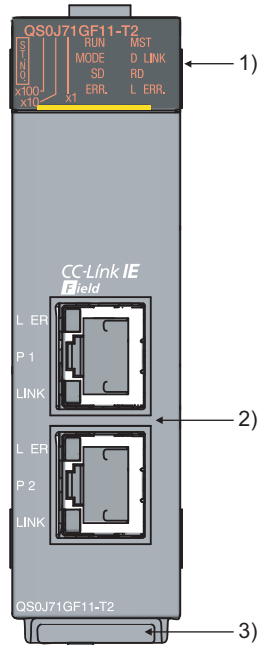
(b) During standard communication

When a communication error occurs, communication is automatically disconnected in order to prevent incorrect input/output from/to the faulty station. When the disconnected station gets back to normal operation, it automatically returns to the network and resumes data link. (☞ Page 35, Section 3.3.1)

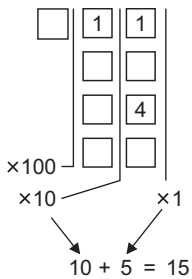


CHAPTER 2 PART NAMES

This chapter describes the names of each part of the master/local modules.






No.	Name	Application
1)	RUN LED	Indicates the operating status.
	ON	Operates normally.
	OFF	A hardware failure or a watchdog timer error has occurred.
	MST LED	Indicates the station type.
	ON	Operates as a master station (safety station).
	OFF	Operates as a local station.
	MODE LED	Indicates the mode.
	ON	In online mode.
	Flashing	In test mode (The module is performing a hardware test, self-loopback test, or loop test.)
	OFF	In offline mode. (Data link not performed)
	D LINK LED	Indicates the status of the data link.
	ON	Data link in operation (cyclic transmission in progress)
	Flashing	Data link in operation (cyclic transmission stopped)
	OFF	Data link not performed (disconnected)
	SD LED	Displays the sending status of data.
ON	Sending data.	
OFF	Data not sent.	
RD LED	Displays the reception status of data.	
ON	Receiving data.	
OFF	Data not received.	

No.	Name	Application	
1)	ERR. LED	Indicates the error status of the master/local module. The description of the errors can be confirmed in CC-Link IE Field Network diagnostics. (☞ Page 124, CHAPTER 9)	
	ON	One of the following errors has occurred: <ul style="list-style-type: none"> • A stop error occurs in the safety CPU module. • An error was detected in all stations. • Modules with same station number exist on the network. • A network parameter is corrupted. • The network parameter does not match the installation status. (Reserved station specification, number of connected stations, network number etc.) 	
	Flashing	A data link faulty station was detected.	
	OFF	Working normally.	
1)	L ERR. LED	Indicates the error status of the received data and the circuit. When the L ERR. LED is on, you can check the L ER LED for "P1" or "P2" to see on which port the error was detected. The description of the errors can be confirmed in CC-Link IE Field Network diagnostics. (☞ Page 124, CHAPTER 9) This LED automatically turns off when the module has received normal data and loopback is completed in ring topology.	
	ON	<ul style="list-style-type: none"> • The module has received abnormal data. • The module is performing loopback. 	
	OFF	<ul style="list-style-type: none"> • The module has received normal data. • The module is not performing loopback. 	
1)	ST.NO.	Displays the station number of the master/local module.	
	ON	Displays the station number. Ex. Station No. 15 	
	OFF	Operates as a master station (safety station). (station No. 0)	
2)	P1	PORT1 connector for CC-Link IE Field Network (RJ45 connector) Connect an Ethernet cable. (☞ Page 64, Section 6.3) There are no restrictions on the connection order of the cables for the "P1" connector and "P2" connector.	
	L ER LED	ON	<ul style="list-style-type: none"> • The module has received abnormal data. • The module is performing loopback.
		OFF	<ul style="list-style-type: none"> • The module has received normal data. • The module is not performing loopback.
	LINK LED	ON	Linkup in progress.
		OFF	Linkdown in progress.
P2	PORT2 connector for CC-Link IE Field Network (RJ45 connector) Connect an Ethernet cable. (☞ Page 64, Section 6.3) There are no restrictions on the connection order of the cables for the "P1" connector and "P2" connector.		
	L ER LED	(Same as the "P1" connector)	
	LINK LED	(Same as the "P1" connector)	
3)	Serial number display	Displays the serial number printed on the rating plate.	

Remark

For LED indication when the master/local module is in test mode (when the module performs hardware test, self-loopback test, or loop test), refer to the following.

- Hardware test:  Page 60, Section 6.2.1
- Self-loopback test:  Page 62, Section 6.2.2
- Loop test:  Page 67, Section 6.4.1

CHAPTER 3 SPECIFICATIONS

This chapter describes the specifications, function list, I/O signal, and buffer memory of the master/local module.

3.1 General Specifications

For the general specifications of the master/local module, refer to the following.

 QSCPU User's Manual (Hardware Design and Maintenance and Inspection)

3.2 Performance Specifications

Item		Specifications	
Number of connectable stations per network	Master station (safety station)	1 station (Up to 120 slave stations can be connected to the master station (safety station).)	
	Local station (standard station)	120 stations	
Number of connectable safety stations per network		32 stations	
Maximum number of networks		239	
Maximum number of safety connections per station	Asynchronous mode	31 connections	
	Synchronous mode	8 connections	
Number of safety inputs/outputs per safety connection	Input	8 words	
	Output	8 words	
Maximum link points per network	RX	16384 points, 2KB	
	RY	16384 points, 2KB	
	RWr	8192 points, 16KB	
	RWw	8192 points, 16KB	
Maximum link points per station	Master station (safety station)	RX	16384 points, 2KB
		RY	16384 points, 2KB
		RWr	8192 points, 16KB
		RWw	8192 points, 16KB
	Local station ^{*1}	RX	2048 points, 256 bytes
		RY	2048 points, 256 bytes
		RWr	1024 points, 2048 bytes ^{*2}
		RWw	1024 points, 2048 bytes ^{*2}

Item		Specifications
Ethernet	Communication speed	1 Gbps
	Network topology	Line topology, star topology (Coexistence of line topology and star topology is possible.), and ring topology
	Connection cable	An Ethernet cable that meets the 1000BASE-T standard: Category 5e or higher (double shielded, STP), straight cable (☞ Page 56, Section 5.2.1)
	Maximum station-to-station distance	100m max. (Compliant with ANSI/TIA/EIA-568-B (Category 5e)) (☞ Page 66, Section 6.3 (2))
	Overall cable distance	<ul style="list-style-type: none"> • Line topology: 12000m (when cables are connected to 1 master station and 120 slave stations) • Star topology: Depends on the system configuration. • Ring topology: 12100m (when cables are connected to 1 master station and 120 slave stations)
	Number of cascade connections	Up to 20
Communication method		Token passing method
Number of occupied I/O points		32 points (I/O assignment: Intelligent 32 points)
Internal current consumption (5VDC)		0.85A
External dimensions		98(H) × 27.4(W) × 115(D) [mm]
Weight		0.18kg

*1 The maximum number of points for one master station is listed. A local station can receive data from other stations in addition to this number of points. (☞ Page 96, Section 8.1.1)

*2 256 points and 512 bytes when "Online (High Speed Mode)" is set

3.3 Function List

3.3.1 Using the master/local module as a master station (safety station)

(1) Safety communication function

Function	Description	Reference
Communication with safety stations	Communication starts among safety stations on the same network after safety connections are established.	Page 96, Section 8.1.1
Error log registration function	Information on errors occurred in safety stations and errors occurred in communications among safety stations are transferred to the safety CPU module and registered as error logs.	Page 99, Section 8.1.2
Safety station interlock function	If an error occurs in safety communication, this function cuts off the safety communication and prevents automatic resumption of the communication.	Page 100, Section 8.1.3

(2) Cyclic transmission

Function	Description	Reference
Communication with other stations	Communication by RX and RY	The master station (safety station) communicates I/O data in units of bits with other stations.
	Communication by RWr and RWw	The master station (safety station) communicates I/O data in units of words with other stations.
Device and link device access	Link refresh	Transfer between the link device of the master/local module and the device of the safety CPU module is performed automatically.
Mode selection for cyclic transmission	This mode is selected for optimizing the performance of cyclic transmission based on the cyclic transmission and transient transmission frequency. The mode can be selected from "Online (Normal mode)" and "Online (High-speed mode)".	Page 81, Section 7.3 Page 103, Section 8.2.1
Assurance of cyclic data integrity	The cyclic data integrity is assured in units of 32 bits or station-based units.	Page 86, Section 7.5 Page 104, Section 8.2.2
Scan synchronization specification	Link scan is set to asynchronous or synchronous with the sequence scan of the safety CPU module.	Page 79, Section 7.2 (1)
Input status setting for data link faulty station	Select whether the input data from another station where the data link error occurred is cleared or held.	Page 106, Section 8.2.3
Output status setting for CPU STOP	When the safety CPU module mounted with a master/local module is set to STOP, whether cyclic data output is held or cleared can be selected.	Page 112, Section 8.2.4
Cyclic transmission stop and restart	During debugging and other operations, cyclic transmission is stopped. (Data reception from the slave station and data transmission from own stations are stopped.) Also, the stopped cyclic transmission is restarted. Transient transmission is not stopped.	Page 113, Section 8.2.5 Page 115, Section 8.2.6 Page 116, Section 8.2.7 Page 138, Section 9.4

(3) Transient transmission

Function	Description	Reference
Communication within the same network	Transient transmission is performed to other stations using dedicated instructions and GX Developer.	Page 152, CHAPTER 10
Communication with different networks	By setting the routing parameters (communication path) using GX Developer in advance, transient transmission can be performed to stations on different networks through dedicated instructions or GX Developer. Seamless communication is available with the following networks. <ul style="list-style-type: none"> • Ethernet • CC-Link IE Controller Network • MELSECNET/H • MELSECNET/10 • CC-Link (when using GX Developer) 	Page 92, Section 7.7 Page 118, Section 8.3.2

(4) RAS function

Function	Description	Reference
Slave station disconnection	Only the slave station where an error occurs is disconnected, and data link continues with the stations that are operating normally. In a line topology, all stations connected after the faulty station are disconnected.	—
Automatic return	When the station disconnected from the network due to a data link failure recovers, it automatically returns to the network and restarts data link (for standard communication only).	—
Loopback function	Only the station where an error occurs is disconnected, and data link continues with the stations that are operating normally. All stations after the faulty station are disconnected in line topology. By using the loopback function with ring topology, data link continues with the stations that are operating normally.	Page 121, Section 8.6

(5) Diagnostic function

Function	Description	Reference	
CC-Link IE Field Network diagnostics	The status of CC-Link IE Field Network can be checked by GX Developer. The faulty area, cause of the fault and its corrective action, and event history can be checked in GX Developer.	Page 124, CHAPTER 9	
Individual unit diagnostics	Hardware test	Check the internal hardware of the master/local module.	Page 60, Section 6.2.1
	Self-loopback test	Check the communication circuit of the transmission system of the master/local module.	Page 62, Section 6.2.2
Own network diagnostics	Loop test	Check the network circuit status and parameter setting status of each station.	Page 67, Section 6.4.1
	Cable test	Check the connection status of the Ethernet cable.	Page 74, Section 6.4.2
Other network diagnostics	Communication test	Check whether the communication path for transient transmission from the own station to the target station is correct.	Page 75, Section 6.4.3

(6) Other functions

Function	Description	Reference
Reserved station specification	The reserved stations are included in the number of stations that will be connected to the network in the future without actually connecting them. Reserved stations are not detected as faulty stations even though they are not actually connected.	Page 119, Section 8.4 Page 142, Section 9.6
Temporary cancel of the reserved station setting	Reserved station specification can be temporarily cancelled without changing the parameters.	
Error invalid station and temporary error invalid station setting	Prevent the master station from detecting a slave station as a faulty station even if the slave station is disconnected during data link. This can be used when replacing a slave station during data link, for instance.	Page 120, Section 8.5 Page 146, Section 9.7

3.3.2 Using the master/local module as a local station

(1) Safety communication function (using the master/local module as a local station (safety station))

Function	Description	Reference
Communication with safety stations	Communication starts among safety stations on the same network after safety connections are established.	Page 96, Section 8.1.1
Error log registration function	Information on errors occurred in safety stations and errors occurred in communications among safety stations are transferred to the safety CPU module and registered as error logs.	Page 99, Section 8.1.2
Safety station interlock function	If an error occurs in safety communication, this function cuts off the safety communication and prevents automatic resumption of the communication.	Page 100, Section 8.1.3

(2) Cyclic transmission

Function	Description	Reference
Communication with other stations	Communication by RX and RY	I/O data in bit units is communicated between the local station and other stations. Page 81, Section 7.3
	Communication by RWr and RWw	I/O data in word units is communicated between the local station and other stations. Page 103, Section 8.2.1
Device and link device access	Link refresh	Transfer between the link device of the master/local module and the device of the safety CPU module is performed automatically. Page 86, Section 7.5 Page 104, Section 8.2.2
Assurance of cyclic data integrity	The cyclic data integrity is assured in units of 32 bits or station-based units.	Page 106, Section 8.2.3
Input status setting for data link faulty station	Select whether the input data from another station where the data link error occurred is cleared or held.	Page 113, Section 8.2.5
Output status setting for CPU STOP	When the safety CPU module mounted with a master/local module is set to STOP, whether cyclic data output is held or cleared can be selected.	Page 115, Section 8.2.6
Cyclic transmission stop and restart	During debugging and other operations, cyclic transmission is stopped. (Data reception from the slave station and data transmission from own stations are stopped.) Also, the stopped cyclic transmission is restarted. Transient transmission is not stopped.	Page 116, Section 8.2.7 Page 138, Section 9.4

(3) Transient transmission

Function	Description	Reference
Communication within the same network	Transient transmission is performed to other stations using dedicated instructions and GX Developer.	Page 152, CHAPTER 10
Communication with different networks	By setting the routing parameters (communication path) using GX Developer in advance, transient transmission can be performed to stations on different networks through dedicated instructions or GX Developer. Seamless communication is available with the following networks. <ul style="list-style-type: none"> • Ethernet • CC-Link IE Controller Network • MELSECNET/H • MELSECNET/10 • CC-Link (when using GX Developer) 	Page 92, Section 7.7 Page 118, Section 8.3.2

(4) Diagnostic function

Function	Description	Reference
CC-Link IE Field Network diagnostics	The status of CC-Link IE Field Network can be checked by GX Developer. The faulty area, cause of the fault and its corrective action, and event history can be checked in GX Developer.	Page 124, CHAPTER 9
Individual unit diagnostics	Hardware test	Check the internal hardware of the master/local module.
	Self-loopback test	Check the communication circuit of the transmission system of the master/local module.
Own network diagnostics	Loop test	Check the network circuit status and parameter setting status of each station.
	Cable test	Check the connection status of the Ethernet cable.
Other network diagnostics	Communication test	Check whether the communication path for transient transmission from the own station to the target station is correct.

3.4 List of I/O Signals


This section lists I/O signals for the safety CPU module.

The I/O signal assignment of when the start I/O number of the master/local module is "0000" (the module is mounted to the 0 slot of the safety main base unit) is shown below.

The device X is an input signal from the master/local module to the safety CPU module. The device Y is an output signal from the safety CPU module to the master/local module.

Signal direction: Master/local module → Safety CPU module		Signal direction: Safety CPU module → Master/local module	
Device number	Signal name	Device number	Signal name
X0	Module failure	Y0	Use prohibited
X1	Own station data link status	Y1	
X2	Use prohibited	Y2	
X3	Other stations data link status	Y3	
X4	Use prohibited	Y4	
X5		Y5	
X6		Y6	
X7		Y7	
X8		Y8	
X9		Y9	
XA		YA	
XB		YB	
XC		YC	
XD		YD	
XE		YE	
XF	Module ready	YF	
X10	Use prohibited	Y10	
X11		Y11	
X12		Y12	
X13		Y13	
X14		Y14	
X15		Y15	
X16		Y16	
X17		Y17	
X18		Y18	
X19		Y19	
X1A		Y1A	
X1B		Y1B	
X1C		Y1C	
X1D		Y1D	
X1E		Y1E	
X1F		Y1F	

Point 

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- Do not use (turn on) any "use prohibited" signals as an input or output signal to the safety CPU module. Doing so may cause malfunction of the programmable controller system.
 - For details on the I/O signals, refer to "I/O Signals". ( Page 264, Appendix 1)
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3.5 List of Buffer Memory Addresses

The buffer memory is used to exchange data between the master/local module and the safety CPU module.
The buffer memory values are defaulted when the power is turned off or the safety CPU module is reset.

Address (Decimal (Hexadecimal))	Name		Initial value	Read, write	Refer to
0 to 1023 (0 to 3FF _H)	Link device area	Remote input (RX)	0	Read	Page 266, Appendix 2.1
1024 to 2047 (400 _H to 7FF _H)		Remote output (RY)		Read, write	
2048 to 10239 (800 _H to 27FF _H)		Remote register (RWw)			
10240 to 18431 (2800 _H to 47FF _H)		Remote register (RWr)		Read	
18432 to 18463 (4800 _H to 481F _H)		Link special relay (SB)		<ul style="list-style-type: none"> • 18432 to 18433 for read and write • 18434 to 18463 for read only 	
18464 to 18975 (4820 _H to 4A1F _H)		Link special register (SW)		<ul style="list-style-type: none"> • 18464 to 18495 for read and write • 18496 to 18975 for read only 	
18976 to 19455 (4A20 _H to 4BFF _H)	System area				—
19456 (4C00 _H)	RX offset/size information	Station No. 1 RX offset	0	Read	Page 269, Appendix 2.2
19457 (4C01 _H)		Station No. 1 RX size			
to		to			
19694 (4CEE _H)		Station No. 120 RX offset			
19695 (4CEF _H)		Station No. 120 RX size			
19696 to 19711 (4CF0 _H to 4CFF _H)	System area				—
19712 (4D00 _H)	RY offset/size information	Station No. 1 RY offset	0	Read	Page 269, Appendix 2.3
19713 (4D01 _H)		Station No. 1 RY size			
to		to			
19950 (4DEE _H)		Station No. 120 RY offset			
19951 (4DEF _H)		Station No. 120 RY size			
19952 to 19967 (4DF0 _H to 4DFF _H)	System area				—

Address (Decimal (Hexadecimal))	Name		Initial value	Read, write	Refer to
19968 (4E00 _H)	RWw offset/size information	Station No. 1 RWw offset	0	Read	Page 270, Appendix 2.4
19969 (4E01 _H)		Station No. 1 RWw size			
to		to			
20206 (4EEE _H)		Station No. 120 RWw offset			
20207 (4EEF _H)		Station No. 120 RWw size			
20208 to 20223 (4EF0 _H to 4EFF _H)	System area				—
20224 (4F00 _H)	RWr offset/size information	Station No. 1 RWr offset	0	Read	Page 270, Appendix 2.5
20225 (4F01 _H)		Station No. 1 RWr size			
to		to			
20462 (4FEE _H)		Station No. 120 RWr offset			
20463 (4FEF _H)		Station No. 120 RWr size			
20464 to 20511 (4FF0 _H to 501F _H)	System area				—
20512 (5020 _H)	Own station (network card) information	Manufacturer code	0	Read	Page 271, Appendix 2.6
20513 (5021 _H)		Model type	1		
20514 (5022 _H)		Model code	6 or 7		
20515 (5023 _H)		Version	*1		
20516 to 20519 (5024 _H to 5027 _H)	System area				—
20520 (5028 _H)	Own station (controller) information	Controller information valid/invalid flag	0	Read, write	Page 271, Appendix 2.6
20521 (5029 _H)		Manufacturer code			
20522 (502A _H)		Model type			
20523 (502B _H)		Model code			
20524 (502C _H)		Version			
20525 to 20534 (502D _H to 5036 _H)		Model name string			
20535 to 20536 (5037 _H to 5038 _H)		Vendor-specific device information			

Address (Decimal (Hexadecimal))	Name	Initial value	Read, write	Refer to	
20537 to 20538 (5039 _H to 503A _H)	System area			—	
20544 (5040 _H)	Other station (network card) information (station No. 1)	Manufacturer code	0	Read	Page 272, Appendix 2.7
20545 (5041 _H)		Model type			
20546 (5042 _H)		Model code			
20547 (5043 _H)		Version			
20548 to 20551 (5044 _H to 5047 _H)		System area			
20552 (5048 _H)	Other station (controller information) (station No. 1)	Controller information valid/invalid flag	0	Read	Page 272, Appendix 2.7
20553 (5049 _H)		Manufacturer code			
20554 (504A _H)		Model type			
20555 (504B _H)		Model code			
20556 (504C _H)		Version			
20557 to 20566 (504D _H to 5056 _H)		Model name string			
20567 to 20568 (5057 _H to 5058 _H)		Vendor-specific device information			
20569 to 20575 (5059 _H to 505F _H)	System area			—	
20576 to 24383 (5060 _H to 5F3F _H)	Other station information (station No. 2 to No. 120)	Same as other station information (station No. 1)		—	
24384 to 31767 (5F40 _H to 7FFF _H)	System area			—	

*1 Since the version of a master/local module is stored, the initial value depends on the master/local module used.

Point

Do not write data to "System area".
Doing so may cause malfunction of the programmable controller system.

CHAPTER 4 PROCEDURES BEFORE OPERATION

This chapter lists the procedures to be performed before operation of CC-Link IE Field Network.

Remark

The programming chapter in this manual provides examples for each procedure (from "System consideration" to "Debug") described below. (☞ Page 209, CHAPTER 11)

Check box

System consideration

Consider the system configuration and link device assignments.



Page 47, CHAPTER 5
Page 96, Section 8.1.1
Page 103, Section 8.2.1



Installation

Mount the master/local module to the safety main base unit.



Page 59, Section 6.1



Safety CPU operation mode check

Check that the safety CPU module is in test mode (the TEST LED of the safety CPU module is on) after power-on.



QSCPU User's Manual
(Hardware Design,
Maintenance and Inspection)



Unit test

Perform a unit test on each module.



Page 60, Section 6.2



Manual for slave stations



Wiring

Connect an Ethernet cable to each module.



Page 64, Section 6.3



Cable check

Perform a cable test on the master/local module.



Page 74, Section 6.4.2



To the next page

Check box

Configuration

Set the parameters for each module.



Page 77, CHAPTER 7



Network diagnostics

Perform a loop test on the master station, and check if it can properly communicate by the configured parameters.



Page 67, Section 6.4.1



Programming

Create a program.



Page 209, CHAPTER 11



Debug

Debug the program by using CC-Link IE Field Network diagnostics.



Page 124, CHAPTER 9



Safety CPU operation mode change (to safety mode)

Change the safety CPU operation mode to safety mode using GX Developer.



QSCPU User's Manual
(Hardware Design,
Maintenance and Inspection)

CHAPTER 5 SYSTEM CONFIGURATION

5.1 CC-Link IE Field Network Configuration

This section describes CC-Link IE Field Network configurations.

The master/local module operates as the following station in CC-Link IE Field Network:

- Master station (safety station)
- Local station (safety station)
- Local station (standard station)

5.1.1 Single network system

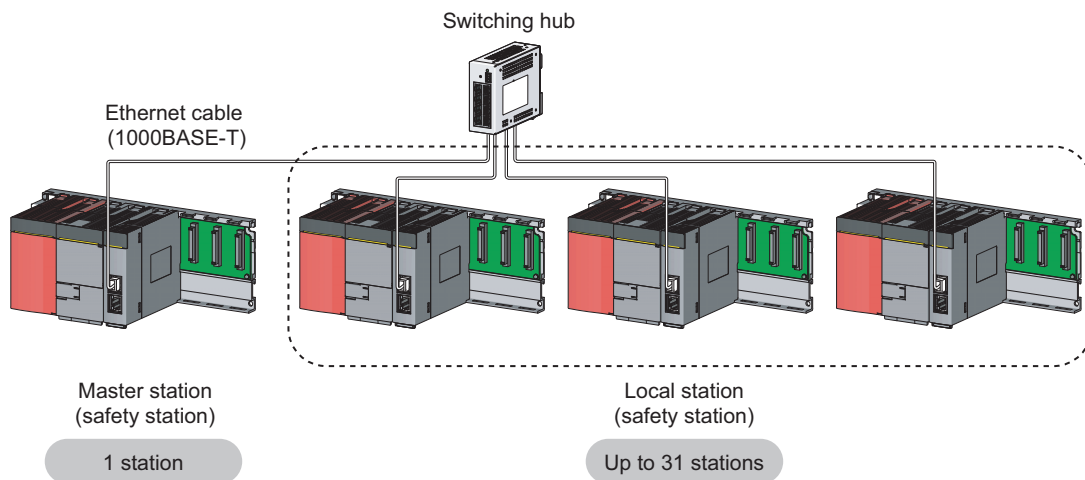
5

(1) Overall system configuration

Single network system is a system that consists of a master station and slave stations connected by Ethernet cables.

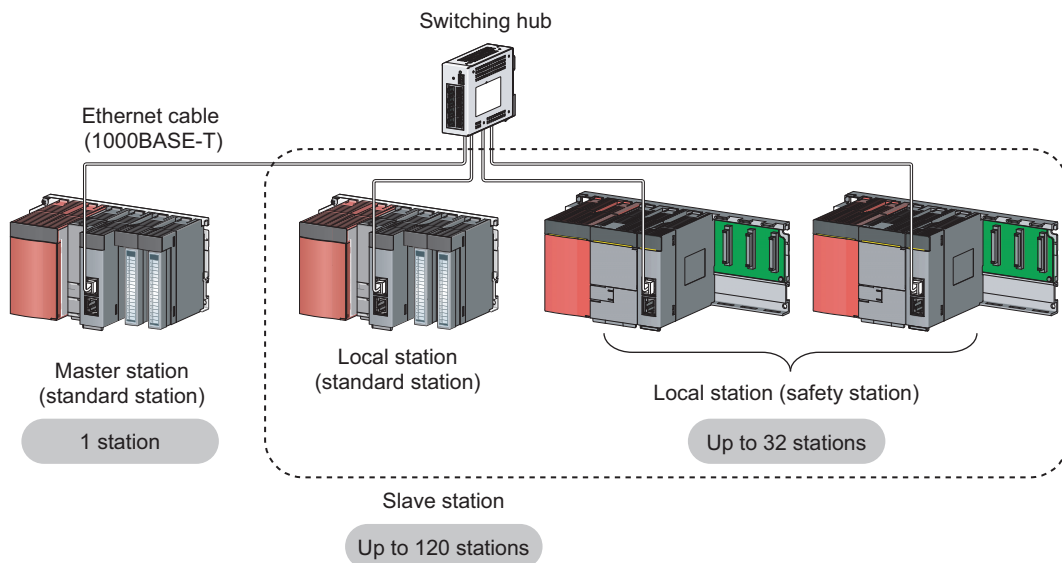
(a) Configuring a system using safety stations only

One master station (safety station) and up to 31 local stations (safety stations) can be connected.



(b) Configuring a system using safety stations and standard stations

One master station (standard station) and up to 120 slave stations can be connected per network. Up to 32 safety stations can be connected per network.



When a safety station is set as a master station, the following restrictions apply:

- Some dedicated instructions cannot be used. (☞ Page 317, Appendix 7.2)
- Interlink transmission is not available.

Point 🔍

The maximum number of safety connections per master/local module is as follows:

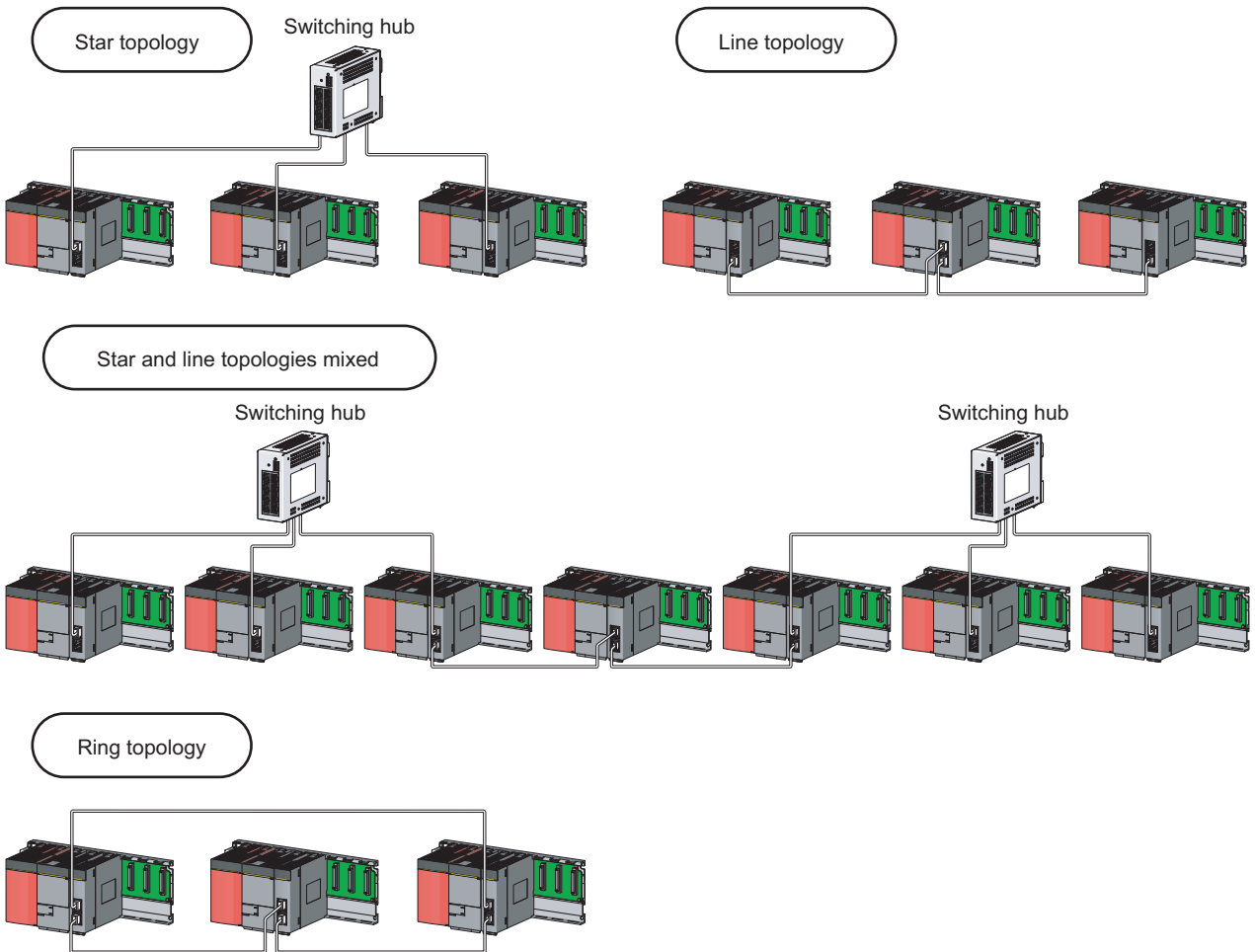
- Asynchronous mode: 31 connections
- Synchronous mode: 8 connections

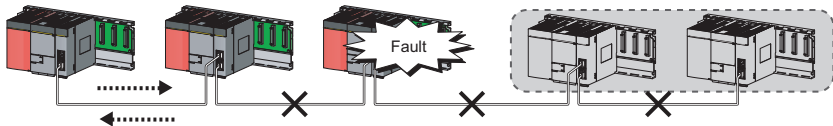
(2) Network configuration

(a) Network topology

The network can be wired into star topology, line topology, and ring topology.

A network can consist of a combination of star and line topologies, but the ring topology cannot be combined with star or line topology.



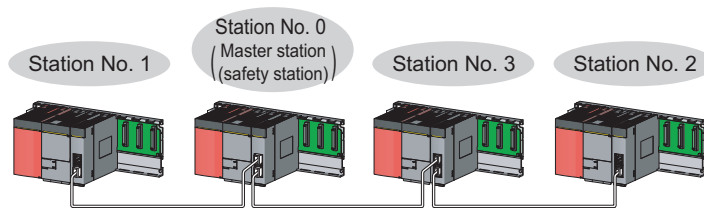
Item	Description
Star topology	The network is configured into a star using a switching hub and Ethernet cables. Slave stations can be easily added to the network using this topology. (Add slave stations one by one. If multiple slave stations are added at a time, all stations on the network will be reconnected. Therefore, an error may momentarily occur in all the stations.) Data link continues with the stations that are operating normally.
Line topology	The network is configured into a line by connecting the modules with Ethernet cables, but without a switching hub. If an error occurs, stations after the faulty station will be disconnected.*1 <div style="text-align: center;"> Line topology Master station (safety station) (Station No. 0)  Stations after the faulty station are disconnected. </div>

Item	Description
Ring topology	<p>The network is configured into a ring using Ethernet cables.</p> <p>Data link continues with the stations that are operating normally.*1</p>

*1 Add/remove slave stations one by one. If multiple slave stations are added/removed at a time, all stations on the network will be reconnected, and an error may momentarily occur in all the stations.

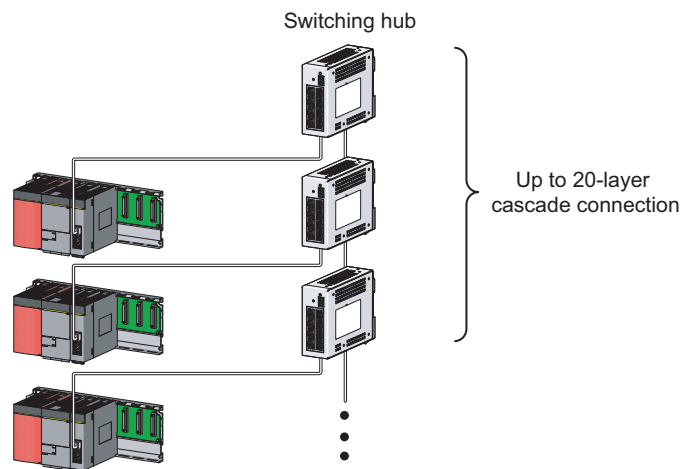
(b) Station number and connection position

Modules can be connected in any order regardless of the station number.



(c) Cascade connection

Up to 20-layer connection is available for the cascade connection.



Remark

For wiring method, refer to Page 64, Section 6.3.

.....

(3) Precautions

(a) Connecting devices to the same network

Do not connect Ethernet devices (e.g. personal computer) other than CC-Link IE Field Network devices to the switching hub used by CC-Link IE Field Network. Doing so will cause timeout in the master station, resulting in disconnection of all the stations.

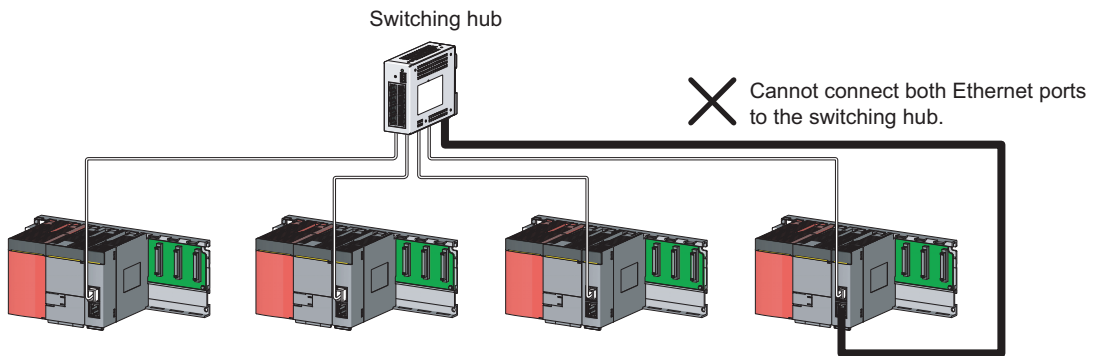
(b) Configuration in which data link cannot be performed (incorrectly configured ring topology)

Point 

Do not wire devices as shown below. Doing so will cause an error in all stations and data link cannot be performed.

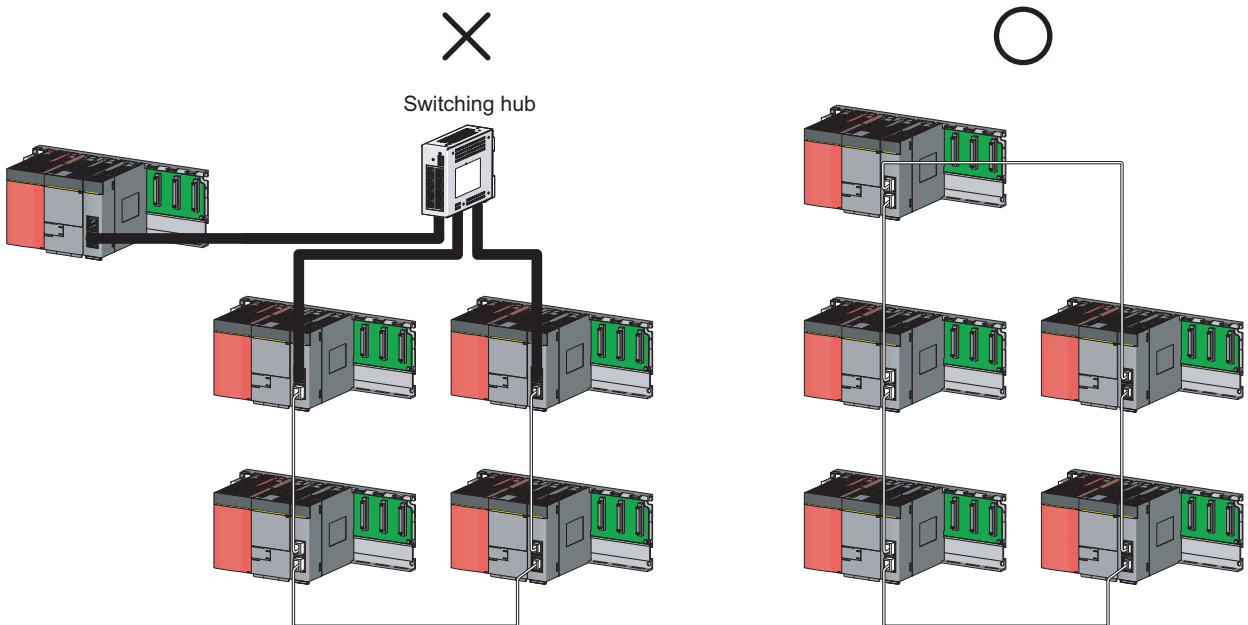
- Connecting both PORT1 and PORT2 to the switching hub

Ex.



- Ring topology through a switching hub

Ex.



(c) Ring topology

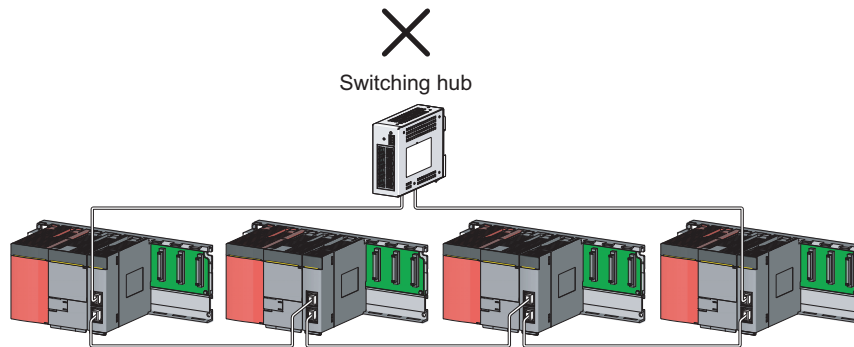
To configure a ring topology, select "Use" under "Loopback Function Setting" in the network parameter window for the master station. (☞ Page 81, Section 7.3)

(d) Using a switching hub to configure a ring topology

If ring topology is configured by connecting two stations through two of the switching hub's ports, the following problems may arise:

- If an Ethernet cable is disconnected, loopback cannot be detected.
- If a station is disconnected due to failure or power-off, data link will stop.

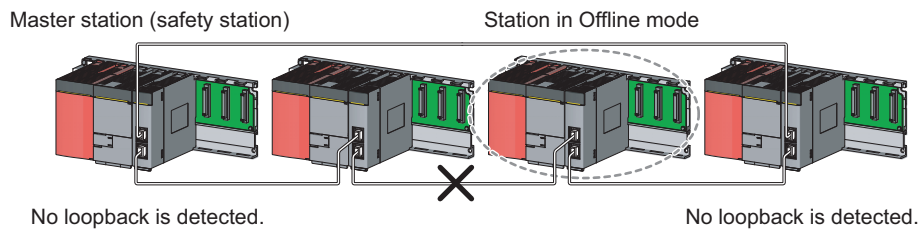
Therefore, do not use a switching hub to configure the ring topology.



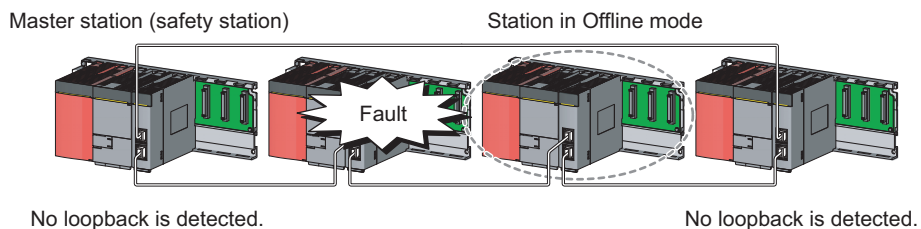
(e) Offline mode station in ring topology

In the following cases, the master station or the station connected to the offline mode station cannot detect loopback.

- One of the Ethernet cables connected to the offline mode station is disconnected.



- A station connected to the offline mode station is disconnected.



To detect loopback, set the offline mode station as a reserved station.

When the offline mode station is disconnected, loopback can be detected.



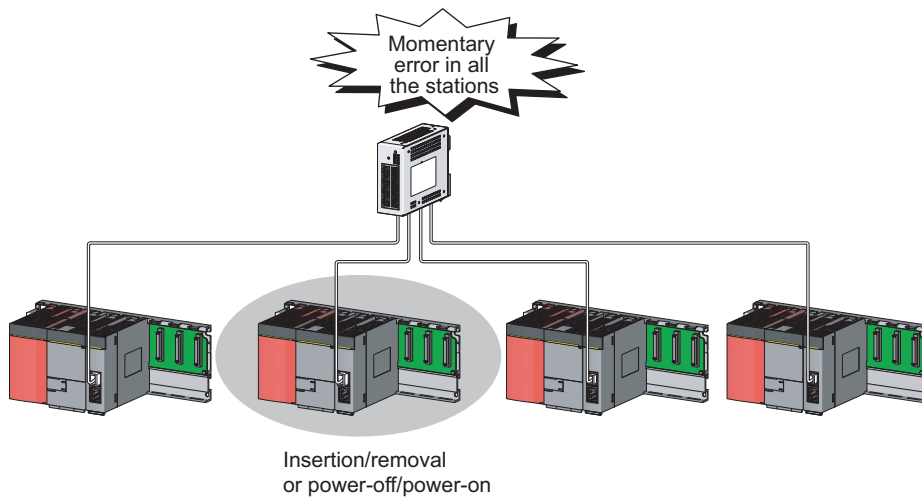
A station during the RESET status and a station with no station number setting operate as an offline mode station does.

(f) Connecting/disconnecting a cable and powering off/on a device

When the operations listed below are performed, all stations on the network may be reconnected.

At that time, a data link error or a baton pass error may momentarily occur in all the stations, and outputs of the connected slave stations may turn off.

Network configuration	Operation
Star topology	<ul style="list-style-type: none"> • Powering a slave station or switching hub off and on • Connecting/disconnecting an Ethernet cable connected to the switching hub • Disconnecting an Ethernet cable from a slave station and connecting it to another slave station or the switching hub • Disconnecting more than nine stations, or half the number of slave stations or more in the system • Changing the network topology when adding a slave station
Line topology, ring topology	<ul style="list-style-type: none"> • Simultaneously powering off/on systems on multiple stations • Simultaneously connecting/disconnecting Ethernet cables to/from multiple stations (When a data link faulty station returns, a data link error will occur in all the stations.) • Disconnecting more than nine stations, or half the number of slave stations or more in the system • Changing the network topology when adding a slave station



To hold the outputs as a measure when a data link error occurs, configure the following settings:

- Master/local module

Set input data to be used from the faulty station.

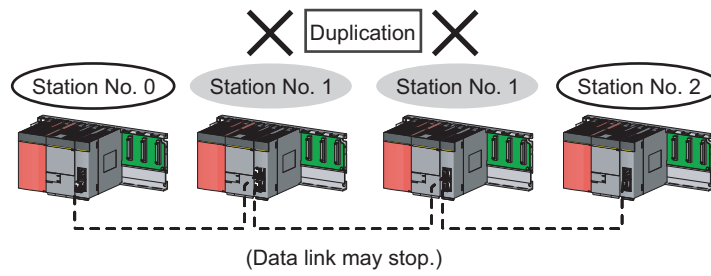
Project data list ⇨ [Parameter] ⇨ [Network param] ⇨ [Ethernet/CC IE/MELSECNET]

⇨ Network Operation Setting button

Note that data input by safety communication is cleared even if the above setting is configured.

(g) Connected station numbers

Do not duplicate station numbers. Data link may be stopped when the station number is duplicated.



(h) Power-on order

To avoid incorrect input from slave stations, power on slave stations before the master station.

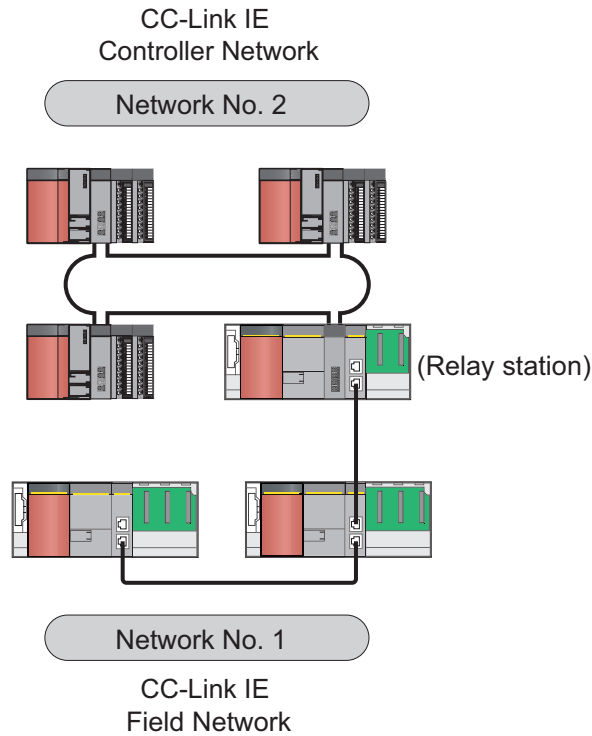
(i) Submaster function

A master/local module cannot be used as a submaster station.

In addition, if a safety station is used in a system which includes a submaster station, an error may occur in safety communications when the control is switched between a master station and a submaster station.

5.1.2 Multi-network system

The multi-network system is a system in which multiple networks are connected by some relay stations. Up to 239 networks can be connected.



Point

- Only one master/local module can be mounted on a safety base unit. Therefore, a safety programmable controller cannot relay more than one CC-Link IE Field Network. To relay more than one CC-Link IE Field Network systems, use a standard programmable controller.
- Safety communications can be achieved among safety stations on the same network.
- Cyclic transmission communication is available only in the same network.
- Transient transmission communication is available with other networks as well as the same network. Communications can be made with stations up to eight networks apart (number of relay stations: 7). (☞ Page 154, Section 10.1 (1) (b))

5.2 Network Components

CC-Link IE Field Network consists of components such as cables and hubs.

5.2.1 Cables

For wiring, use the 1000BASE-T compliant Ethernet cables.

Ethernet cable	Connector	Type
Category 5e or higher (Double shielded/STP) Straight cable	RJ45 connector	The following conditioning cables: • IEEE802.3 (1000BASE-T) • ANSI/TIA/EIA-568-B (Category 5e)

Point

- For CC-Link IE Field Network wiring, use the recommended wiring components by CC-Link Partner Association.
- Cables for CC-Link IE Controller Network cannot be used for CC-Link IE Field Network.

(1) Product

Cables for CC-Link IE Field Network are available from Mitsubishi Electric System & Service Co., Ltd. (Catalogs for cable are also available.)

Also, the connector processing of cable length is available for your preference. Please consult your local Mitsubishi Electric System & Service Co., Ltd.

Type	Model (manufacturer)
CC-Link IE Field Network cable	SC-E5EW series (Mitsubishi Electric System & Service Co., Ltd.)

Remark

- Cable types
The following cable types are available depending on the operating environment:
 - Standard type: Cables for inside the control panel and indoor connection
 - L type: Cables for outdoor connection
 Cables and relay adapters of flame retardant or waterproof type are also available. Please contact your Mitsubishi Electric System & Service Co., Ltd.

5.2.2 Hubs

Use hubs that meet all the conditions listed below:

- Compliance with the IEEE802.3 (1000BASE-T)
- Support of the auto MDI/MDI-X function
- Support of the auto-negotiation function
- Switching hub (layer 2 switch) *1

Operation is not guaranteed if the hubs do not meet these conditions.

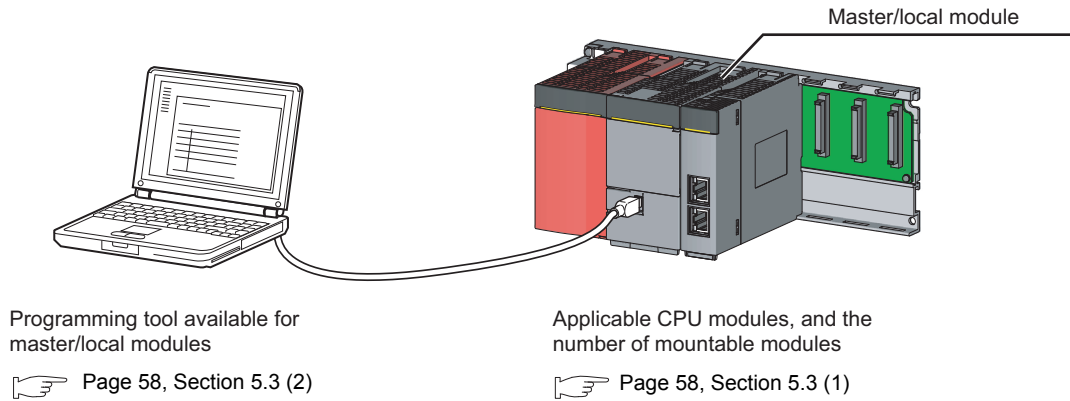
*1 A repeater hub is not available.

(1) Mitsubishi product

Type	Model name
Industrial switching hub	NZ2EHG-T8

5.3 Applicable Systems

This section describes MELSEC-QS series systems that include the master/local module.



(1) Applicable safety CPU modules and the number of mountable modules

(a) Safety CPU module

The following safety CPU module is applicable to the master/local module.

Safety CPU module	Serial number (first five digits)
QS001CPU	13042 or later

(b) Number of mountable modules

For the number of mountable modules, refer to the following.

📖 QSCPU User's Manual (Hardware Design, Maintenance and Inspection)

(c) Mounting to a MELSECNET/H remote I/O station

The master/local module cannot be mounted to any MELSECNET/H remote I/O stations. Mount the module on a safety base unit on which a safety CPU module is mounted.

(2) Applicable programming tool

GX Developer is required for setting and diagnosing master/local modules.

GX Works2 cannot be used.

Software	Version
GX Developer	Version 8.98C or later

(3) Module replacement

Replacing the module before the following time elapses is recommended.

Module	Replacement time
Master/local module	10 years

CHAPTER 6 INSTALLATION AND WIRING

This chapter describes the installation and wiring of a master/local module.

6.1 Installation

This section describes the installation of a master/local module.

(1) Handling precautions

The following is a list of precautions for handling the master/local module:

- Do not drop or apply strong shock to the module case since it is made from resin. Doing so may cause failure.
- Do not remove the printed-circuit board of the module from the case. Doing so may cause failure.
- Prevent foreign matter such as dust or wire chips from entering the module. Such foreign matter can cause a fire, failure, or malfunction.
- A protective film is attached to the top of the module to prevent foreign matter, such as wire chips, from entering the module during wiring. Do not remove the film during wiring. Remove it for heat dissipation before system operation.
- Before handling the module, touch a grounded metal object to discharge the static electricity from the human body. Failure to do so may cause the module to fail or malfunction.
- Tighten the screws such as module fixing screws within the following range.

Screw	Tightening torque range
Module fixing screw (M3 × 12)	0.36 to 0.48N•m

- To mount the module, while pressing the module mounting lever located in the lower part of the module, fully insert the module fixing projection(s) into the hole(s) in the base unit and press the module until it snaps into place. Be sure to tighten the module fixing screw within the specified tightening torque range. Incorrect mounting may cause malfunction, failure or drop of the module.

(2) Installation environment

For details on installation environment, refer to the following.

- 📖 QSCPU User's Manual (Hardware Design, Maintenance and Inspection)

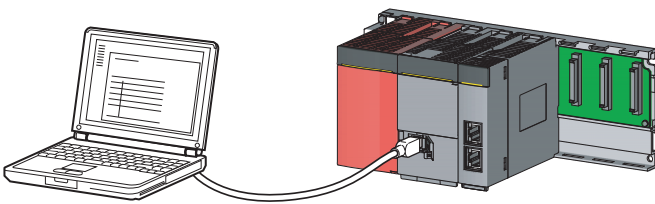
6.2 Tests Before Wiring

This section describes module tests that should be performed before network wiring.

6.2.1 Hardware test

Hardware test checks the hardware inside the master/local modules.

(1) Procedure



Module 1	
Network type	CC IE Field(Master station [Safety])
Starting I/O No.	0000
Network No.	1
Total stations	1
Group No.	1
Station No.	0
Mode	H/W test

Select one from the followings:
 "CC IE Field (Master station [Safety])",
 "CC IE Field (Local station [Safety])",
 or "CC IE Field (Local station)".

Select "H/W test".

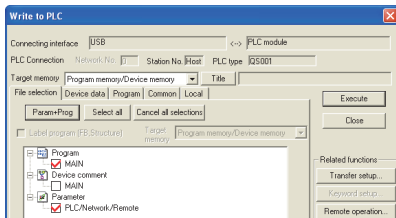
- 1. Mount the master/local module on the safety base unit, and connect GX Developer to the safety CPU module.**
 An Ethernet cable is not connected to the master/local modules.

- 2. Set network parameters in GX Developer as shown in the figure to left.**

Project data list ⇨ [Parameter] ⇨ [Network param] ⇨ [Ethernet/CC IE/MELSECNET]

- 3. Write the network parameters set in GX Developer to the safety CPU module.**

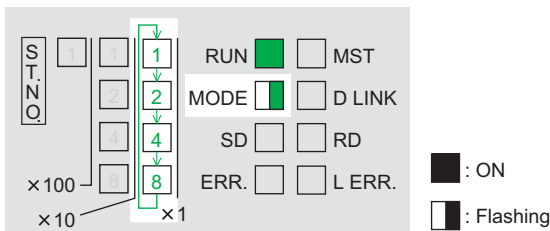
[Online] ⇨ [Write to PLC]



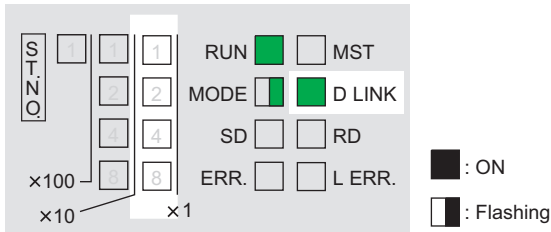
- 4. Reset the safety CPU module or power off and on the system.**

- 5. Hardware test begins.**

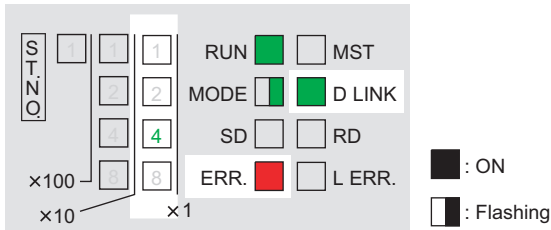
The MODE LED of master/local modules flashes, and each of the ×1 LED repeatedly turns on and off (1 → 2 → 4 → 8 → 1...).
 1 → 2 → 4 → 8 → 1...



When completed



When failed



6. D LINK LED turns on when the test is completed.

- When completed
The ×1 LED turns off.
- When failed
Any one of the ×1 LEDs turns on, and the ERR. LED turns on.
When the test fails, the possible cause is hardware failure of the master/local modules. Please consult your local Mitsubishi service center or representative with the detailed problem description.

Remark

The test status and result can be checked through monitoring the link special relays on GX Developer.

Item	Description
When completed	<ul style="list-style-type: none"> • Hardware test completion status (SB0090): ON • Hardware test normal/abnormal end (SB0091): OFF
When failed	<ul style="list-style-type: none"> • Hardware test completion status (SB0090): ON • Hardware test normal/abnormal end (SB0091): ON

(2) Precautions

(a) Settings

Do not enter values for "Network Configuration Setting" and "Refresh parameters". When link refresh is executed during a hardware test, the test may fail.

(b) Operations

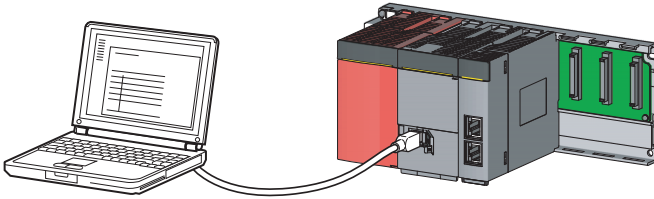
Do not access the buffer memory through the program during the hardware test. Doing so may cause the test to fail.

6.2.2 Self-loopback test

Self-loopback test checks the communication circuit of the master/local module.

Point

When conducting the self-loopback test, use a normal Ethernet cable. (☞ Page 56, Section 5.2)



Module 1	
Network type	CC IE Field(Master station [Safety])
Starting I/O No.	0000
Network No.	1
Total stations	1
Group No.	
Station No.	0
Mode	Self-loopback test

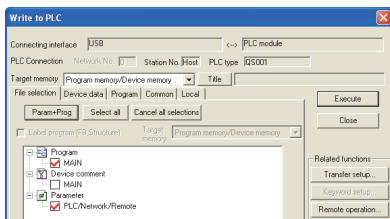
Select one from the followings:
 "CC IE Field (Master station [Safety])",
 "CC IE Field (Local station [Safety])",
 or "CC IE Field (Local station)".

Select "Self-loopback test".

1. Mount the master/local module on the safety base unit, and connect GX Developer to the safety CPU module.

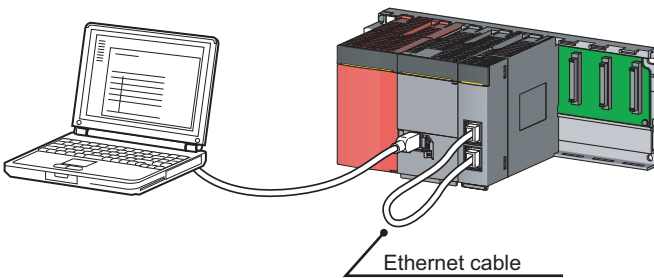
2. Set network parameters in GX Developer as shown in the figure to left.

☞ Project data list ⇨ [Parameter] ⇨ [Network param] ⇨ [Ethernet/CC IE/MELSECNET]



3. Write the network parameters set in GX Developer to the safety CPU module.

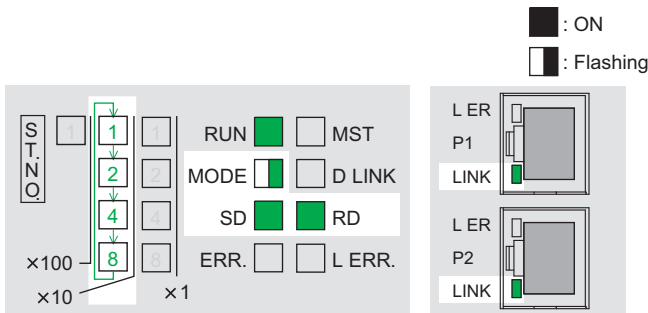
☞ [Online] ⇨ [Write to PLC]



4. Connect PORT1 and PORT2 of the master/local modules with an Ethernet cable. (☞ Page 64, Section 6.3)



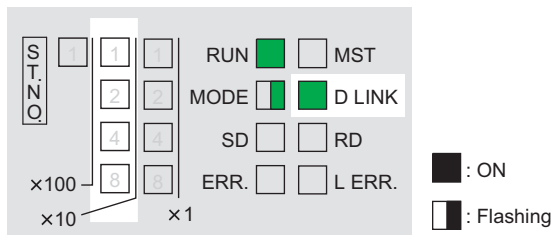
5. Reset the safety CPU module or power off and on the system.



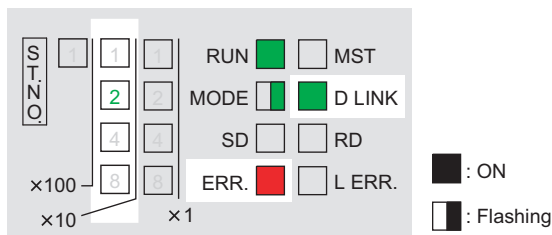
6. Self-loopback test begins.

The MODE LED of master/local modules flashes, and each of the ×10 LED repeatedly turns on and off (1 → 2 → 4 → 8 → 1...). Also, the SD LED, RD LED, and LINK LED turn on.

When completed



When failed



7. D LINK LED turns on, and SD LED and RD LED turn off when the test is completed.

- When completed
 The ×10 LED turns off.
- When failed
 Any one of the ×10 LEDs turns on, and the ERR. LED turns on. If the test fails, replace the Ethernet cable and execute the test again. If the test fails again, the possible cause is hardware failure of the master/local modules. Please consult your local Mitsubishi service center or representative with the detailed problem description.

Remark

The test status and result can be checked through monitoring the link special relays on GX Developer.

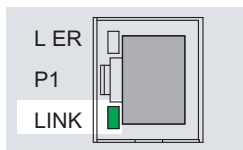
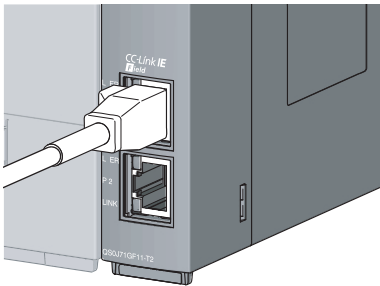
Item	Description
When completed	<ul style="list-style-type: none"> • Self-loopback test completion status (SB0092): ON • Self-loopback test normal/abnormal end (SB0093): OFF
When failed	<ul style="list-style-type: none"> • Self-loopback test completion status (SB0092): ON • Self-loopback test normal/abnormal end (SB0093): ON

6.3 Wiring

This section describes the cable wiring and precautions. For network configuration, cables, and hubs used for the wiring, refer to the system configuration. (☞ Page 47, CHAPTER 5)

(1) Ethernet cable connection

(a) Connecting the cable



- 1. Power off the master/local module and the connected device.**
- 2. Push the Ethernet cable connector into the master/local module until it clicks. Pay attention to the connector's direction.**

- 3. Power on the master/local module and the connected device.**
- 4. Check whether the LINK LED of the port connected with an Ethernet cable is on.**

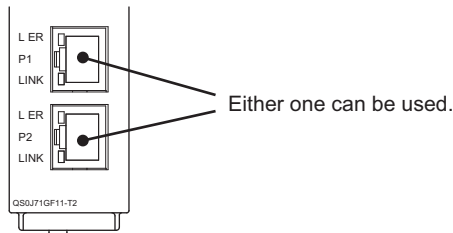
The time between the power-on and the LINK LED turning on may vary. The LINK LED usually turns on in a few seconds. Note, however, that the time may be extended further if the linkup process is repeated depending on the status of the device on the line. If the LINK LED does not turn on, refer to the troubleshooting section and take corrective actions.

(☞ Page 239, Section 12.3)



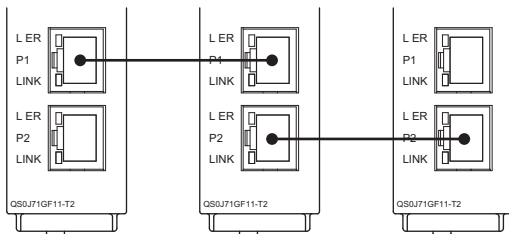
PORT1 and PORT2 need not be distinguished.

- When only one connector is used in star topology, either PORT1 or PORT2 is applicable.

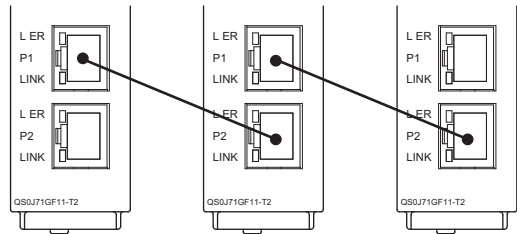


- When using two connectors for line topology and ring topology, an Ethernet cable can be connected to the connectors in any combination. For example, the cable can be connected between PORT1s or between PORT1 and PORT2.

Connection between PORT1s or PORT2s

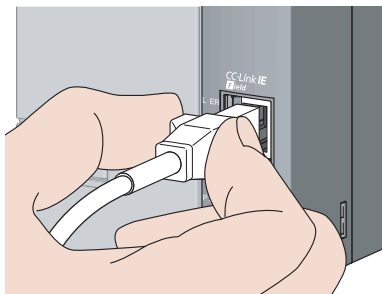


Connection between PORT1 and PORT2



6

(b) Disconnecting the cable



1. Power off the system.
2. Press the latch down and unplug the Ethernet cable.

6.3 Wiring

(2) Precautions

This section describes wiring precautions.

(a) Handling

- Place the Ethernet cable in a duct or clamp them. If not, dangling cable may swing or inadvertently be pulled, resulting in damage to the module or cables or malfunction due to poor contact.
- Do not touch the core of the cable-side or module-side connector, and protect it from dirt or dust. If oil from your hand, dirt or dust is attached to the core, it can increase transmission loss, arising a problem in data link.
- Check the following:
 - Is any Ethernet cable disconnected?
 - Is any of the Ethernet cables shorted?
 - Are the connectors securely connected?

(b) Broken cable latch

Do not use Ethernet cables with broken latches. Doing so may cause the cable to unplug or malfunction.

(c) Connecting and disconnecting the Ethernet cable

Hold the connector part when connecting and disconnecting the Ethernet cable. Pulling a cable connected to the module may damage the module or cable, or result in malfunction due to poor contact.

(d) Connectors without Ethernet cable

Attached connector cover should be placed to prevent foreign matter such as dirt or dust.

(e) Maximum station-to-station distance (maximum cable length)

The maximum station-to-station distance is 100m. However, the distance may be shorter depending on the operating environment of the cable. For details, contact your cable manufacturer.

(f) Bend radius

The bend radius of the Ethernet cable is limited. For details, see the specifications of the Ethernet cable to be used.

(g) Network configuration

For wiring, check Page 49, Section 5.1.1 (2) and Page 51, Section 5.1.1 (3) to prevent incorrect wiring

6.4 Tests After Wiring

This section describes loop and cable tests that should be performed after network wiring. Perform these tests to the actual operating network configuration.

6.4.1 Loop test

The loop test checks each station's network line and parameter setting status to verify whether the network is operating correctly.

The test completes approximately in 10 seconds.

Start testing from the master station. To use a standard programmable controller for the master station, refer to the following manual.

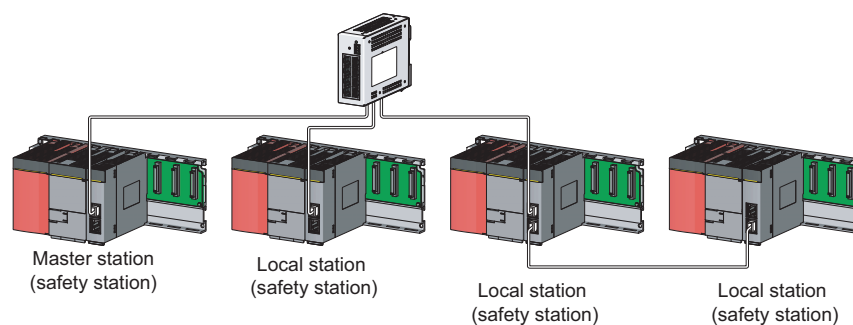
 User's manual for the CC-Link IE Field Network master/local module used

The test allows checking of the following items:

Item	Description
Master station duplication check	Checks if the master station is duplicated.
Station number duplication check	Checks if stations on the network are duplicated.
Out-of-range station No. check	Checks if the number of connected slave stations exceeds the number of slave stations set to the master station.
Reserved station specification check	Checks if the specified reserved stations are actually connected.
Consistency check of the number of connected stations	Consistency check for the number of total slave stations set by parameters and actual connected slave stations.
Station type check	Consistency check for the station type of slave stations set in master stations and actual connected station type.
Loopback check	Detects whether loopback is being performed when "Use" is selected under "Loopback Function Setting" in the network parameter window for the master station.

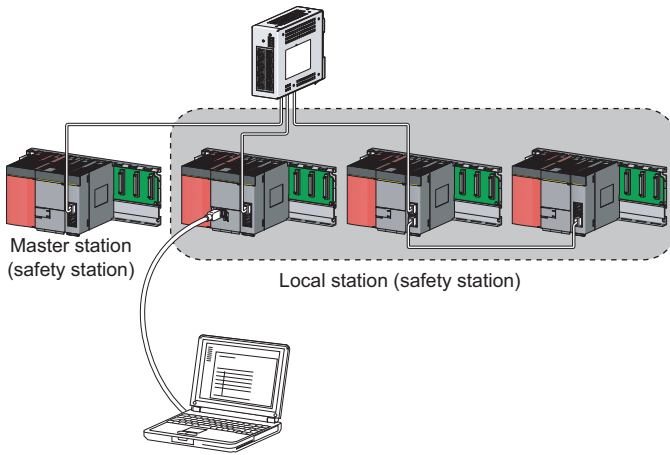
(1) Performing a loop test

This section describes the procedure using the following system configuration example.



(a) Preparing for a loop test

After wiring, set the local stations (safety stations) to online mode before executing the loop test.



1. Connect GX Developer to the CPU module.
2. Set the local stations (safety stations) to online mode by GX Developer.

Ex. In the case of a local station (safety station)

Module 1	
Network type	CC IE Field(Local station [Safety])
Starting I/O No.	0000
Network No.	1
Total stations	
Group No.	
Station No.	1
Mode	Online

Select "CC IE Field (Local station [Safety])."

Select "Online."

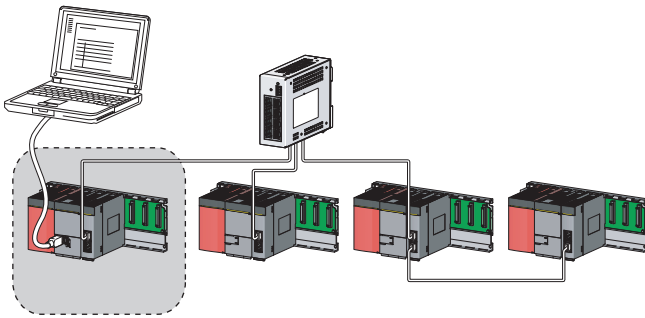
3. Reset the slave stations or power off and on to set the mode to online.

Remark

For slave stations other than the local station where the master/local module is mounted, also set their mode to online. For the setting method of slave stations, refer to the manual of the slave station used.

(b) Procedure

Perform a loop test from the master station (safety station).

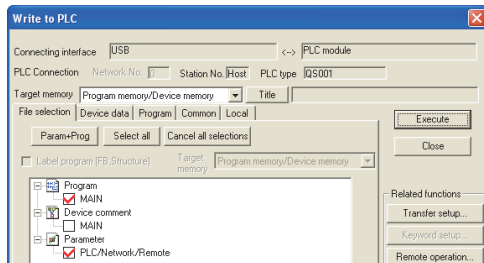


Master station (safety station)

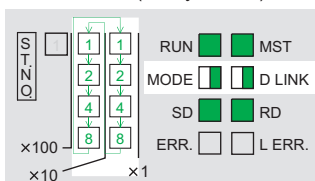
Module 1	
Network type	CC IE Field(Master station [Safety])
Starting I/O No.	0000
Network No.	1
Total stations	3
Group No.	
Station No.	0
Mode	Loop test

Select "CC IE Field (Master station [Safety])".
Select "Loop test".

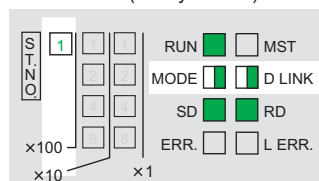
Number of PLCs	Station No.	Station Type	RX/RX Setting			RWw/RWw Setting		
			Points	Start	End	Points	Start	End
1	1	Local Station	256	0000	00FF	128	0000	007F
2	2	Local Station	256	0100	01FF	128	0080	00FF
3	3	Local Station	256	0200	02FF	128	0100	017F



Master station (safety station)



Local station (safety station)



■ : ON
■ : Flashing

1. Connect GX Developer to the safety CPU module.

2. Set network parameters in GX Developer as shown in the figure to left.

Project data list ⇨ [Parameter] ⇨ [Network param] ⇨ [Ethernet/CC IE/MELSECNET]

3. Configure the network configuration setting in the network parameter. (Page 81, Section 7.3)

Project data list ⇨ [Parameter] ⇨ [Network param] ⇨ [Ethernet/CC IE/MELSECNET] ⇨

Network Configuration Setting button

4. Write the network parameters set in GX Developer to the safety CPU module.

[Online] ⇨ [Write to PLC]

5. Reset the safety CPU module or power off and on the system.

6. Loop test begins.

• Master station (safety station)

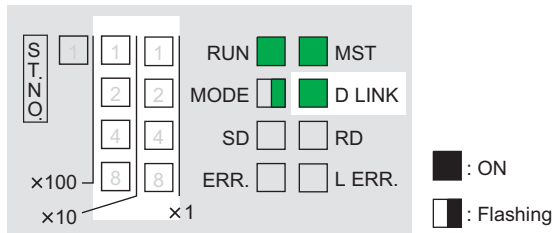
The MODE and D LINK LEDs flash. Also, each of the ×10 LED and ×1 LED repeatedly turns on and off (1 → 2 → 4 → 8 → 1 •••).

However, if errors are detected, the test is immediately terminated (failure).

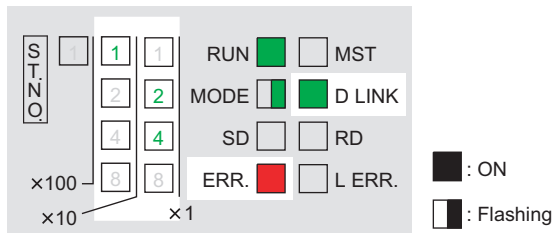
• Local station (safety station)

Data link stops on all stations. Also, the MODE, D LINK, and ×100 LEDs flash.

When completed

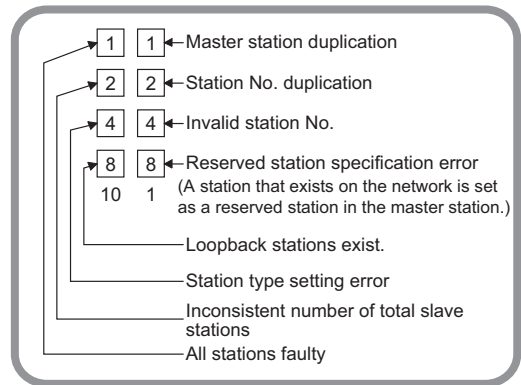


When failed



7. Check the test result with LEDs of the master station (safety station). D LINK LED turns on when the test is completed.

- When completed
The ×10 and ×1 LEDs turn off.
- When failed
Any one of the ×10 and ×1 LEDs turns on, and the ERR. LED turns on. Error details can be specified depending on the lighting status of ×10 and ×1 LEDs.

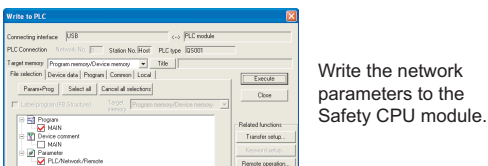
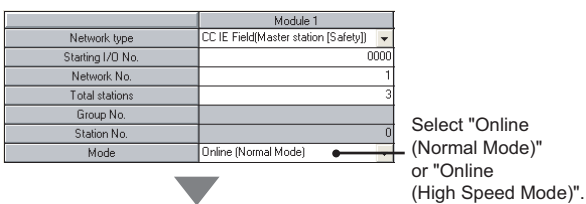


Identify the error location through GX Developer or link special register (SW), and take actions.

(☞ Page 72, Section 6.4.1 (2))

8. When the loop test is completed, slave stations will be in online mode.

Set the master station (safety station) to "Online (Normal Mode)" or "Online (High Speed Mode)" through the network parameter.



Point

During the loop test, data link stops on all stations.

Remark

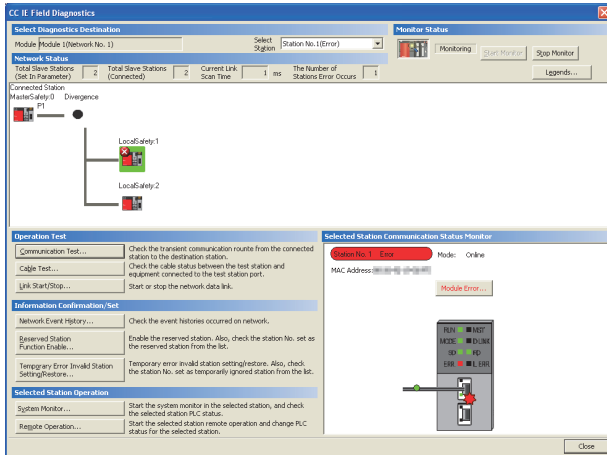
The test status and result can be viewed through monitoring the link special relays on GX Developer.

Item	Description
When completed	<ul style="list-style-type: none"> • Loop test completion status (SB0094): ON • Loop test normal/abnormal end (SB0095): OFF
When failed	<ul style="list-style-type: none"> • Loop test completion status (SB0094): ON • Loop test normal/abnormal end (SB0095): ON

(2) Actions if the loop test fails

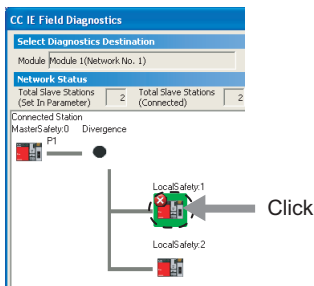
(a) Checking by GX Developer

In the CC-Link IE Field Network diagnostics, identify the error location and take action. Then, execute the loop test again.



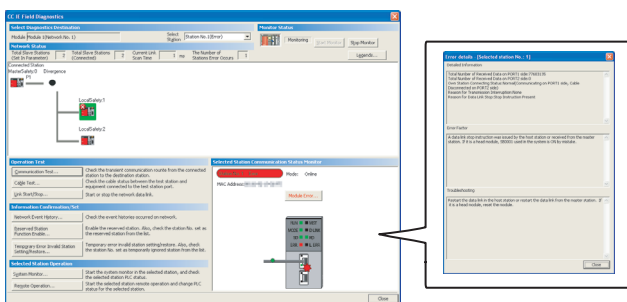
1. Open the "CC IE Field Diagnostics" window.

[Diagnostics] ⇒ [CC IE Field diagnostics]



2. The error location is displayed on top of the diagnostic window.

3. Click the error location.



4. Click the button on the bottom right of the window to display the error descriptions.



5. Reset the safety CPU module on the master station (safety station) or power off and on the system to retry the loop test.

Point

With CC-Link IE Field Network diagnostics, a station where network number mismatch, master station duplication, station number duplication, or station type error occurs cannot be selected. Check the error details by directly connecting GX Developer to the faulty station and displaying the system monitor window. (Page 261, Section 12.6)

(b) Checking by link special register (SW)

Identify the error location by link special register (SW) and take actions. After the actions, execute the loop test again.

1. Check the error locations and descriptions by link special register (SW), and take actions.

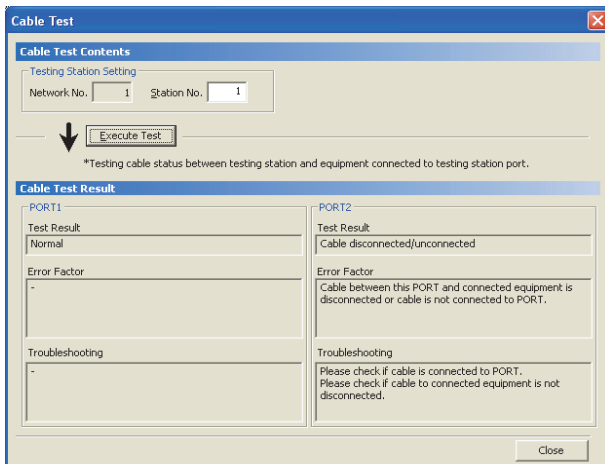
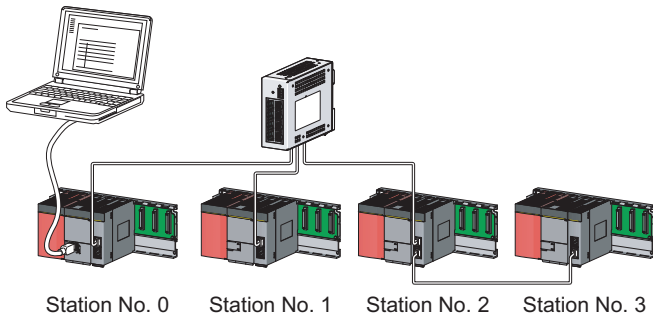
Error cause	Action
Master station duplication, station number duplication, out-of-range station No., reserved station specification, or station type	Parameter error status (each station) (SW0170 to SW0177) checks error locations. Take corrective actions by checking error codes on Parameter setting status (SW004C). (☞ Page 246, Section 12.5)
All station errors or inconsistent number of connected stations	Identify the error stations on baton pass status (each station) (SW00A0 to SW00A7). The following actions are taken on error stations. <ul style="list-style-type: none"> • Replace the Ethernet cable. • Adjust the total number of slave stations set to the master station (safety station) to the number of connected slave stations. • Check if the station set in the network configuration setting of GX Developer matches with the connected station. • Set the station number for the station where a station number is not set. • Replace the master/local modules.
Loopback stations exist.	The network is not configured in ring topology or is incorrectly configured. (☞ Page 49, Section 5.1.1 (2)) Check connection status of stations between the stations specified at Loopback station number 1 (SW0070) and Loopback station number 2 (SW0071), and connected Ethernet cables. To use a network configuration other than the ring topology, clear the "Use" checkbox under "Loopback Function Setting" in the network parameter window for the master station (safety station).

2. Reset the safety CPU module on the master station (safety station) or power off and on the system to retry the loop test.

6.4.2 Cable test

Cable test checks if the Ethernet cables are properly connected.

Only the Ethernet cable connected to the PORT1 or PORT2 of the target station is tested. For the whole network status, perform the loop test. (☞ Page 67, Section 6.4.1)



1. Connect GX Developer to the safety CPU module.

2. Open the "Cable Test" window.

☞ [Diagnostics] ⇒ [CC IE Field diagnostics] ⇒

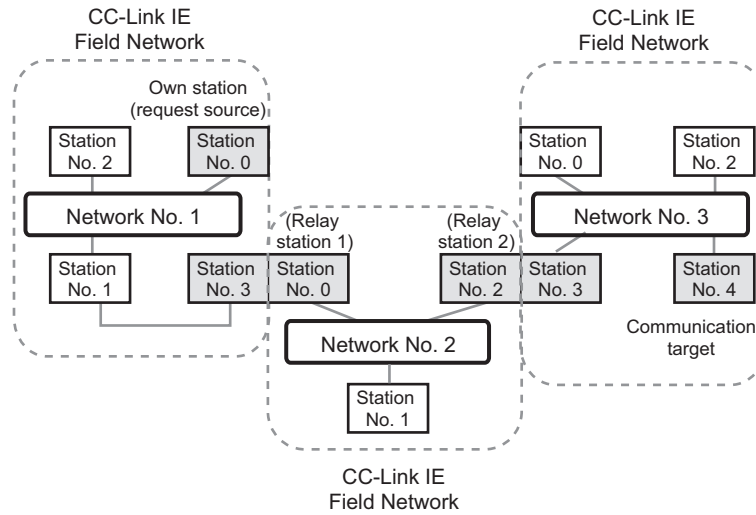
Cable Test... button

3. Enter a station number and click the Execute Test button to operate the test. If an error occurs, take corrective actions according to the error message.

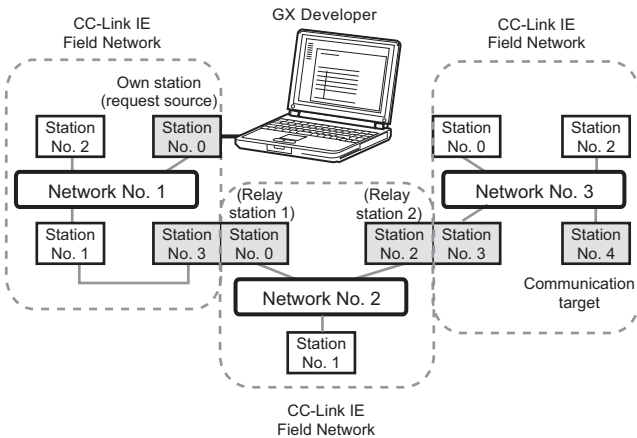
6.4.3 Communication test

Communication test checks if transient transmission data can be properly routed from the own station to the communication target.

Take the following system configuration as an example of communication test procedure.



1. Connect GX Developer to the safety CPU module.



Routing parameters for stations of network No. 1

	Target network No.	Relay network No.	Relay station No.
1	2	1	3
2	3	1	3

No setting is required for station No. 3 because data are transmitted via the station itself.

Routing parameters for stations of network No. 2

	Target network No.	Relay network No.	Relay station No.
1	1	2	0
2	3	2	2

No setting is required for station No. 0 because data are transmitted via the station itself.

No setting is required for station No. 2 because data are transmitted via the station itself.

Routing parameters for stations of network No. 3

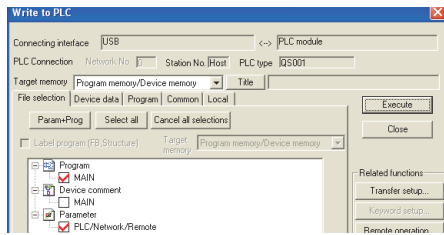
	Target network No.	Relay network No.	Relay station No.
1	1	3	3
2	2	3	3

No setting is required for station No. 3 because data are transmitted via the station itself.

2. Set routing parameters in GX Developer as shown in the figure to left. (☞ Page 92, Section 7.7)

☞ Project data list ⇨ [Parameter] ⇨ [Network param] ⇨ [Ethernet/CC IE/MELSECNET] ⇨

Routing parameters button



3. Write the network parameters set in GX Developer to the safety CPU module.

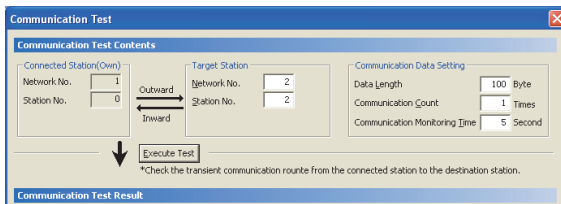
[Online] ⇨ [Write to PLC]

4. Reset the safety CPU module or power off and on the system.

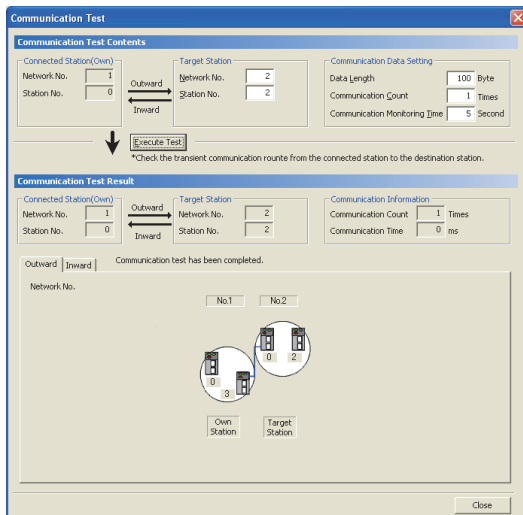
5. Open the "Communication Test" window and enter values for "Target Station" and "Communication Data Setting".

[Diagnostics] ⇨ [CC IE Field diagnostics] ⇨

button

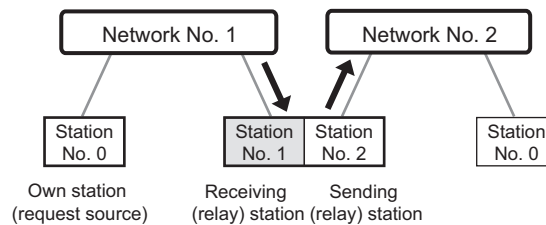


6. Click the button to perform the communication test. If an error occurs, take actions according to the error message.



Point

When conducting the test on relay stations, set the receiving (relay) station in "Target Station". Setting the sending (relay) station will cause an error.



CHAPTER 7 PARAMETER SETTING

This chapter describes CC-Link IE Field Network parameters.

The network parameters are set for either the master station or slave stations.

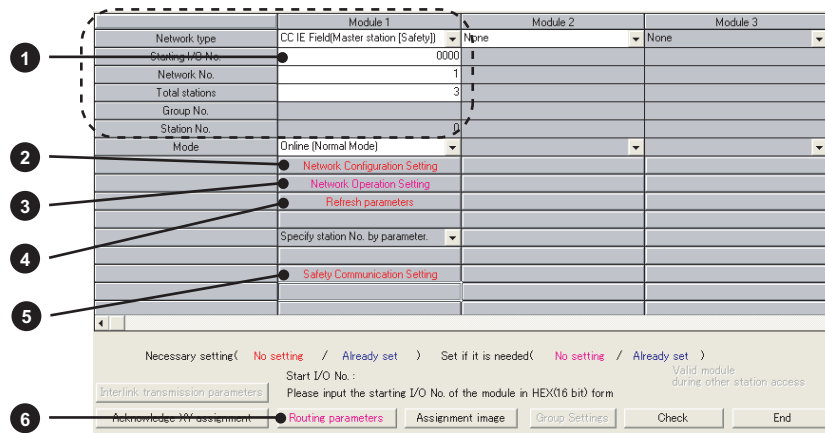
This manual describes network parameters for master/local modules. For slave station settings, refer to the manuals for the slave stations used.

7.1 Parameter List

The following table lists CC-Link IE Field Network parameters.

(1) Parameters set for a master/local module

The following table lists parameters that need to be set for safety and standard communications.



○: Always, △: When required, —: Cannot be set

Item	Setting			Reference	
	Master station (safety station)	Local station (safety station)	Local station (standard station)		
1 Network setting	Network type	○	○	○	Page 79, Section 7.2
	Starting I/O No.	○	○	○	
	Network No.	○	○	○	
	Total stations	○	—	—	
	Station No.	—	○	○	
	Mode	○	○	○	

Item	Setting			Reference		
	Master station (safety station)	Local station (safety station)	Local station (standard station)			
② Network Configuration Setting	Station No.	○	—	—	Page 81, Section 7.3	
	Station Type	○	—	—		
	RX/RV Setting*1	△	—	—		
	RWw/RWr Setting*1	△	—	—		
	Reserved/Error Invalid Station	△	—	—		
	Alias	△	—	—		
	Comment	△	—	—		
	Supplementary Setting	Link Scan Mode Setting	△	—		—
		Loopback Function Setting	△	—		—
Block Data Assurance per Station		△	—	—		
③ Network Operation Setting	Parameter Name	△	△	△	Page 85, Section 7.4	
	Data Link Faulty Station Setting	△	△	△		
	Output Setting During CPU STOP	△	△	△		
④ Refresh parameters		○	○	○	Page 86, Section 7.5	
⑤ Safety Communication Setting	Communication Target Station No.	○	○	—	Page 90, Section 7.6	
	Open Method	○	○	—		
	Transmission Interval Monitoring Time	○	○	—		
	Safety Refresh Monitoring Time	○	○	—		
	Safety Data Transfer Device Setting	○	○	—		
⑥ Routing parameters		△	△	△	Page 92, Section 7.7	

*1 This parameter needs to be set for standard communication (needs not to be set for safety communication).



Always set parameters. Failure to do so will cause "NETWORK PARAMETER ERROR" in the safety CPU module.

7.2 Network Setting

Set the network number, station number, and other parameters for the master/local module.

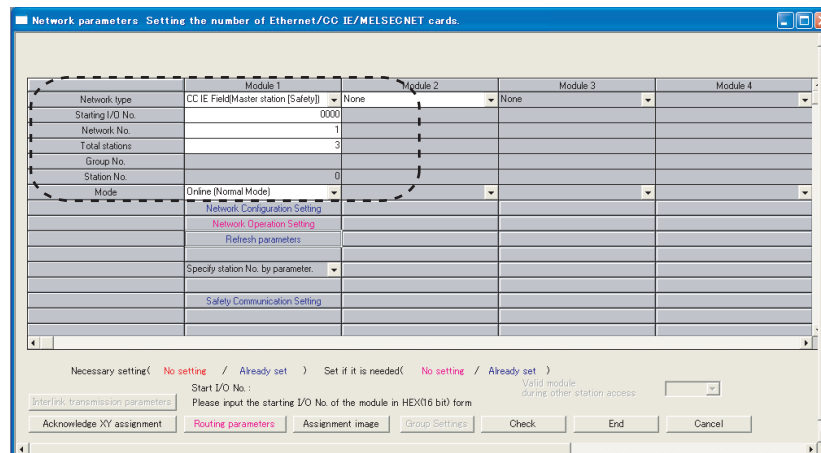
(1) Setting procedure

1. Open the setting window in GX Developer.

 Project data list ⇨ [Parameter] ⇨ [Network param] ⇨ [Ethernet/CC IE/MELSECNET]

2. Set parameters in the window.

3. Click the  button.



Item	Description	Setting range
Network type	Select whether to use the master/local module as a master station (safety station) or a local station. Only one master station (safety station) can be set for one network.	<ul style="list-style-type: none"> • CC IE Field (Master station [Safety]) • CC IE Field (Local station [Safety]) • CC IE Field (Local station) (Default: Blank)
Starting I/O No.	Enter the start I/O number of the master/local module in increments of 16 points.	Within the number of I/O points of the safety CPU module (Default: Blank)
Network No.	Enter the network number of the master/local module.	1 to 239 (Default: Blank)
Total stations	Enter the number of slave stations connected to the master station (safety station) including reserved slave stations. This setting is available when "CC IE Field (Master Station [Safety])" is selected in "Network type".	1 to 120 (Default: Blank)
Station No.	Enter the station number of the master/local module. Set a station number different from those used in the same network. Note that the master station (safety station) number is fixed at "0".	<ul style="list-style-type: none"> • Master station (safety station): Fixed at "0". • Local station: 1 to 120 (Default: Blank)

Item	Description	Setting range				
Mode	Select a master station (safety station) mode. Two online modes are available. Select an online mode according to the system.	<ul style="list-style-type: none"> • Online (Normal Mode) • Online (High Speed Mode) • Offline • H/W test • Self-loopback test • Loop test (Default: Online (Normal Mode))				
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;">Mode</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>Online (Normal Mode)</td> <td>This mode performs cyclic transmission and transient transmission without losing their inherent speed performance. This mode is suitable for a system that performs I/O control and analog control, and transmits large amount of data for management, monitoring, and diagnostics by transient transmission. Use this mode for general applications.</td> </tr> </tbody> </table>		Mode	Description	Online (Normal Mode)	This mode performs cyclic transmission and transient transmission without losing their inherent speed performance. This mode is suitable for a system that performs I/O control and analog control, and transmits large amount of data for management, monitoring, and diagnostics by transient transmission. Use this mode for general applications.
	Mode		Description			
	Online (Normal Mode)		This mode performs cyclic transmission and transient transmission without losing their inherent speed performance. This mode is suitable for a system that performs I/O control and analog control, and transmits large amount of data for management, monitoring, and diagnostics by transient transmission. Use this mode for general applications.			
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td>Online (High Speed Mode)</td> <td>This mode preferentially performs cyclic transmission for high-speed communications. Note that the maximum number of points assigned to RWw/RWr is 256 points per local station. In this mode, the processing speed of transient transmission is slower than in "Online (Normal Mode)".</td> </tr> </tbody> </table>		Online (High Speed Mode)	This mode preferentially performs cyclic transmission for high-speed communications. Note that the maximum number of points assigned to RWw/RWr is 256 points per local station. In this mode, the processing speed of transient transmission is slower than in "Online (Normal Mode)".		
	Online (High Speed Mode)		This mode preferentially performs cyclic transmission for high-speed communications. Note that the maximum number of points assigned to RWw/RWr is 256 points per local station. In this mode, the processing speed of transient transmission is slower than in "Online (Normal Mode)".			
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td>Offline</td> <td>Select this mode to disconnect the master/local module from the network for stopping data link with other stations.</td> </tr> </tbody> </table>		Offline	Select this mode to disconnect the master/local module from the network for stopping data link with other stations.		
Offline	Select this mode to disconnect the master/local module from the network for stopping data link with other stations.					
<table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td>H/W test</td> <td>Select this mode to perform a hardware test. Page 60, Section 6.2.1)</td> </tr> </tbody> </table>	H/W test	Select this mode to perform a hardware test. Page 60, Section 6.2.1)				
H/W test	Select this mode to perform a hardware test. Page 60, Section 6.2.1)					
<table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td>Self-loopback test</td> <td>Select this mode to perform a self-loopback test. Page 62, Section 6.2.2)</td> </tr> </tbody> </table>	Self-loopback test	Select this mode to perform a self-loopback test. Page 62, Section 6.2.2)				
Self-loopback test	Select this mode to perform a self-loopback test. Page 62, Section 6.2.2)					
<table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td>Loop test</td> <td>Select this mode to perform a loop test. Page 67, Section 6.4.1)</td> </tr> </tbody> </table>	Loop test	Select this mode to perform a loop test. Page 67, Section 6.4.1)				
Loop test	Select this mode to perform a loop test. Page 67, Section 6.4.1)					
	Select a local station mode.	<ul style="list-style-type: none"> • Online • Offline • H/W test • Self-loopback test (Default: Online)				
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;">Mode</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>Online</td> <td>Select this mode to connect the master/local module to the network for performing data link with other stations.</td> </tr> </tbody> </table>	Mode		Description	Online	Select this mode to connect the master/local module to the network for performing data link with other stations.	
Mode	Description					
Online	Select this mode to connect the master/local module to the network for performing data link with other stations.					
<table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td>Offline</td> <td>Select this mode to disconnect the master/local module from the network for stopping data link with other stations.</td> </tr> </tbody> </table>	Offline		Select this mode to disconnect the master/local module from the network for stopping data link with other stations.			
Offline	Select this mode to disconnect the master/local module from the network for stopping data link with other stations.					
<table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td>H/W test</td> <td>Select this mode to perform a hardware test. Page 60, Section 6.2.1)</td> </tr> </tbody> </table>	H/W test	Select this mode to perform a hardware test. Page 60, Section 6.2.1)				
H/W test	Select this mode to perform a hardware test. Page 60, Section 6.2.1)					
<table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td>Self-loopback test</td> <td>Select this mode to perform a self-loopback test. Page 62, Section 6.2.2)</td> </tr> </tbody> </table>	Self-loopback test	Select this mode to perform a self-loopback test. Page 62, Section 6.2.2)				
Self-loopback test	Select this mode to perform a self-loopback test. Page 62, Section 6.2.2)					

(2) Setting example

For setting example, refer to Page 209, CHAPTER 11.

7.3 Network Configuration Setting

Set parameters of slave stations (the number of points and assignment of link devices) in the master station (safety station). Also, set link scan mode and block data assurance per station.

This setting is available when "CC IE Field (Master Station [Safety])" is selected in network setting.

(1) Setting procedure

1. Configure network setting. (☞ Page 79, Section 7.2)

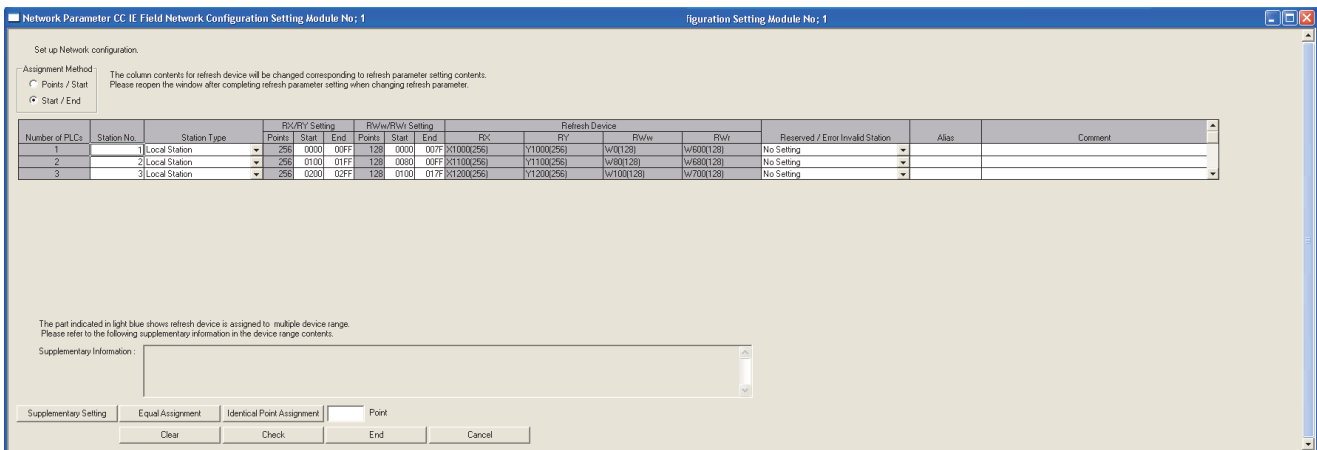
2. Open the setting window in GX Developer.

☞ Project data list ☞ [Parameter] ☞ [Network param] ☞ [Ethernet/CC IE/MELSECNET] ☞

Network Configuration Setting button

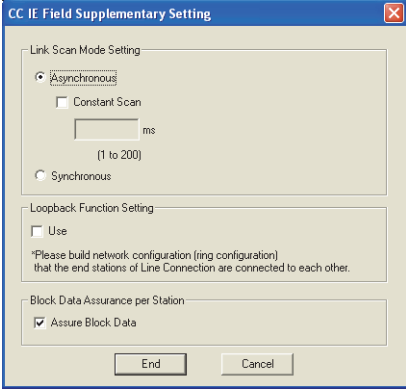
3. Set parameters in the window.

4. Click the **End** button.



Item	Description	Setting range
Assignment Method	Select a link device assignment method. • Points/Start: Enter the points and start numbers of link devices. • Start/End: Enter the start and end numbers of link devices.	• Points/Start • Start/End (Default: Start/End)
Number of PLCs	Displays the number of slave stations set for "Total Stations" in network setting.	—
Station No.	Enter the number of a slave station connected to the network. Station numbers can be set at random (cannot be duplicated).	1 to 120 (Starting from 1 (default), numbers are displayed by the value set in "Total stations" in network setting.)
Station Type	Select a slave station type. Select the station type same as that of the slave station connected to the network.	• Remote I/O Station • Remote Device Station • Intelligent Device Station • Local Station (Default: Intelligent Device Station)

Item	Description	Setting range								
RX/Ry Setting	Set assignment for RX/Ry for each slave station. (☞ Page 103, Section 8.2.1) Enter values in increments of 16 points (Start: □□□0 _H , End: □□□F _H).	<ul style="list-style-type: none"> Points: <table border="1" data-bbox="1078 271 1436 477"> <thead> <tr> <th>Station Type</th> <th>Setting range</th> </tr> </thead> <tbody> <tr> <td>Local Station, Intelligent Device Station</td> <td>16 to 2048</td> </tr> <tr> <td>Remote Device Station</td> <td>16 to 128</td> </tr> <tr> <td>Remote I/O Station</td> <td>16 to 64</td> </tr> </tbody> </table> <ul style="list-style-type: none"> Device number: 0 to 3FFF_H (Default: Blank) 	Station Type	Setting range	Local Station, Intelligent Device Station	16 to 2048	Remote Device Station	16 to 128	Remote I/O Station	16 to 64
Station Type	Setting range									
Local Station, Intelligent Device Station	16 to 2048									
Remote Device Station	16 to 128									
Remote I/O Station	16 to 64									
RWw/RWr Setting	Set assignment for RWw/RWr in increments of 4 points for each slave station. (☞ Page 103, Section 8.2.1)	<ul style="list-style-type: none"> Points: <table border="1" data-bbox="1078 618 1436 851"> <thead> <tr> <th>Station Type</th> <th>Setting range</th> </tr> </thead> <tbody> <tr> <td>Local Station, Intelligent Device Station</td> <td>4 to 1024</td> </tr> <tr> <td>Remote Device Station</td> <td>4 to 64</td> </tr> <tr> <td>Remote I/O Station</td> <td>Cannot be set.</td> </tr> </tbody> </table> <ul style="list-style-type: none"> Device number: 0 to 1FFF_H (Default: Blank) 	Station Type	Setting range	Local Station, Intelligent Device Station	4 to 1024	Remote Device Station	4 to 64	Remote I/O Station	Cannot be set.
Station Type	Setting range									
Local Station, Intelligent Device Station	4 to 1024									
Remote Device Station	4 to 64									
Remote I/O Station	Cannot be set.									
Refresh Device	Link devices of the master/local module to be transferred by link refresh and the transfer target safety CPU module devices are displayed. This item is displayed when refresh parameters have been set. (☞ Page 86, Section 7.5)	—								
Reserved/Error Invalid Station	Set this item to reserve the slave station or to set the slave station as an error invalid station. (☞ Page 119, Section 8.4, Page 120, Section 8.5) <ul style="list-style-type: none"> No Setting The slave station is connected to the network. Reserved Station The slave station is reserved for future expansion. By reserving a slave station, link device assignment will not change even if the slave station is added or the reservation is cancelled. Therefore, the program needs not to be modified. Physical connection of the slave station is not required. Invalid Station Even if a slave station is disconnected during data link, the master station (safety station) will not detect the slave station as a faulty station. However, if a local station (safety station) set as an error invalid station or a temporary error invalid station is disconnected, an error will occur in safety communication with the disconnected station. 	<ul style="list-style-type: none"> No Setting Reserved Station Invalid Station (Default: Blank) 								
Alias	Enter the name of a device on the slave station if required.	Up to 8 characters (Default: Blank)								
Comment	Enter the comment of the slave station if required.	Up to 32 characters (Default: Blank)								

Item	Description	Setting range								
	<p>Set link scan mode and block data assurance per station.</p>  <p>(1) Link Scan Mode Setting</p> <table border="1" data-bbox="395 698 1050 1460"> <thead> <tr> <th data-bbox="395 698 579 736">Item</th> <th data-bbox="582 698 1050 736">Description</th> </tr> </thead> <tbody> <tr> <td data-bbox="395 741 579 907">Asynchronous</td> <td data-bbox="582 741 1050 907">Link scan is performed asynchronously with the sequence scan of the safety CPU module. Select this item to shorten input transmission delay time when sequence scan takes much time than link scan. Note that output transmission delay time will become longer.</td> </tr> <tr> <td data-bbox="395 911 579 1234">Constant Scan</td> <td data-bbox="582 911 1050 1234">Cyclic transmission is performed punctually. Link scan time will be the constant link scan time set in this setting. However, when the actual link scan time is longer than the specified link scan time, cyclic transmission is performed by actual link scan time. While constant link scan is used to keep link scan time constant, the transmission delay time is not kept constant by this function. To keep transmission delay time constant, select "Synchronous".</td> </tr> <tr> <td data-bbox="395 1238 579 1460">Synchronous</td> <td data-bbox="582 1238 1050 1460">Link scan is performed synchronously with the sequence scan of the safety CPU module. Select this item in the following cases: <ul style="list-style-type: none"> • To shorten output transmission delay time (Note that when sequence scan takes much time than link scan, input transmission delay time will become longer.) • To keep transmission delay time constant*1 </td> </tr> </tbody> </table> <p>*1 The sequence scan must be constant as well. Set "Constant Scanning" in the "PLC RAS" of the PLC Parameter window.</p> <p>(2) Loopback Function Setting Select whether to use the loopback function. (☞ Page 121, Section 8.6) To configure a network in ring topology, select the checkbox.</p> <p>(3) Block Data Assurance per Station Select whether to assure data integrity on a station basis in link refresh between the safety CPU module and the master/local module. (☞ Page 106, Section 8.2.3)</p>	Item	Description	Asynchronous	Link scan is performed asynchronously with the sequence scan of the safety CPU module. Select this item to shorten input transmission delay time when sequence scan takes much time than link scan. Note that output transmission delay time will become longer.	Constant Scan	Cyclic transmission is performed punctually. Link scan time will be the constant link scan time set in this setting. However, when the actual link scan time is longer than the specified link scan time, cyclic transmission is performed by actual link scan time. While constant link scan is used to keep link scan time constant, the transmission delay time is not kept constant by this function. To keep transmission delay time constant, select "Synchronous".	Synchronous	Link scan is performed synchronously with the sequence scan of the safety CPU module. Select this item in the following cases: <ul style="list-style-type: none"> • To shorten output transmission delay time (Note that when sequence scan takes much time than link scan, input transmission delay time will become longer.) • To keep transmission delay time constant*1 	<ul style="list-style-type: none"> • Link Scan Mode Setting: Asynchronous, Synchronous (Default: Asynchronous) • Loopback Function Setting: Selected (Use)/not selected (Default: Not selected) • Block Data Assurance per Station: Selected (Assure Block Data)/not selected (Default: Selected)
Item	Description									
Asynchronous	Link scan is performed asynchronously with the sequence scan of the safety CPU module. Select this item to shorten input transmission delay time when sequence scan takes much time than link scan. Note that output transmission delay time will become longer.									
Constant Scan	Cyclic transmission is performed punctually. Link scan time will be the constant link scan time set in this setting. However, when the actual link scan time is longer than the specified link scan time, cyclic transmission is performed by actual link scan time. While constant link scan is used to keep link scan time constant, the transmission delay time is not kept constant by this function. To keep transmission delay time constant, select "Synchronous".									
Synchronous	Link scan is performed synchronously with the sequence scan of the safety CPU module. Select this item in the following cases: <ul style="list-style-type: none"> • To shorten output transmission delay time (Note that when sequence scan takes much time than link scan, input transmission delay time will become longer.) • To keep transmission delay time constant*1 									

Supplementary Setting
button

Item	Description	Setting range										
<p data-bbox="140 526 316 584">Equal Assignment button</p>	<p data-bbox="386 221 1018 248">Equally assign link devices to slave stations with preset conditions.</p> <div data-bbox="513 277 919 506" style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> </div> <table border="1" data-bbox="395 539 1034 824" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;">Item</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>Start station</td> <td>Enter the start station number of slave stations for which link devices are equally assigned.</td> </tr> <tr> <td>End station</td> <td>Enter the end station number of slave stations for which link devices are equally assigned.</td> </tr> <tr> <td>Start No.</td> <td>Enter the start number of link devices to be equally assigned.</td> </tr> <tr> <td>Total points assigned</td> <td>Enter the total points of link devices to be equally assigned.</td> </tr> </tbody> </table>	Item	Description	Start station	Enter the start station number of slave stations for which link devices are equally assigned.	End station	Enter the end station number of slave stations for which link devices are equally assigned.	Start No.	Enter the start number of link devices to be equally assigned.	Total points assigned	Enter the total points of link devices to be equally assigned.	<ul style="list-style-type: none"> • Start station: 1 to the end slave station number • End station: Number set to "Start station" to the end slave station number • Start No.: Same values set in "RX/RV Setting" and "RWw/RWr Setting" • Total points assigned: Same values set in "RX/RV Setting" and "RWw/RWr Setting" <p>(Default: Blank)</p>
Item	Description											
Start station	Enter the start station number of slave stations for which link devices are equally assigned.											
End station	Enter the end station number of slave stations for which link devices are equally assigned.											
Start No.	Enter the start number of link devices to be equally assigned.											
Total points assigned	Enter the total points of link devices to be equally assigned.											
<p data-bbox="140 1025 341 1048">Identical Point Assignment button</p>	<p data-bbox="386 891 1002 958">Assign the same link device points to all slave stations. Enter the points in the field right next to the Identical Point Assignment button.</p> <div data-bbox="593 972 847 1039" style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> </div> <p data-bbox="386 1059 1034 1178">Points entered in this field will be reflected to the "Points" of "RX/RV Setting". Half of the points entered in this field will be reflected to the "Points" of "RWw/RWr Setting".</p>	<p style="text-align: center;">—</p>										

(2) Precautions

- When "Synchronous" is set under "Link Scan Mode Setting" of "Supplementary Setting", observe the following.
- Change the program or the system configuration so that the sequence scan time of the safety CPU module may be within 200ms. Failure to do so may cause disconnection of slave stations.
 - Set the sequence scan time of safety CPU modules on local stations (safety stations) so that it may be longer than or equal to the link scan time.
- If the sequence scan time is shorter than the link scan time, an error occurs in safety communication. To avoid this, set the constant scan time of the safety CPU modules on the local stations (safety stations).

For how to calculate link scan time, refer to Page 303, Appendix 5.2.

For how to set the constant scan time of a safety CPU module, refer to the following.

QSCPU User's Manual (Function Explanation, Program Fundamentals)


(3) Setting example

For setting example, refer to Page 209, CHAPTER 11.

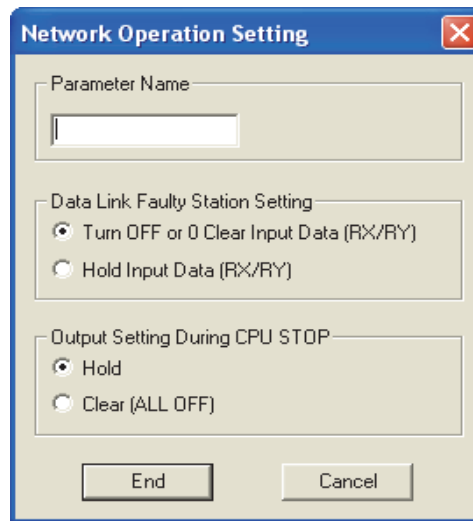
7.4 Network Operation Setting

Set operating status of a network if a data link error occurs or the safety CPU module is set to STOP.

1. Configure network setting. (☞ Page 79, Section 7.2)
2. Open the setting window in GX Developer.

☞ Project data list ☞ [Parameter] ☞ [Network param] ☞ [Ethernet/CC IE/MELSECNET] ☞
 button

3. Set parameters in the window.



Item	Description	Setting range
Parameter Name	Enter the name of network operation setting parameters if desired.	Up to 8 characters
Data Link Faulty Station Setting	Select whether to hold or clear data input by standard communication from the slave station where a data link error has occurred. (☞ Page 113, Section 8.2.5) Data input by safety communication will be cleared regardless of this setting and safety CPU operation mode.	<ul style="list-style-type: none"> • Turn OFF or 0 Clear Input Data (RX/Ry) • Hold Input Data (RX/Ry) (Default: Turn OFF or 0 Clear Input Data (RX/Ry))
Output Setting During CPU STOP	Select whether to hold or clear cyclic data output when the safety CPU module mounted with the master/local module is set to STOP. (☞ Page 115, Section 8.2.6)	<ul style="list-style-type: none"> • Hold • Clear (ALL OFF) (Default: Hold)

7.5 Refresh Parameters

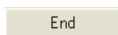
Set the ranges of link devices of the master/local module and safety CPU module devices for which link refresh is to be performed.

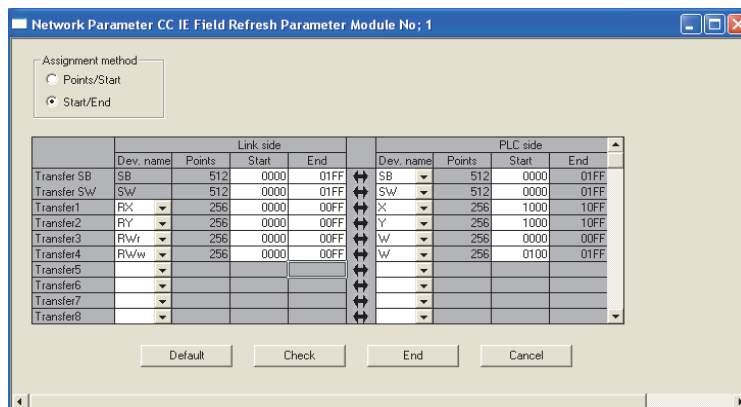
(1) Setting procedure

1. Configure network setting. (☞ Page 79, Section 7.2)
2. Open the setting window in GX Developer.

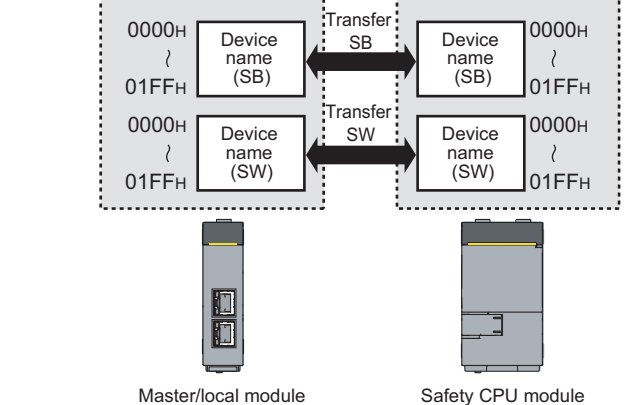
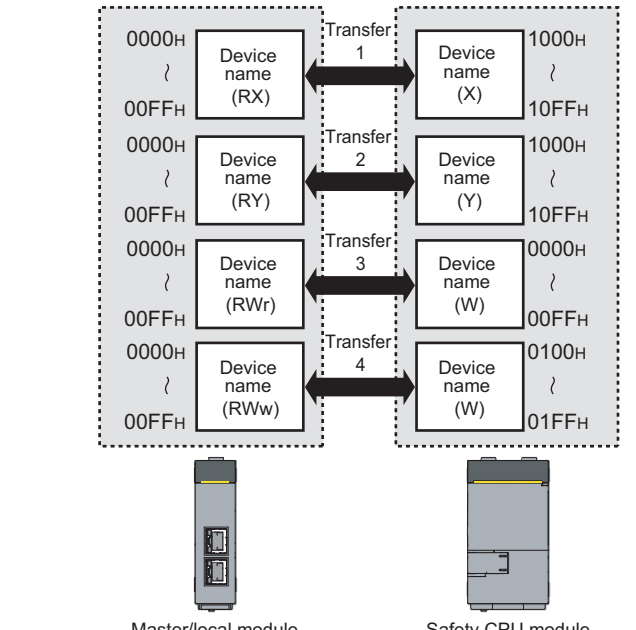
☞ Project data list ☞ [Parameter] ☞ [Network param] ☞ [Ethernet/CC IE/MELSECNET] ☞

 button

3. Set parameters in the window.
4. Click the  button.

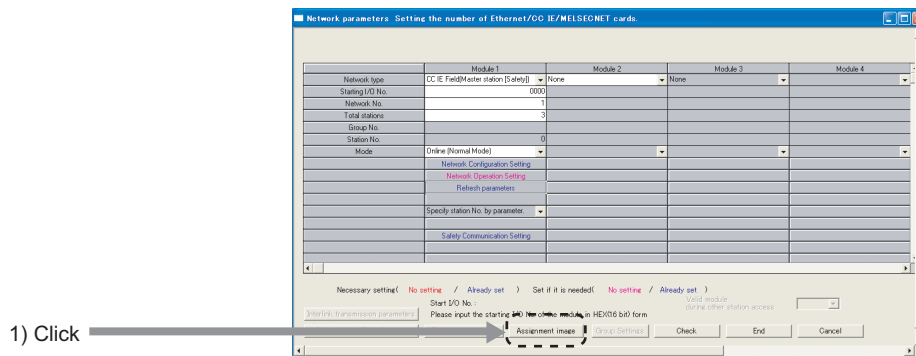


Item	Description	Setting range
Assignment method	Select a link device assignment method. • Points/Start: Enter the points and start numbers of link devices. • Start/End: Enter the start and end numbers of link devices.	• Points/Start • Start/End (Default: Start/End)

Item	Description	Setting range																																																				
Transfer SB Transfer SW	<p>Select link refresh ranges of SB and SW. Link refresh range can be set for both "Transfer SB" and "Transfer SW" by 1. (☞ Page 104, Section 8.2.2)</p> <p>Ex.</p> <table border="1" data-bbox="427 376 1066 459"> <thead> <tr> <th colspan="4">Link side</th> <th colspan="4">PLC side</th> </tr> <tr> <th>Dev. name</th> <th>Points</th> <th>Start</th> <th>End</th> <th>Dev. name</th> <th>Points</th> <th>Start</th> <th>End</th> </tr> </thead> <tbody> <tr> <td>Transfer SB</td> <td>SB</td> <td>512</td> <td>0000</td> <td>01FF</td> <td>SB</td> <td>512</td> <td>0000</td> <td>01FF</td> </tr> <tr> <td>Transfer SW</td> <td>SW</td> <td>512</td> <td>0000</td> <td>01FF</td> <td>SW</td> <td>512</td> <td>0000</td> <td>01FF</td> </tr> </tbody> </table>  <p style="text-align: center;">Master/local module Safety CPU module</p>	Link side				PLC side				Dev. name	Points	Start	End	Dev. name	Points	Start	End	Transfer SB	SB	512	0000	01FF	SB	512	0000	01FF	Transfer SW	SW	512	0000	01FF	SW	512	0000	01FF	<p>(1) Transfer SB</p> <ul style="list-style-type: none"> • Link side: Fixed at "SB". • PLC side: M, B, D, W, SB <p>(2) Transfer SW</p> <ul style="list-style-type: none"> • Link side: Fixed at "SW". • PLC side: M, B, D, W, SW <p>(Default: Blank)</p> <ul style="list-style-type: none"> • Link side: 0 to 1FF_H • PLC side: Within device range of safety CPU module <p>(Default: Blank)</p> <p>Set bit devices in increments of 16 points and word devices in increments of 4 points.</p>																		
Link side				PLC side																																																		
Dev. name	Points	Start	End	Dev. name	Points	Start	End																																															
Transfer SB	SB	512	0000	01FF	SB	512	0000	01FF																																														
Transfer SW	SW	512	0000	01FF	SW	512	0000	01FF																																														
Transfer 1 to 8	<p>Select link refresh ranges of RX, RY, RW_r, and RW_w. Link refresh ranges can be set up to 8. (☞ Page 104, Section 8.2.2)</p> <p>Ex.</p> <table border="1" data-bbox="427 1059 1066 1209"> <thead> <tr> <th colspan="4">Link side</th> <th colspan="4">PLC side</th> </tr> <tr> <th>Dev. name</th> <th>Points</th> <th>Start</th> <th>End</th> <th>Dev. name</th> <th>Points</th> <th>Start</th> <th>End</th> </tr> </thead> <tbody> <tr> <td>Transfer1</td> <td>RX</td> <td>256</td> <td>0000</td> <td>00FF</td> <td>X</td> <td>256</td> <td>1000</td> <td>10FF</td> </tr> <tr> <td>Transfer2</td> <td>RY</td> <td>256</td> <td>0000</td> <td>00FF</td> <td>Y</td> <td>256</td> <td>1000</td> <td>10FF</td> </tr> <tr> <td>Transfer3</td> <td>RW_r</td> <td>256</td> <td>0000</td> <td>00FF</td> <td>W</td> <td>256</td> <td>0000</td> <td>00FF</td> </tr> <tr> <td>Transfer4</td> <td>RW_w</td> <td>256</td> <td>0000</td> <td>00FF</td> <td>W</td> <td>256</td> <td>0100</td> <td>01FF</td> </tr> </tbody> </table>  <p style="text-align: center;">Master/local module Safety CPU module</p>	Link side				PLC side				Dev. name	Points	Start	End	Dev. name	Points	Start	End	Transfer1	RX	256	0000	00FF	X	256	1000	10FF	Transfer2	RY	256	0000	00FF	Y	256	1000	10FF	Transfer3	RW _r	256	0000	00FF	W	256	0000	00FF	Transfer4	RW _w	256	0000	00FF	W	256	0100	01FF	<ul style="list-style-type: none"> • Link side: RX, RY, RW_r, RW_w • PLC side: <ul style="list-style-type: none"> When RX is set to "Link Side": X, M, B, D, W When RY is set to "Link Side": Y, M, B, T, C, ST, D, W When RW_r is set to "Link Side": M, B, D, W When RW_w is set to "Link Side": M, B, T, C, ST, D, W <p>(Default: Blank)</p> <ul style="list-style-type: none"> • Link side: <ul style="list-style-type: none"> 0 to 3FFF_H for RX/R_Y 0 to 1FFF_H for RW_r/RW_w • PLC side: Within device range of safety CPU module <p>(Default: Blank)</p> <p>Set bit devices in increments of 16 points and word devices in increments of 4 points.</p>
Link side				PLC side																																																		
Dev. name	Points	Start	End	Dev. name	Points	Start	End																																															
Transfer1	RX	256	0000	00FF	X	256	1000	10FF																																														
Transfer2	RY	256	0000	00FF	Y	256	1000	10FF																																														
Transfer3	RW _r	256	0000	00FF	W	256	0000	00FF																																														
Transfer4	RW _w	256	0000	00FF	W	256	0100	01FF																																														
Default button	Reset refresh parameters to default.	—																																																				

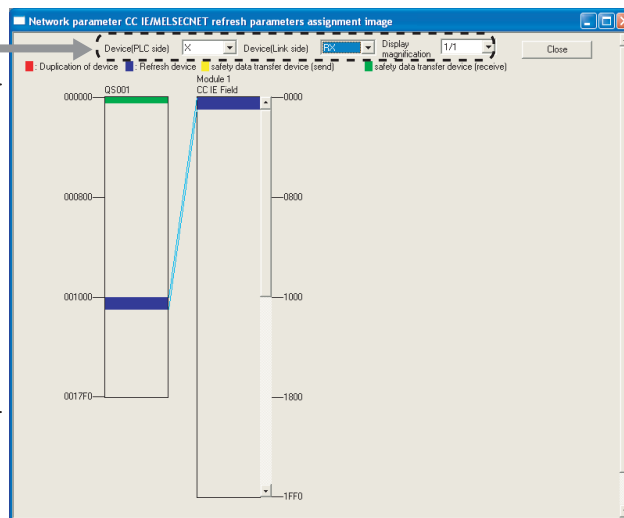
(2) Checking method

1. Clicking the **Assignment image** button in the "Network parameters Setting the number of Ethernet/CC IE/MELSECNET cards." window will open the "assignment image" window.
(☞ Page 79, Section 7.2)
2. Select a device to be displayed and the magnification ratio in the window, and check the image of refresh parameter assignment.



- 2) Set "Device (PLC side)", "Device (Link side)", and "Display magnification".

- 3) The assignment image is displayed.



3. A red part in the CPU side device indicates that the device in the red part overlaps with the device set for another refresh parameter. Correct the refresh parameters.

(3) Precautions

(a) Device set to "Device (PLC side)"

Set a device range that differs from the one used for the following:

- Refresh parameters for other network modules
- Auto refresh parameters for CC-Link Safety master module
- I/O numbers used for network modules

(b) Link refresh range

Set only link devices used in the safety CPU module for link refresh range. Doing so will reduce link refresh points, resulting in a shorter link refresh time.

(c) Changing link device assignment in the "Network Configuration Setting" window

Correct the link refresh ranges of refresh parameters.

(4) Setting example

For setting example, refer to  Page 209, CHAPTER 11.

7.6 Safety Communication Setting

Set safety communication parameters for stations that perform safety communication.

This setting can be configured when "CC IE Field (Master station [Safety])" and "CC IE Field (Local station [Safety])" are set in network setting.

(1) Setting procedure

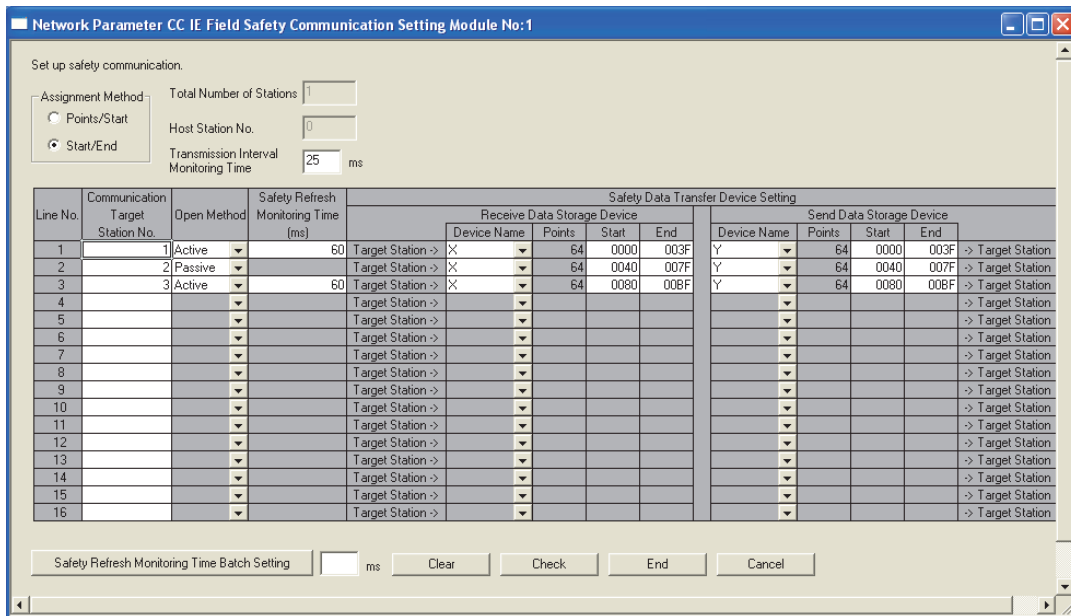
1. Open the setting window in GX Developer.

Project data list ⇨ [Parameter] ⇨ [Network param] ⇨ [Ethernet/CC IE/MELSECNET] ⇨

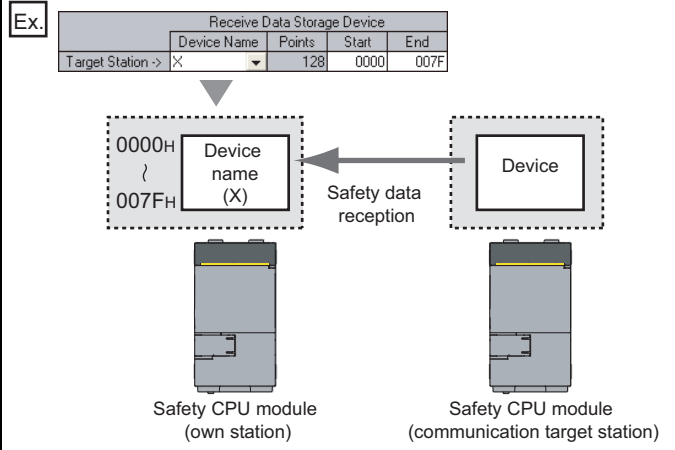
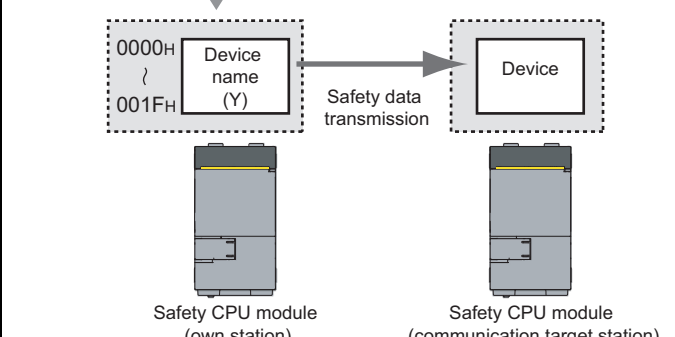
 button

2. Set parameters in the window.

3. Click the button.



Item	Description	Setting range
Assignment Method	Select how to assign safety CPU module devices. <ul style="list-style-type: none"> Points/Start: Set devices by the number of device points and the start number. Start/End: Set devices by the start and last device numbers. 	<ul style="list-style-type: none"> Points/Start Start/End (Default: Start/End)
Total Number of Stations	When "CC IE Field (Master station [Safety])" is selected in network setting, the number of slave stations set in "Total stations" is displayed. When "CC IE Field (Local station [Safety])" is selected in network setting, the number of slave stations is not displayed.	—
Host Station No.	When "CC IE Field (Master station [Safety])" is selected in network setting, "0" is displayed. When "CC IE Field (Local station [Safety])" is selected in network setting, own station number set to "Station No." in network setting is displayed.	—

Item	Description	Setting range																											
Transmission Interval Monitoring Time	In each safety connection, batch-set monitoring time for a receiving station to detect safety communication errors. (☞ Page 308, Appendix 5.4)	1 to 1000 (Default: 25)																											
Communication Target Station No.	Set the communication target's station number.	<ul style="list-style-type: none"> • Master station (safety station): 1 to 120 • Local station: 0 to 120 (Default: Blank)																											
Open Method	Select how to establish safety connection. <ul style="list-style-type: none"> • Active: Establishes safety connection from the own station. • Passive: Establishes safety connection upon request from the communication target station. 	<ul style="list-style-type: none"> • Active • Passive (Default: Active)																											
Safety Refresh Monitoring Time (ms)	In each safety connection, set monitoring time for a receiving station to detect safety communication errors. Set this item for the Active side of the stations that perform safety communication. (☞ Page 309, Appendix 5.5)	2 to 2000 (Default: 60)																											
Safety Data Transfer Device Setting	Set a CPU module device where safety data are stored. <div style="border: 1px solid gray; padding: 5px; margin: 10px 0;"> Ex. <table border="1" style="font-size: small;"> <thead> <tr> <th colspan="5">Receive Data Storage Device</th> </tr> <tr> <th>Device Name</th> <th>Points</th> <th>Start</th> <th>End</th> <th></th> </tr> </thead> <tbody> <tr> <td>Target Station -> X</td> <td>128</td> <td>0000</td> <td>007F</td> <td></td> </tr> </tbody> </table> </div>  <ul style="list-style-type: none"> • Device Name: X, M, B, D, W • Points: <table border="1" style="font-size: small; margin: 5px 0;"> <thead> <tr> <th>Device</th> <th>Range</th> </tr> </thead> <tbody> <tr> <td>Bit devices</td> <td>16 to 128</td> </tr> <tr> <td>Word devices</td> <td>1 to 8</td> </tr> </tbody> </table> <ul style="list-style-type: none"> • Start } Device range of the • End } safety CPU module (Default: Blank) Set bit devices in units of 16 points and word devices in units of 1 points.	Receive Data Storage Device					Device Name	Points	Start	End		Target Station -> X	128	0000	007F		Device	Range	Bit devices	16 to 128	Word devices	1 to 8	<table border="1" style="font-size: small; margin: 5px 0;"> <thead> <tr> <th>Device</th> <th>Range</th> </tr> </thead> <tbody> <tr> <td>Bit devices</td> <td>16 to 128</td> </tr> <tr> <td>Word devices</td> <td>1 to 8</td> </tr> </tbody> </table> <ul style="list-style-type: none"> • Start } Device range of the • End } safety CPU module (Default: Blank) Set bit devices in units of 16 points and word devices in units of 1 points.	Device	Range	Bit devices	16 to 128	Word devices	1 to 8
	Receive Data Storage Device																												
Device Name	Points	Start	End																										
Target Station -> X	128	0000	007F																										
Device	Range																												
Bit devices	16 to 128																												
Word devices	1 to 8																												
Device	Range																												
Bit devices	16 to 128																												
Word devices	1 to 8																												
Set a CPU module device from where safety data are sent. <div style="border: 1px solid gray; padding: 5px; margin: 10px 0;"> Ex. <table border="1" style="font-size: small;"> <thead> <tr> <th colspan="5">Send Data Storage Device</th> </tr> <tr> <th>Device Name</th> <th>Points</th> <th>Start</th> <th>End</th> <th></th> </tr> </thead> <tbody> <tr> <td>Y</td> <td>32</td> <td>0000</td> <td>001F</td> <td>-> Target Station</td> </tr> </tbody> </table> </div>  <ul style="list-style-type: none"> • Device Name: Y, M, B, T, C, ST, D, W • Points: <table border="1" style="font-size: small; margin: 5px 0;"> <thead> <tr> <th>Device</th> <th>Range</th> </tr> </thead> <tbody> <tr> <td>Bit devices</td> <td>16 to 128</td> </tr> <tr> <td>Word devices</td> <td>1 to 8</td> </tr> </tbody> </table> <ul style="list-style-type: none"> • Start } Device range of the • End } safety CPU module (Default: Blank) Set bit devices in units of 16 points and word devices in units of 1 points.	Send Data Storage Device					Device Name	Points	Start	End		Y	32	0000	001F	-> Target Station	Device	Range	Bit devices	16 to 128	Word devices	1 to 8	<ul style="list-style-type: none"> • Device Name: Y, M, B, T, C, ST, D, W • Points: <table border="1" style="font-size: small; margin: 5px 0;"> <thead> <tr> <th>Device</th> <th>Range</th> </tr> </thead> <tbody> <tr> <td>Bit devices</td> <td>16 to 128</td> </tr> <tr> <td>Word devices</td> <td>1 to 8</td> </tr> </tbody> </table> <ul style="list-style-type: none"> • Start } Device range of the • End } safety CPU module (Default: Blank) Set bit devices in units of 16 points and word devices in units of 1 points.	Device	Range	Bit devices	16 to 128	Word devices	1 to 8	
Send Data Storage Device																													
Device Name	Points	Start	End																										
Y	32	0000	001F	-> Target Station																									
Device	Range																												
Bit devices	16 to 128																												
Word devices	1 to 8																												
Device	Range																												
Bit devices	16 to 128																												
Word devices	1 to 8																												
<div style="border: 1px solid gray; padding: 2px; margin-bottom: 5px;">Safety Refresh Monitoring Time Batch Setting</div> button	Batch-set "Safety Refresh Monitoring Time". (☞ Page 309, Appendix 5.5) Enter the time in the area right to the <div style="border: 1px solid gray; padding: 2px; display: inline-block; font-size: small;">Safety Refresh Monitoring Time Batch Setting</div> button.	2 to 2000 (Default: Blank)																											

7.7 Routing Parameters

Set communication paths for transient transmission between a station in the own network and stations in other networks.

(1) Setting procedure

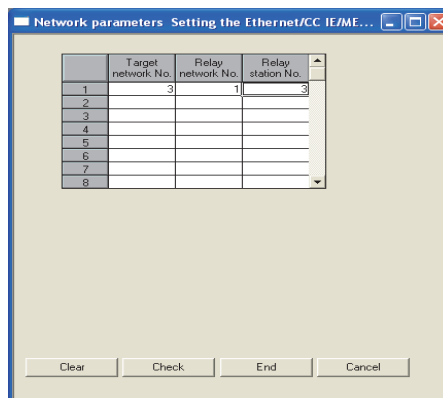
1. Open the setting window in GX Developer.

Project data list ⇨ [Parameter] ⇨ [Network param] ⇨ [Ethernet/CC IE/MELSECNET] ⇨

Routing parameters button

2. Set parameters in the window.

3. Click the **End** button.

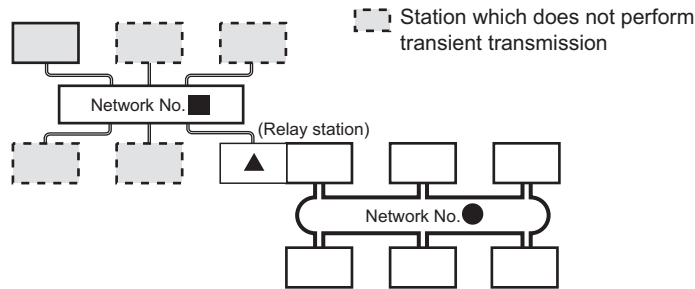


Item	Description	Setting range												
Target network No.	Set a relay station through which data are sent to stations in other networks by transient transmission in the own network. Up to 8 communication paths can be set. Set routing parameters as shown below. Ex. Setting to transmit data to network number ● by transient transmission	1 to 239 (Default: Blank)												
Relay network No.	To go to network No. ●, data passes through station No. ▲ of its own network No. ■. <table border="1" style="margin: 10px auto;"> <thead> <tr> <th></th> <th>Target Network No.</th> <th>Relay Network No.</th> <th>Relay Station No.</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>●</td> <td>■</td> <td>▲</td> </tr> <tr> <td>?</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <div style="border: 1px solid gray; padding: 5px; width: fit-content; margin: 10px auto;">No routing parameter setting is required for network No. ● because the module of network No. ● is mounted on the relay station.</div>		Target Network No.	Relay Network No.	Relay Station No.	1	●	■	▲	?				1 to 239 (Default: Blank)
	Target Network No.	Relay Network No.	Relay Station No.											
1	●	■	▲											
?														
Relay station No.		0 to 120 (Default: Blank)												

*1 Routing parameters need not to be set for stations for which routing parameters are not available (e.g. station including a head module). The station communicates with other networks according to routing parameters set to the master station.

Point

- Transient transmission range
Communications can be made with stations up to eight networks apart (number of relay stations: 7).
- Setting for stations that do not perform transient transmission to other networks
Routing parameters are not required for stations that do not perform transient transmission to other networks; however, setting the same routing parameters to all stations is recommended.



It is recommended to set the same routing parameters as for . and can communicate by the same routing parameters, since they pass through the same relay station.

Note that routing parameters need not to be set for stations for which routing parameters are not available (e.g. station including a head module). The station communicates with other networks according to routing parameters set to the master station.

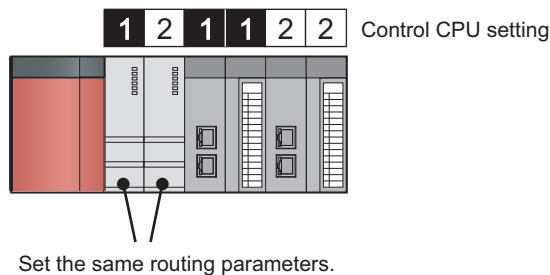
(2) Checking method

To check whether routing parameters have been correctly set and transient transmission can be performed, perform a communication test from CC-Link IE Field Network diagnostics. (☞ Page 75, Section 6.4.3)

(3) Precautions

(a) Different control CPUs are set to the network modules on a relay station in a multiple CPU system

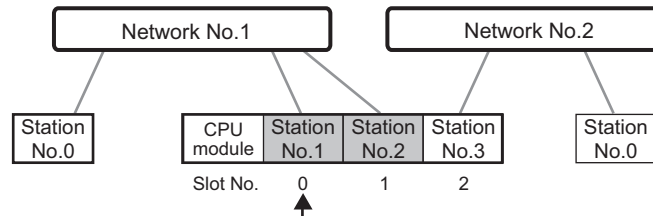
Set the same routing parameters to all the control CPUs.



(b) When multiple master/local modules with the same network number are connected to one system

Set the station number of a module with the smallest slot number in "Relay Station No."

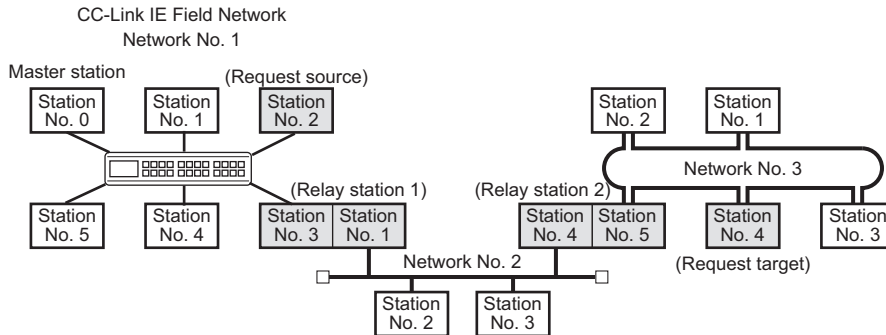
In a multiple CPU system, set the station number of a module with the smallest slot number, regardless of the CPU number of the control CPU.



Set "1" in "Relay Station No."

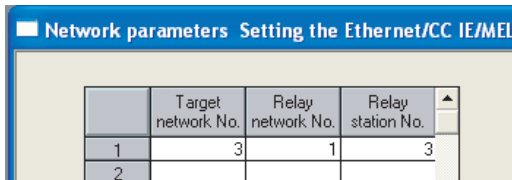
(4) Setting example

The following shows an example to perform transient transmission from the station number 2 in the network number 1 to the station number 4 in the network number 3.

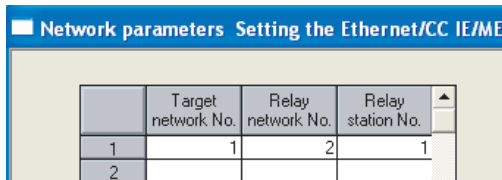


Station	Transient transmission (request)			Transient transmission (response)		
Request source	Station No. 2	Target network No. 3	Relay network No. 1	Relay station No. 3	Station No. 2	
	Goes through station No. 3 of network No. 1 to reach network No. 3.					
Relay station 1	Station No. 3 Station No. 1	Target network No. 3	Relay network No. 2	Relay station No. 4	Station No. 3 Station No. 1	
	Goes through station No. 4 of network No. 2 to reach network No. 3.					
Relay station 2	Station No. 4 Station No. 5	Passes data to the request target on network No. 3.		Target network No. 1	Relay network No. 2	Relay station No. 1
	Passes data to the request source on network No. 1.					
Request target	Station No. 4					
	Automatically passes data to the relay station.					

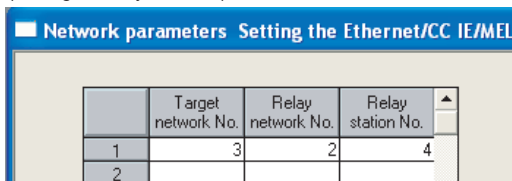
(Setting for request target)



(Setting for relay station 2)



(Setting for relay station 1)



CHAPTER 8 FUNCTIONS

This chapter explains the functions of the master/local module.

8.1 Safety Communication Function

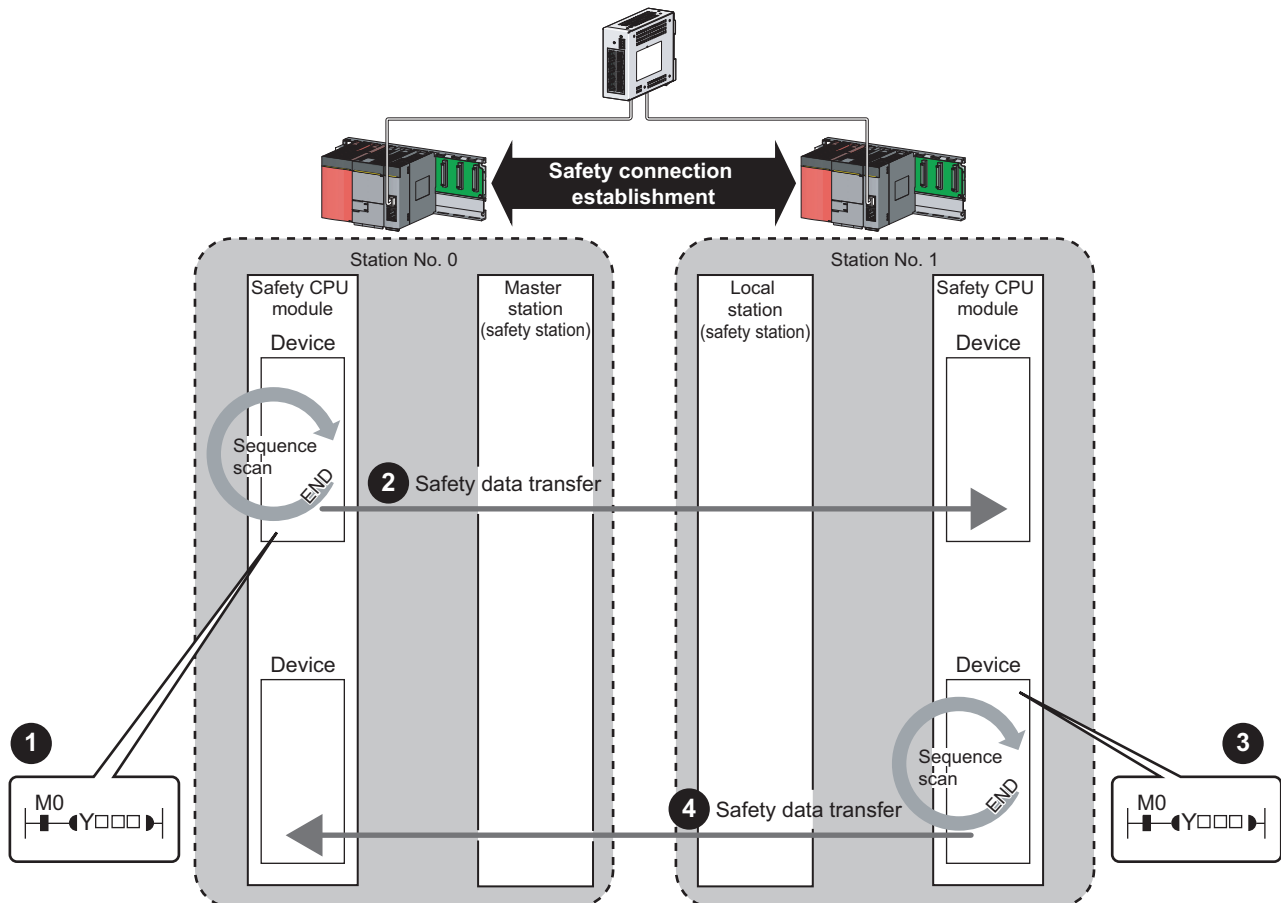
This section explains functions related to safety communication.

8.1.1 Communication with safety stations

One-on-one safety communication is available periodically between safety stations on the same network. The following devices are used for data communication: X, Y, M, B, D, W, T, ST, and C.

(1) Safety communication flow

After a safety connection is established, safety data is sent periodically from safety stations on both stations. The device status in the safety CPU module on a station (sending side) is stored into a device in the safety CPU module on the other station (receiving side). The figure below is an example of safety communication between a master station (safety station) and a local station (safety station). Safety communication between local stations (safety station) is also the same.



• Output from a master station (safety station)

- 1** The device in the safety CPU module on a master station (safety station) turns on.
- 2** The device status in the safety CPU module on the master station (safety station) is stored into the device in the safety CPU module on the local station (safety station) by safety data transfer.

• Output from a local station (safety station)

- 3** The device in the safety CPU module on a local station (safety station) turns on.
- 4** The device status in the safety CPU module on the local station (safety station) is stored into the device in the safety CPU module on the master station (safety station) by safety data transfer.

(2) Setting method

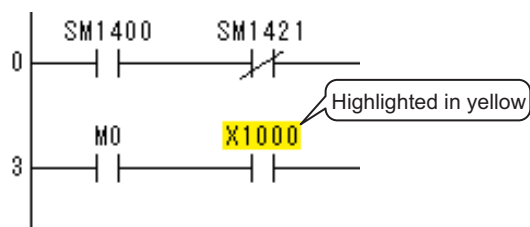
Assign devices to be used for safety communication in the safety communication setting.

(☞ Page 90, Section 7.6)

Devices used for safety communication are highlighted in yellow or green in ladder programs on GX Developer.

(📖 GX Developer Version 8 Operating Manual (Safety Programmable Controller))

The following figure is an example of a ladder program with a device highlighted in yellow.



Point

- If an error occurs in safety communication, safety data from a station with an error is cleared.
- A safety connection can be established only while baton pass is performed after configuring the safety communication setting of both stations (sending side and receiving side). Note that stations not set to the network configuration setting of the master station and reserved stations cannot establish a safety connection. Check whether a safety connection is established or not at special registers (SD1420 to SD1427) (Safety refresh communication status of each safety station) and a special relay (SM1421) (Safety refresh communication status of safety master station).
(📖 QSCPU User's Manual (Function Explanation, Program Fundamentals))
- The following data can be held only when the safety CPU mode is set to the test mode: output data of safety communication when the safety CPU module is on the STOP status. (☞ Page 115, Section 8.2.6)

8.1.2 Error log registration function

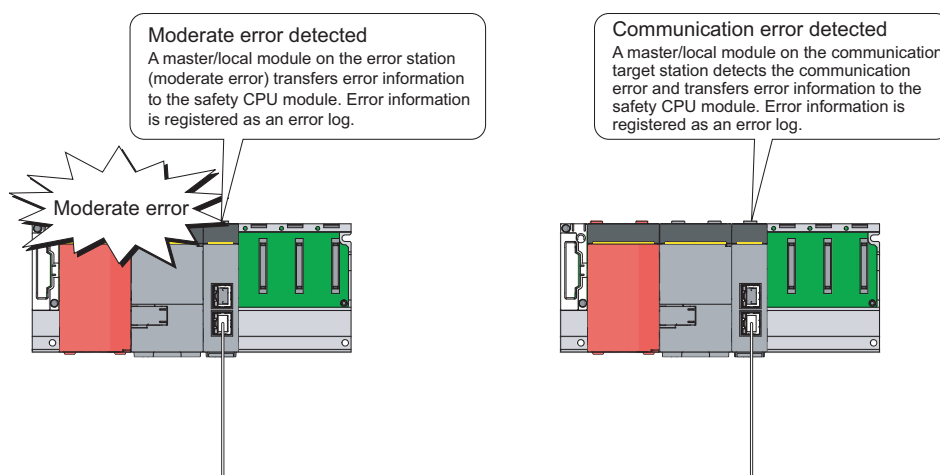
Under the following occasions, error information can be registered to a safety CPU module as an error log.

- When a moderate error (an error that stops input/output) has occurred on a safety station
- When a communication error has occurred between safety stations during safety communication

The error log is held even if the power is turned off.

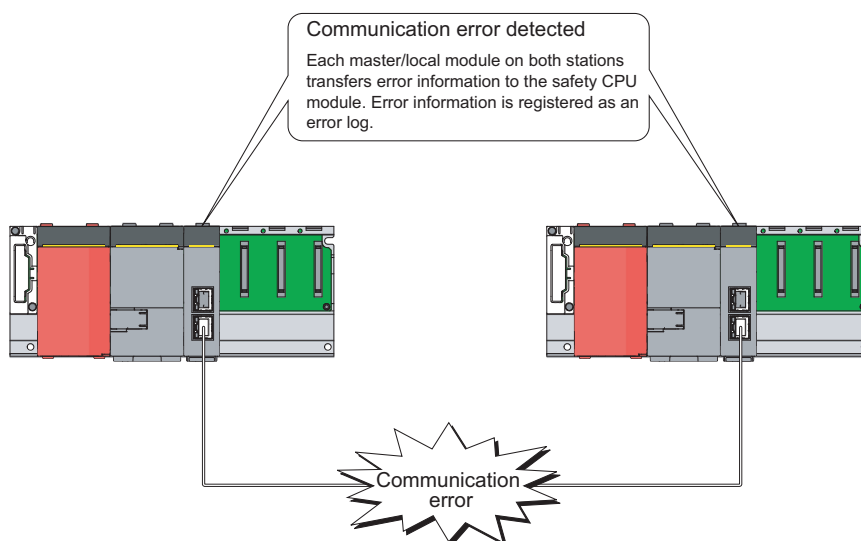
(1) When a moderate error has occurred on a safety station

When a moderate error is detected on a safety station, the error information is registered to the safety CPU module on the station. The other safety station detects the error as a communication error, and registers the error information on the safety CPU module on the station.




(2) When a communication error has occurred between safety stations

Both stations detect a communication error, and register the error information to the safety CPU module of own station.



(3) Checking method

The registered error information can be checked on the PLC diagnostics of GX Developer. ( GX Developer Version 8 Operating Manual)

8.1.3 Safety station interlock function

When a communication error has occurred between safety stations, communication is automatically cut to prevent incorrect input or output from the error station.

The safety communication between the stations becomes "safety station interlock status", and it does not resume until the safety interlock status is released.

Note that standard communication automatically resumes even under the safety interlock status if the communication error cause is eliminated.

The safety station interlock function prevents equipment stopped by a communication error from suddenly resuming its operation after it recovers from the error.

(1) Checking method

Under the safety station interlock status, the bit of the following special relay or special registers turn on.

○: Bit that turns on, — : N/A

Stations communicated (through safety communication)	Station to be check	Safety station interlock status (SD1700 to SD1707)*1	Safety master station interlock status (SM1700)
Master station (safety station) and local station (safety station)	Master station (safety station)	○	—
	Local station (safety station)	—	○
Local station (safety station) and local station (safety station)	Local station (safety station)	○	—

*1 A bit that turns on is the one designated for the station No. of the local station (safety station) which is in safety communication with own station.

(2) Releasing method

The safety station interlock status is released when the bit of the following special relay or special registers is turned on.

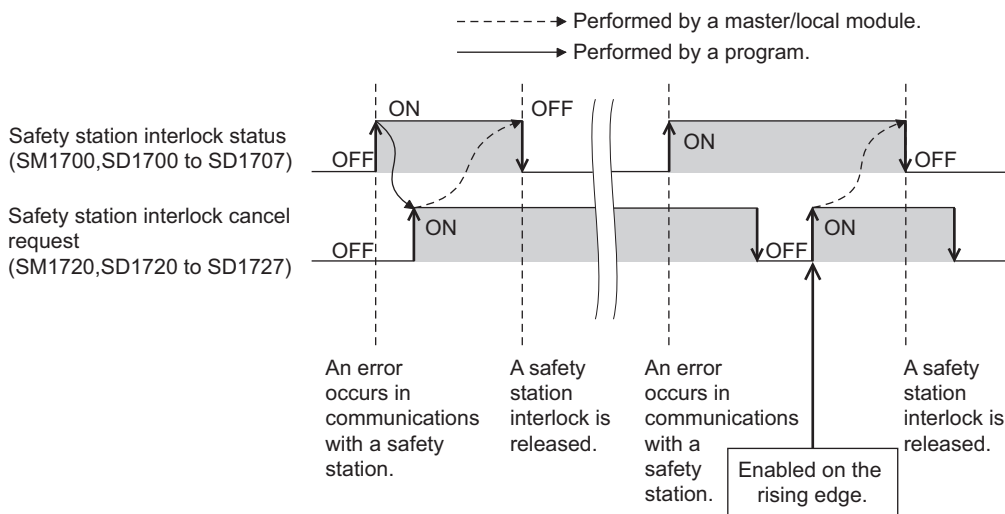
○: Bit that turns on, — : N/A

Stations communicated (through safety communication)	Station to be checked	Safety station interlock release request (SD1720 to SD1727)*1	Safety master station interlock release request (SM1720)
Master station (safety station) and local station (safety station)	Master station (safety station)	○	—
	Local station (safety station)	—	○
Local station (safety station) and local station (safety station)	Local station (safety station)	○	—

*1 A bit that turns on is the one designated for the station No. of the local station (safety station) which is in safety communication with own station.

Request release of the safety station interlock status on both stations where safety communication is cut after solving the communication error cause.

A release request of the safety station interlock is activated at the rising edge of the device as follows.



For details on special relays and special registers, refer to the following manual.

QSCPU User's Manual (Hardware Design, Maintenance and Inspection)

8.2 Cyclic Transmission

Data communication is available periodically among stations on the same network. Link devices (RX, RY, RWr, and RWw) are used.

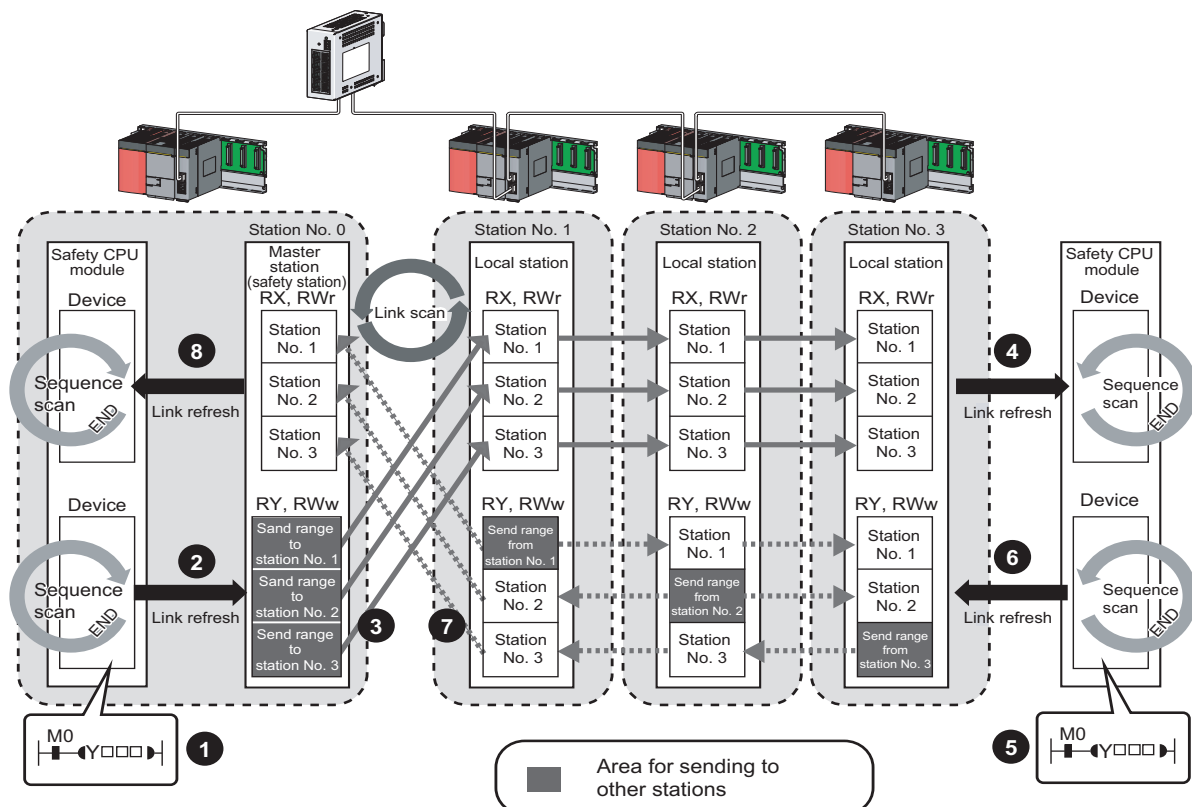
8.2.1 Data flow and link device assignment

(1) Master station (safety station) and local station

Data can be written into the send range of each station's link device (RY, RWw) and can be sent to any station on the same network.

The status data of the link devices (RY, RWw) of the master station (safety station) are stored in the link devices (RX, RWr) of each local station.

The status data of the link devices (RY, RWw) of local stations are stored in the link devices (RX, RWr) of the master station (safety station) and the link devices (RY, RWw) of other local stations.



• Output from the master station (safety station)

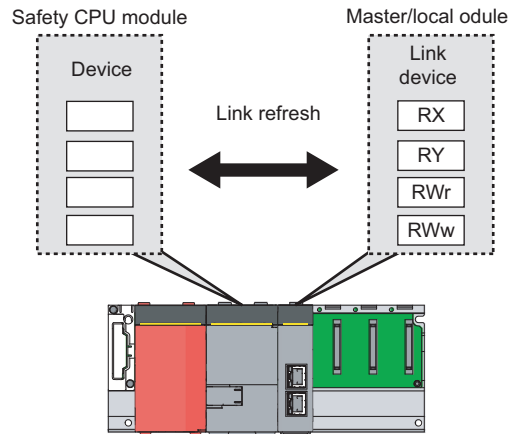
- ① The device of the safety CPU module turns on.
- ② The device status data of the safety CPU module is stored in the link device (RY, RWw) of the master station (safety station) by link refresh.
- ③ The status data of the link device (RY, RWw) of the master station (safety station) is stored in the link device (RX, RWr) of the local station by link scan.
- ④ The status data of the link device (RX, RWr) of the local station is stored in the device of the safety CPU module.

• Input from the local station

- ⑤ The device of the safety CPU module turns on.
- ⑥ The status data of the device of the safety CPU module is stored in the own station send range of the link device (RY, RWw).
- ⑦ The status data of the link device (RY, RWw) of the local station is stored in the link device (RX, RWr) of the master station (safety station) by link scan.
- ⑧ The status data of the link device (RX, RWr) of the master station (safety station) is stored in the device of the safety CPU module by link refresh.

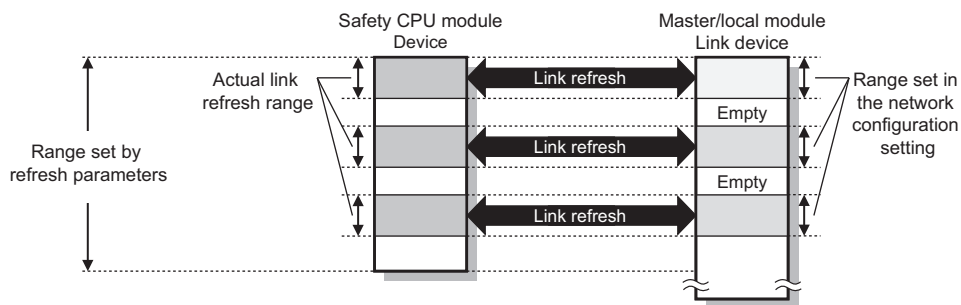
8.2.2 Link refresh

Data can be automatically transferred between the link devices of the master/local module and the devices of the safety CPU module.



(1) Concept of the link refresh range

The area range set with the refresh parameters and also specified in Network Configuration Setting is executed by link refresh.



(2) Shortening the link refresh time and transmission delay time

Use the following method to shorten time mentioned above by reducing the number of link refresh points of the safety CPU module.

- In the refresh parameters setting, set only the link devices used in the safety CPU module as the link refresh range. (☞ Page 86, Section 7.5)

(3) Setting method

The link refresh is assigned by the Refresh Parameters. (☞ Page 86, Section 7.5)

(4) Precautions

For cyclic data assurance of more than 32 bits, use one of the following methods.

- Enable the Block Data Assurance per Station setting. (☞ Page 81, Section 7.3, Page 108, Section 8.2.3 (2))
- Create an interlock program. (☞ Page 109, Section 8.2.3 (3))

Point 

“Network Configuration Setting” is send to slave stations from the master station (safety station) as parameters. Therefore, the link refresh is not started until a slave station receives the parameters from the master station (safety station) (Parameter reception status (SB0077) turns off.) even if refresh parameters are set for the slave station.

8.2.3 Assurance of cyclic data integrity

The cyclic data integrity can be assured in 32-bit units or for each station.

Method	Description
32-bit data assurance	Assures data in 32-bit units. Data is automatically assured by satisfying assignment conditions of link devices.
Block Data Assurance per Station	Assures data in station-based units. Data is assured by enabling the station-based block data assurance in the parameter setting.
Interlock program	Assures data of more than 32 bits. Data is assured by performing interlocks on programs.

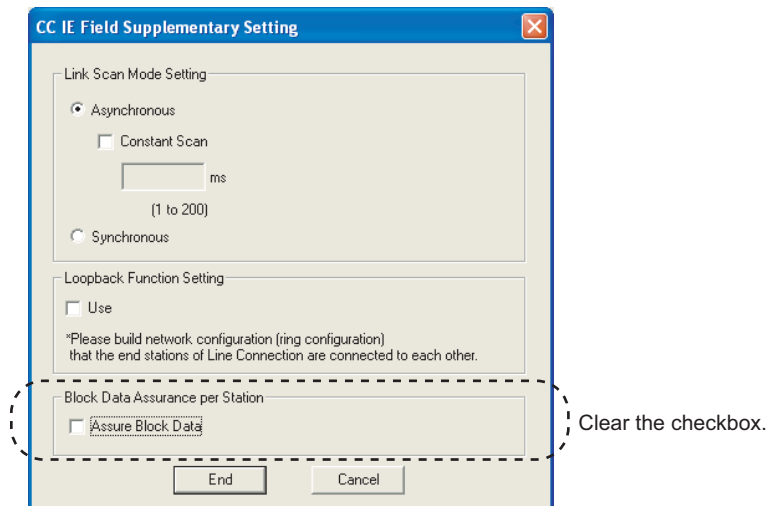
(1) 32-bit data assurance

The RWr and RWw data can be assured in 32-bit units.

To enable 32-bit data assurance, disable block data assurance per station.

🖱️ Project data list ⇨ [Parameter] ⇨ [Network param] ⇨ [Ethernet/CC IE/MELSECNET] ⇨

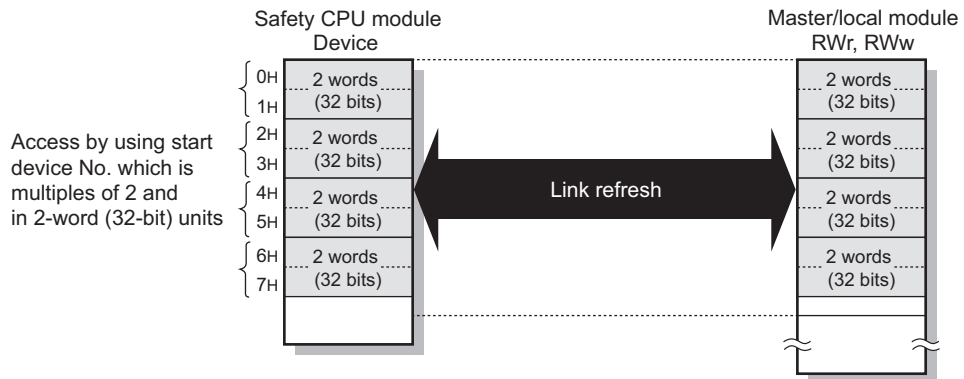
Network Configuration Setting button ⇨ Supplementary Setting button



(a) Access to cyclic data

When link devices are accessed, the integrity of the 32-bit data can be assured by accessing RWr and RWw with the following conditions satisfied:

- The start device number of RWr/RWw is multiples of 2.
- The number of points assigned to RWr/RWw is multiples of 2.



Point

For data assurance of more than 32 bits, use the block data assurance per station or interlock programs.

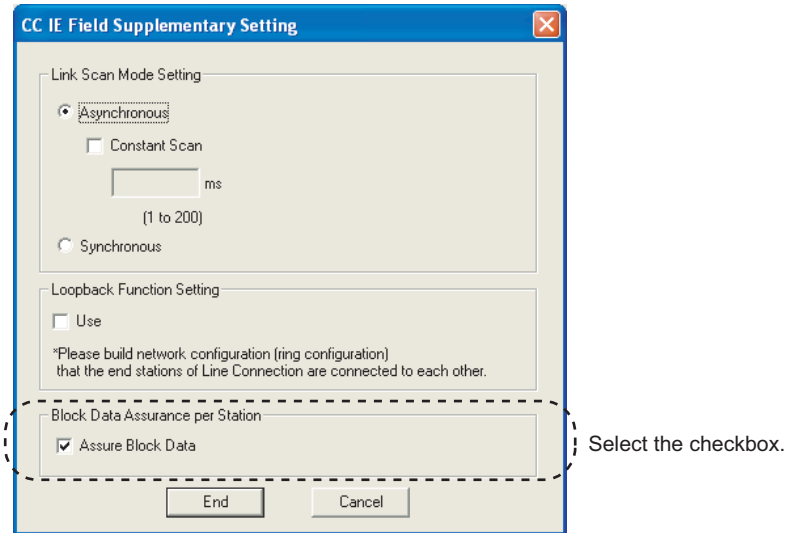
(2) Block data assurance per station

Integrity of the cyclic data is assured for each station by handshake between the safety CPU module and master/local module for a link refresh.

(a) Setting

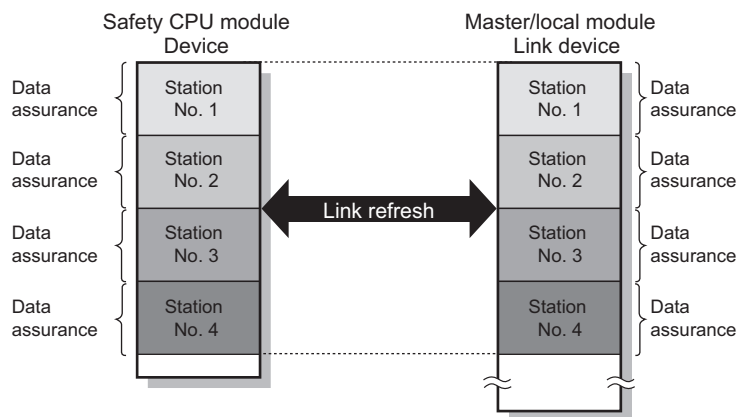
Enable "Block Data Assurance per Station" in "Network Configuration Setting" of the master station (safety station). (☞ Page 81, Section 7.3)

Once this setting is enabled on the master station (safety station), integrity of the data for all stations is assured for each station.



(b) Access to link devices

During a link refresh, data are assured for each station as shown below.



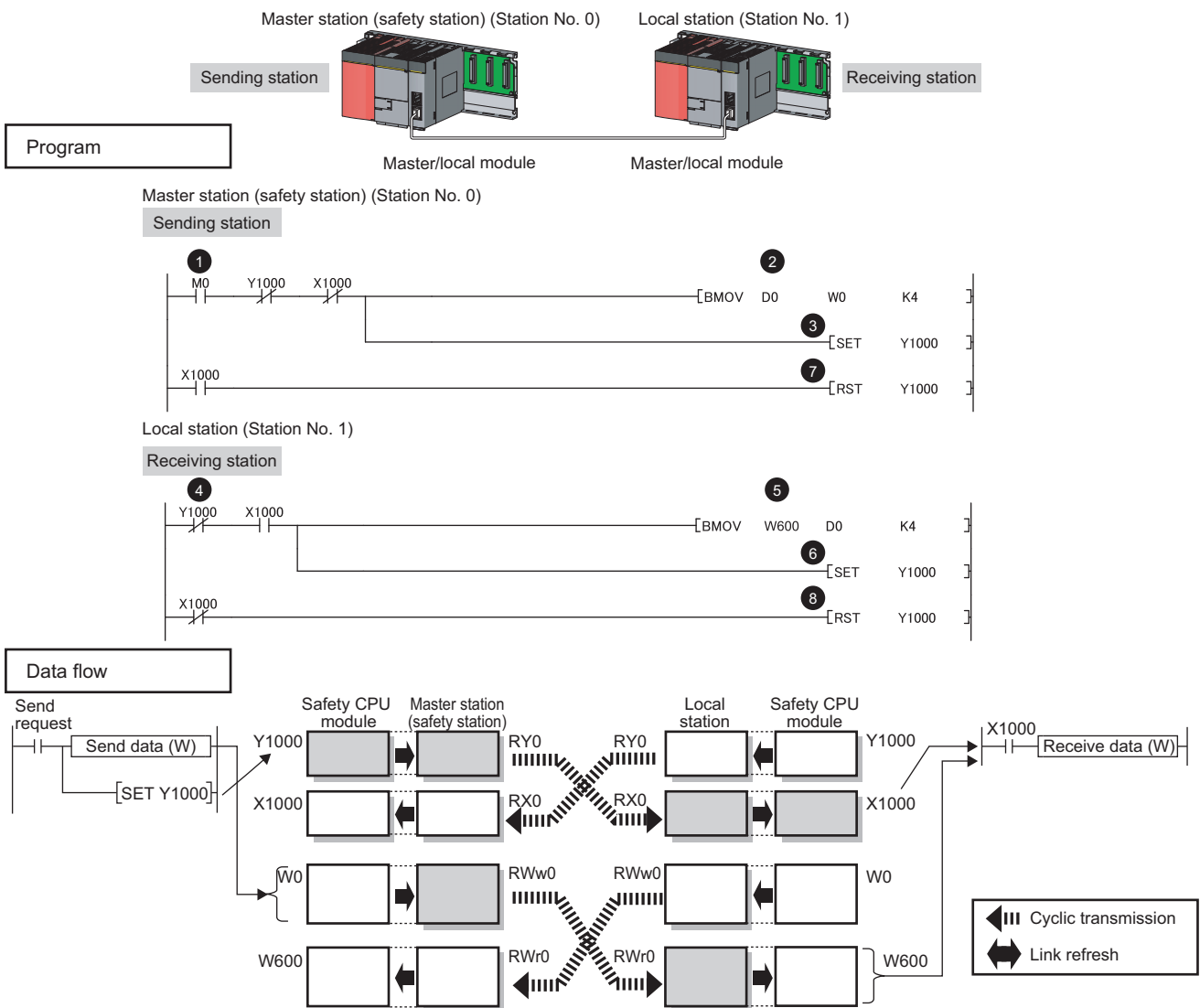
(3) Interlock program

Data of more than 32 bits can be assured with the Block Data Assurance per Station setting disabled. Use either of the following methods.

- Interlock using X and Y
- Interlock using devices other than X and Y (when X, Y cannot be used as an interlock device)

(a) Example of interlock using X and Y

An example of sending data in W0 to W3 of the master station (safety station) (station No. 0) to W600 to W603 of the local station (station No. 1) is shown below. (X1000 and Y1000 are used for a handshake to the safety CPU modules of RX and RY.)



8

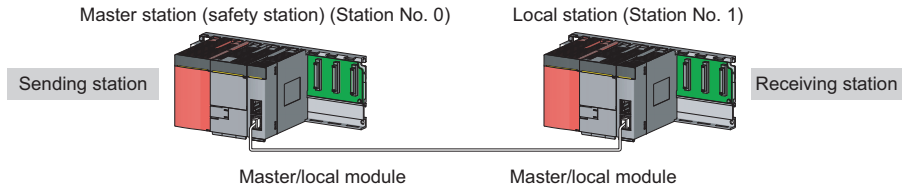
8.2 Cyclic Transmission
8.2.3 Assurance of cyclic data integrity

- 7 When the data are sent to the receiving station, Y1000 at the sending station is turned off.
- 8 When X1000 at the receiving station turns off, Y1000 at the receiving station is turned off.

(b) Example of interlock using devices other than X and Y

The following shows an example of sending data in W0 to W3 of the master station (safety station) (station No. 0) to W600 to W603 of the local station (station No. 1). This is a method used when X and Y cannot be used as interlock devices.

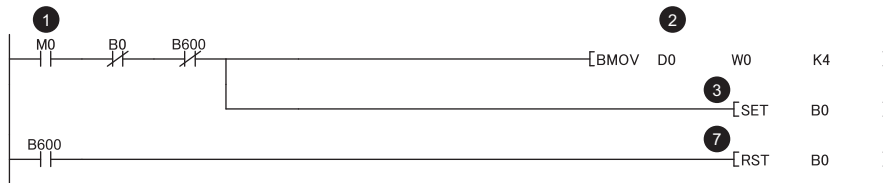
(B0 and B600 are used for a handshake to the safety CPU modules of RWr and RYWw.)



Program

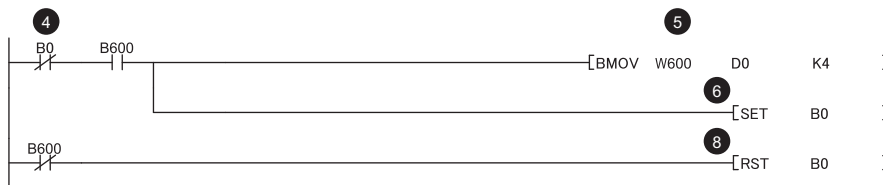
Master station (safety station) (Station No. 0)

Sending station

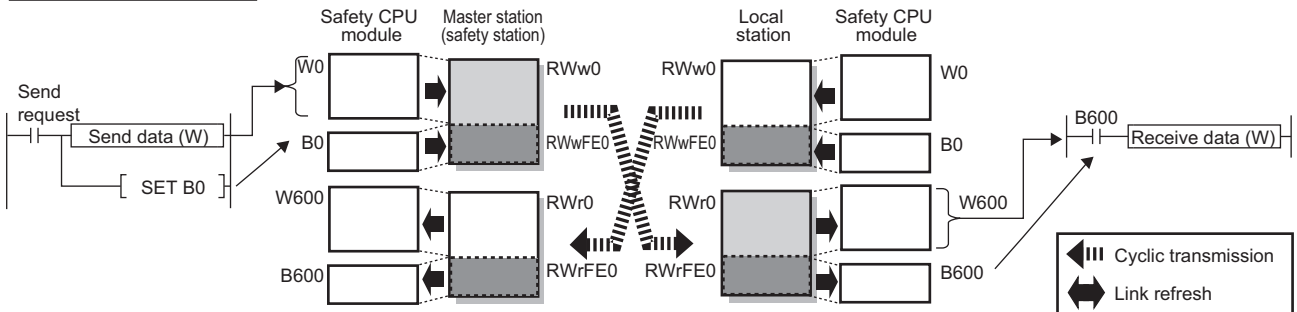


Local station (Station No. 1)

Receiving station



Data flow



- 1 The send request turns on.
- 2 The contents of D0 to D3 are transferred to W0 to W3.
- 3 Upon completion of storage in W0 to W3, B0 at the sending station for a handshake is turned on.

- 4 Cyclic transmission sends signals starting from RWw0 following by signals starting from RWwFE0, and B600 at the receiving station is turned on.
- 5 The contents of W600 to W603 are stored in D0 to D3.
- 6 Upon completion of storage in D0 to D3, B0 at the receiving station for a handshake is turned on.
- 7 When the data are sent to the receiving station, B0 at the sending station is turned off.
- 8 When B600 at the receiving station turns off, B0 at the receiving station is turned off.

8.2.4 Scan synchronization specification

Whether to synchronize the link scan with the safety CPU module's sequence scan or not can be selected.

(1) Difference between asynchronous and synchronous settings

(a) Asynchronous setting

Link scan is performed asynchronously with the sequence scan of the safety CPU module.

Select this item to shorten input transmission delay time when sequence scan takes much time than link scan.

Note that output transmission delay time will become longer.

(b) Synchronous setting

Link scan is performed synchronously with the sequence scan of the safety CPU module. Select this item in the following cases:

- To shorten output transmission delay time (Note that when sequence scan takes much time than link scan, input transmission delay time will become longer.)
- To keep transmission delay time constant (In the PLC Parameter setting of the safety CPU module, "Constant Scanning" must be set, and the sequence scan must be set to be performed at the specified intervals.)

(2) Setting method

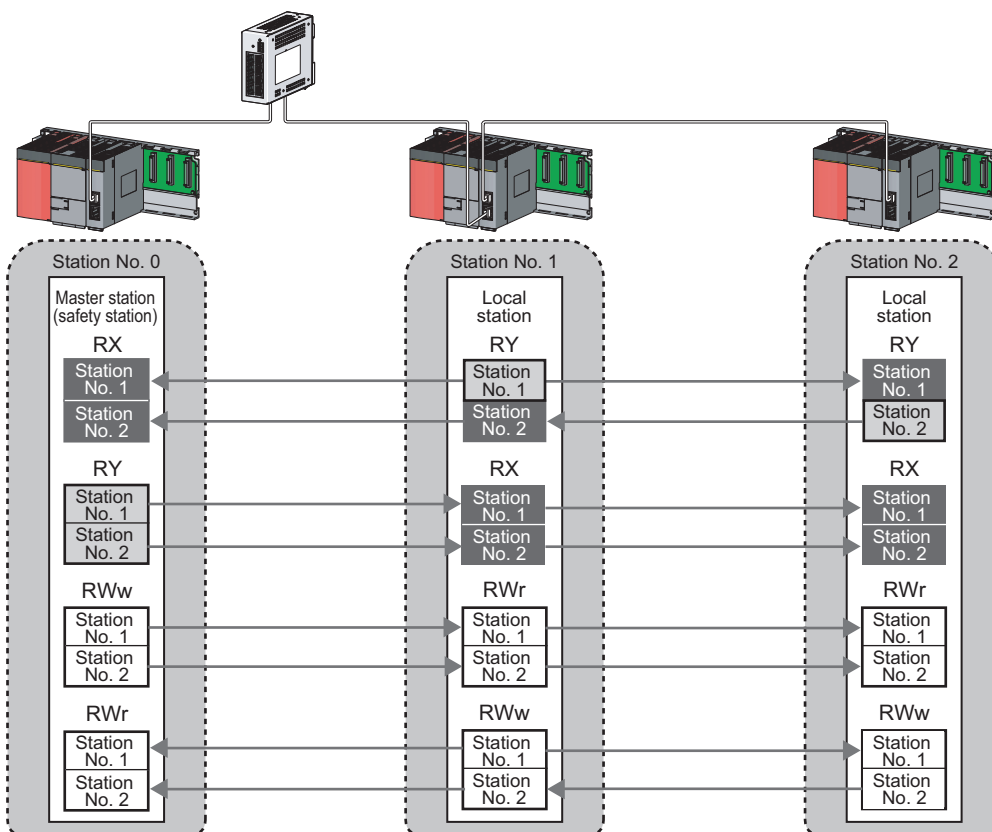
Scan synchronization is specified in Network Configuration Setting. ( Page 81, Section 7.3)

8.2.5 Input status setting in case of failure

For the master/local module, whether to hold or clear input data from a data link faulty station can be set.

Status	Range where the settings are enabled
Input status of data link faulty station	Clearing or holding the following RX and RY input data can be selected. <ul style="list-style-type: none"> • Master station RX • Local station RX and RY (only the input data from other stations) Even if "Clear" is set, input data will be held for two seconds after disconnection.
	The RWr and RWw input data are held regardless of any setting. <ul style="list-style-type: none"> • Master station RWr • Local station RWr and RWw (only the input data from other stations)

- Area for which "Clear" or "Hold" can be selected in the data link faulty station input status setting
- Area where data are cleared when a stop error occurs in the safety CPU module
- Area where data are held regardless of the setting



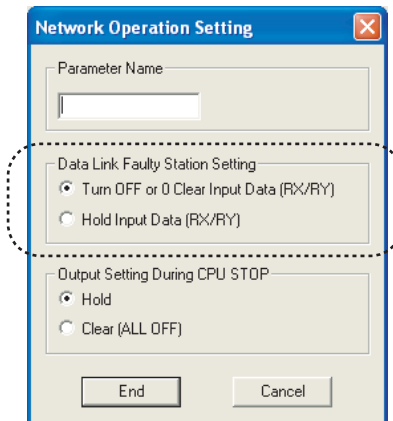
Point

Input data of safety communication from the data link faulty station is cleared regardless of the input status setting of the data link faulty station and the safety CPU operation mode.

(1) Setting method

(a) Input status of data link faulty station

It can be set in the Network Operation Setting. (☞ Page 85, Section 7.4)



(2) Precautions

(a) When data link is stopped by users

When cyclic transmission is stopped using one of the following methods, the input status of the faulty station is held.

- CC-Link IE Field Network diagnostics (☞ Page 138, Section 9.4)
- Link special relay (SB), link special register (SB) (☞ Page 221, Section 11.3 (1))

(b) Setting on a station with a data link error

When the following settings are set to "Hold" on the station where a data link error has occurred, the input status of the own station upon error is held, regardless of setting.

- "Network Operating Setting" ⇔ "Output Setting During CPU STOP" (☞ Page 115, Section 8.2.6)
 - "PLC Parameter" ⇔ "Intelligent Function Module Detailed Setting" ⇔ "Error Time Output Mode" (only when the station with a data link error is a standard programmable controller)
- (📖 User's manual for the CC-Link IE Field Network master/local module used)

8.2.6 Output status setting for CPU module STOP

When the safety CPU module mounted with a master/local module is set to STOP, whether cyclic data output is held or cleared can be selected.

(1) Active range

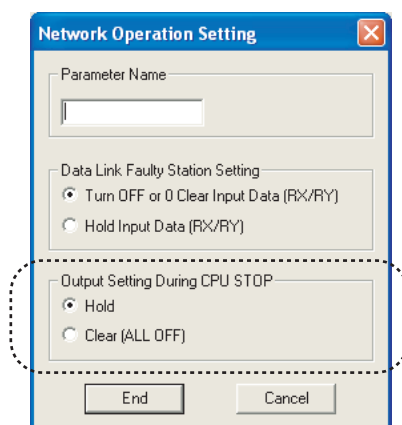
Depending on the device set for link refresh, the output status is fixed to hold or clear regardless of the setting in "Output Setting During CPU STOP".

The table below shows a relationship between the output status of devices set for link refresh and "Output Setting During CPU STOP".

Link refresh device		Output setting during CPU STOP	
		Hold	Clear (ALL OFF)
RY	Y	Clear	Clear
	Other than Y	Hold	Clear
RWw	All available devices	Hold	Hold

(2) Setting method

Set the output status for the case where the safety CPU module switch is set to STOP. Select hold or clear in "Network Operation Setting". (☞ Page 85, Section 7.4)



(3) Precautions

(a) When "Output Setting During CPU STOP" is set to clear

When the safety CPU module is on the STOP status, data cannot be forcibly output to a slave station by GX Developer.

Point

For output of safety communication, the content set in "Output Setting During CPU STOP" is active only when the safety CPU operation mode is on the test mode. Under the safety mode, output is cleared regardless of the setting.

8.2.7 Cyclic transmission stop and restart

During debugging and other operations, cyclic transmission is stopped. (Data reception from the slave station and data transmission from own stations are stopped.) Also, the stopped cyclic transmission is restarted.

Safety communication and transient transmission are not stopped. ( Page 138, Section 9.4)

Point

This cannot be performed when the safety CPU operation mode is on the safety mode.

8.3 Transient Transmission

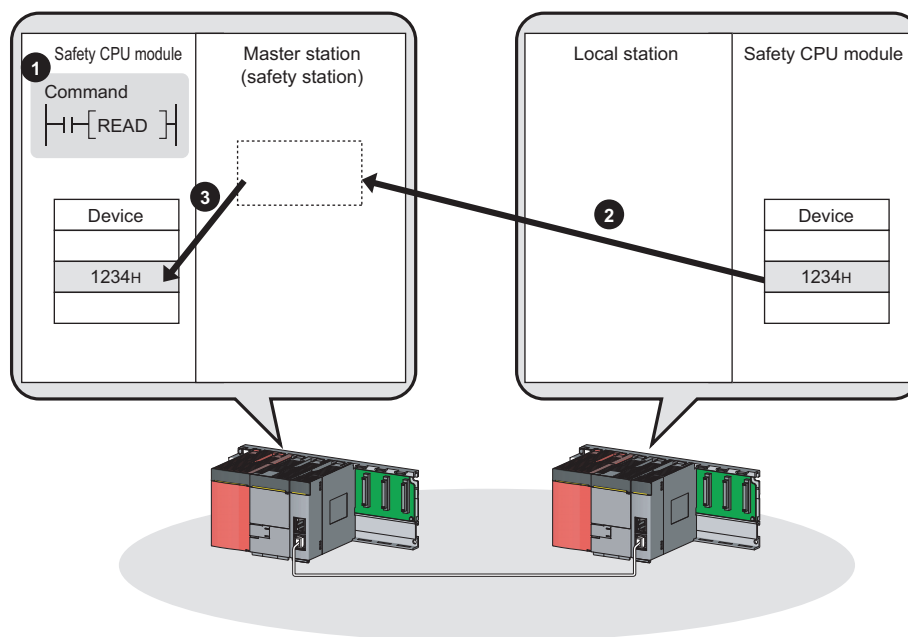
This function allows communication with other stations when a request is made by a method such as a dedicated instruction. Communication is also possible with different networks.

8.3.1 Communication within the same network

Transient transmission can be performed to other stations through dedicated instructions or GX Developer.

(☞ Page 152, CHAPTER 10)

Ex. With a dedicated instruction (READ), accessing a programmable controller of another station



Point

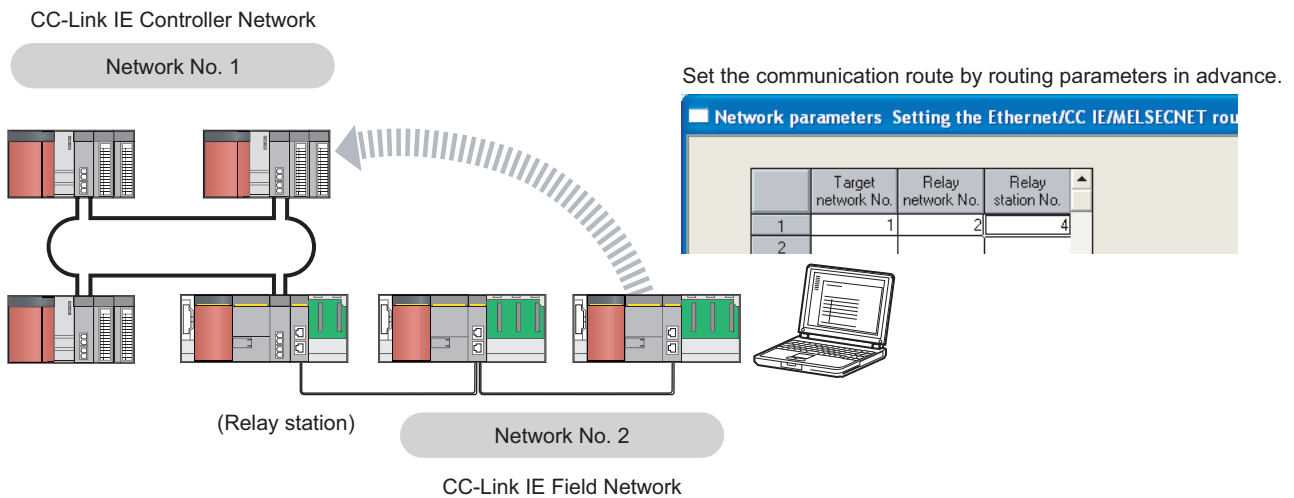
To batch-set clocks of all stations or each group of stations on CC-Link IE Field Network, use the REQ instruction.

(☞ Page 194, Section 10.8)

8.3.2 Communication with different networks

By setting the routing parameters (communication path) using GX Developer in advance, transient transmission can be performed to stations on different networks through dedicated instructions or GX Developer. Seamless communication is available with the following networks. (☞ Page 92, Section 7.7)

- Ethernet
- CC-Link IE Controller Network
- MELSECNET/H
- MELSECNET/10
- CC-Link (when using GX Developer)



Point

- Communications can be made with stations up to eight networks apart (number of relay stations: 7). (☞ Page 154, Section 10.1 (1) (b))
- To batch-set clocks of all stations on CC-Link IE Field Network, use the REQ instruction. (☞ Page 194, Section 10.8)

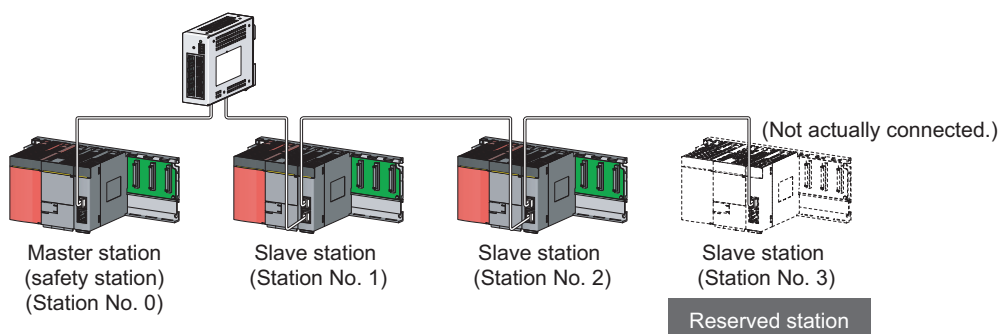
8.4 Reserved station specification and reserved station function disable

Reserved station specification allows setting of a station that is not actually connected at present but will be connected to the network in the future (must be included in the total number of stations for the network). Reserved stations are not detected as faulty stations even though they are not actually connected.

When the reserved station function is disabled, a slave station specified as a reserved station can be canceled temporarily without changing the GX Developer setting.

(1) Reserved station specification

A slave station can be specified as a reserved station in the Network Configuration Setting. (☞ Page 81, Section 7.3)



Network Configuration Setting

Set up Network configuration.

Assignment Method
 Points / Start
 Start / End

The column contents for refresh device will be changed corresponding to refresh parameter setting contents. Please reopen the window after completing refresh parameter setting when changing refresh parameter.

Number of PLCs	Station No.	Station Type	RX/RX Setting			RWw/RWw Setting			Refresh Device			Reserved / Error Invalid Station	
			Points	Start	End	Points	Start	End	RX	RY	RWw		RWw
1	1	Local Station	256	0000	00FF	256	0000	00FF	X1000(256)	Y1000(256)	W500(256)	W0(256)	No Setting
2	2	Local Station	256	0100	01FF	256	0100	01FF	X1100(256)	Y1100(256)	W600(256)	W100(256)	Reserved Station
3	3	Local Station	256	0200	02FF	256	0200	02FF	X1200(256)	Y1200(256)	W700(256)	W200(256)	Reserved Station

Select "Reserved Station".

(2) Reserved station function disable and cancel

This is used when connecting a reserved-status slave station to the network. For details on the reserved station function disable, refer to ☞ Page 142, Section 9.6.



This cannot be performed when the safety CPU operation mode is on the safety mode.

8.5 Error Invalid Station and Temporary Error Invalid Station Setting Function

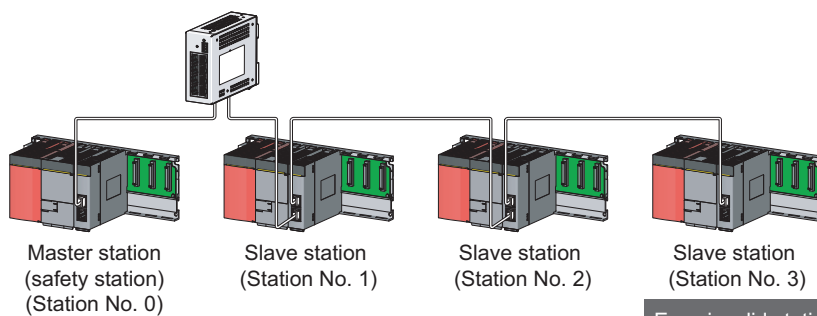
When a slave station is set as an error invalid station, even if it is disconnected from the network during data link, the master station will not detect it as faulty station.

Furthermore, by the temporary error invalid station setting function, a slave station can be temporarily set as an error invalid station without changing the GX Developer setting each time.

(1) Error invalid station setting

A slave station can be set as an error invalid station in Network Configuration Setting.

(☞ Page 81, Section 7.3)



No data link error will be detected on this station even in the case of an error or power OFF.

Network Configuration Setting

Set up Network configuration.

Assignment Method
 Points / Start
 Start / End

The column contents for refresh device will be changed corresponding to refresh parameter setting contents. Please reopen the window after completing refresh parameter setting when changing refresh parameter.

Number of PLCs	Station No.	Station Type	RX/RX Setting			RWw/RW/ Setting			Refresh Device				Reserved / Error Invalid Station
			Points	Start	End	Points	Start	End	RX	RY	RWw	RWr	
1	1	Local Station	256	0000	00FF	256	0000	00FF	X1000(256)	Y1000(256)	w500(256)	w0(256)	No Setting
2	2	Local Station	256	0100	01FF	256	0100	01FF	X1100(256)	Y1100(256)	w600(256)	w100(256)	No Setting
3	3	Local Station	256	0200	02FF	256	0200	02FF	X1200(256)	Y1200(256)	w700(256)	w200(256)	Invalid Station

Select "Invalid Station".

(2) Temporary error invalid station

This function is useful for various operations such as replacing a slave station during data link by temporarily setting it as an error invalid station. For details, refer to ☞ Page 146, Section 9.7.

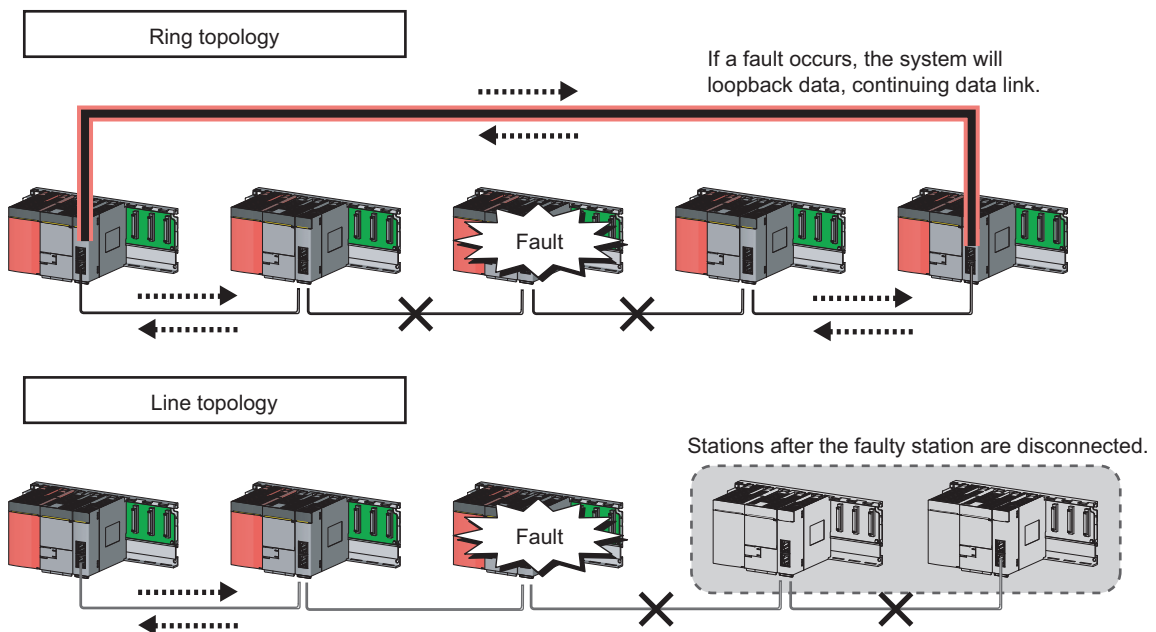
Point

- This cannot be performed when the safety CPU operation mode is on the safety mode.
- When the local station (safety station) is set as an error invalid station or a temporary error invalid station also, if the local station (safety station) gets disconnected, safety communication with the disconnected station fails.

8.6 Loopback Function

This function disconnects the station in which an error has occurred from the network and continues data link with the stations that are operating normally. All stations after the faulty station are disconnected in line topology. By using the loopback function with ring topology, data link continues with the stations that are operating normally.

To use this function, configure the network in ring topology and select "Use" under "Loopback Function Setting" in the Network Parameter window for the master station.

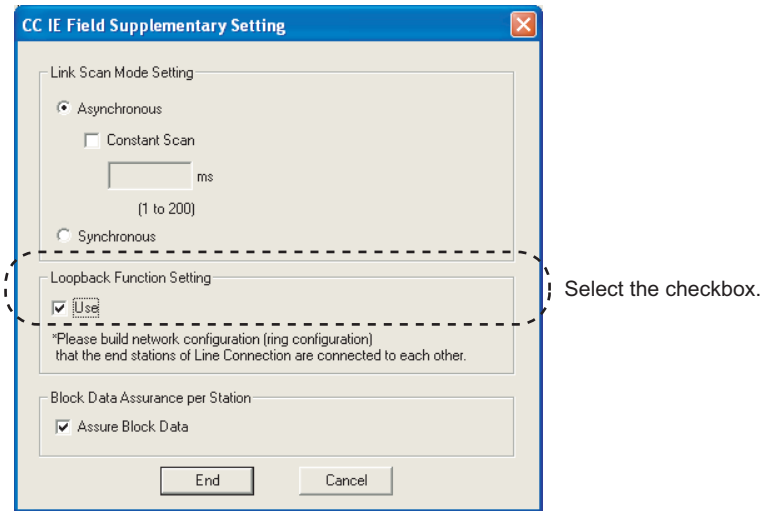


(1) Setting procedure

1. Configure the network in ring topology.
2. Select "Use" under "Loopback Function Setting" in the network configuration setting for the master station (safety station).

Project data list ⇨ [Parameter] ⇨ [Network param] ⇨ [Ethernet/CC IE/MELSECNET] ⇨

Network Configuration Setting button ⇨ **Supplementary Setting** button

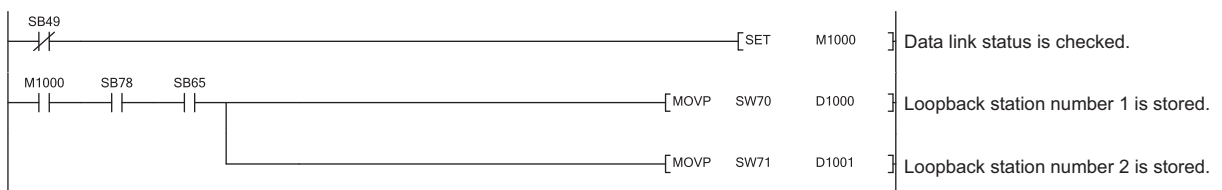


(2) Program that detects loopback station numbers (master station (safety station) only)

By detecting loopback station numbers, a faulty station can be found.

Whether loopback is being performed or not can be checked by Loopback function setting status (SB0078) and Loopback status (SB0065).

Ex. Program that stores loopback station numbers to D1000 and D1001



For details on link special relay (SB) and link special register (SW), refer to the following.

☞ Page 273, Appendix 3, Page 286, Appendix 4

(3) Precautions

(a) Loopback during safety communication

When an error occurs on the safety station which is in safety communication, the safety monitoring timeout error may be detected before the loopback function is performed. If the safety monitoring timeout error is detected, release the safety station interlock function, and resume safety communication. (☞ Page 100, Section 8.1.3)

(b) Loopback function setting and network configuration

For ring topology, select "Use" in "Loopback Function Setting". For network topology other than ring topology, clear the checkbox.

If the loopback function setting and the network configuration are inconsistent, an error may occur in all stations and data link cannot be performed.

CHAPTER 9 CC-Link IE FIELD NETWORK DIAGNOSTICS

This section describes how to check error locations, error causes, and event history by the CC-Link IE Field Network diagnostics of GX Developer. With the diagnostic function, status of other stations can also be monitored.

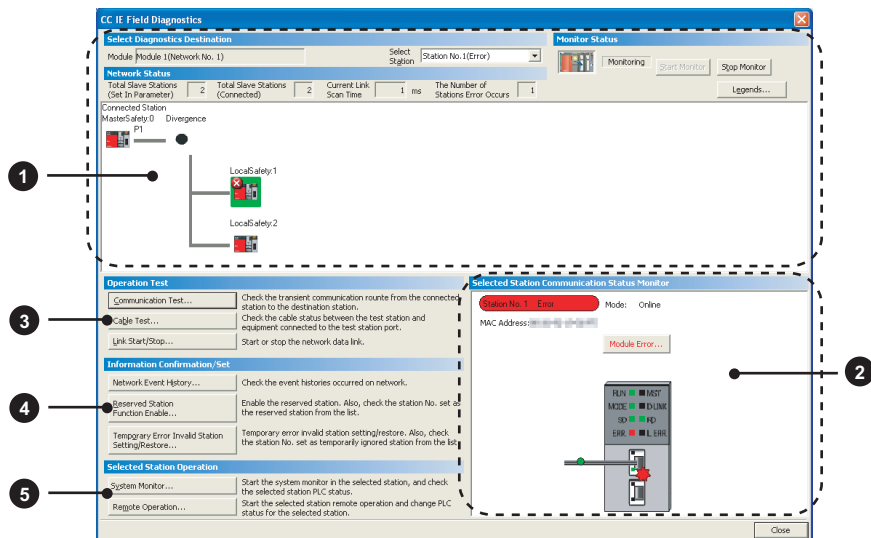
When the master station is a standard programmable controller, perform CC-Link IE Field Network diagnostics using GX Works2. For details, refer to the following.

 User's manual for the CC-Link IE Field Network master/local module used

9.1 Diagnostic Items

The following table lists items that can be diagnosed by CC-Link IE Field Network diagnostics (when GX Developer is connected to the master/local module).

The diagnostic items depend on the connected station.



○: Diagnosed △: Diagnosed with restrictions ×: Not diagnosed

Item	GX Developer is connected to:		Restrictions	Reference
	Master station (safety station)	Local station		
①	Display of network configuration diagram and error status	○	○	—
	Display of disconnected cable and disconnected station	○	○	
②	Display of selected station status and error details	△	△	Modules that do not support GX Developer (e.g. Ethernet adapter module) cannot be diagnosed. ● Restrictions on master station (safety station) This setting can be configured only when the safety CPU operation mode is test mode.
	Slave station number setting	△	×	
③	Communication Test	○	○	—
	Cable Test	○	○	
③	Link Start/Stop	△	△	● Restrictions on master station (safety station) This setting can be configured only when the safety CPU operation mode is test mode. ● Restrictions on local stations Data link of the own station can be started/stopped when the safety CPU operation mode is test mode.

Item	GX Developer is connected to:		Restrictions	Reference	
	Master station (safety station)	Local station			
4	Network Event History	△	△	<ul style="list-style-type: none"> • Events that can be collected depend on the station type. • Event history data can be collected/cleared only when the safety CPU operation mode is test mode. 	Page 140, Section 9.5
	Reserved Station Function Enable	△	△	<ul style="list-style-type: none"> ● Restrictions on master station (safety station) This setting can be configured only when the safety CPU operation mode is test mode. ● Restrictions on local stations Reserved stations can be displayed (cannot be set). 	Page 142, Section 9.6
	Temporary Error Invalid Station Setting/Restore	△	△	<ul style="list-style-type: none"> ● Restrictions on master station (safety station) This setting can be configured only when the safety CPU operation mode is test mode. ● Restrictions on local stations Temporary error invalid stations can be displayed (cannot be set). 	Page 146, Section 9.7
5	System Monitor	△	△	Modules that do not support GX Developer (e.g. Ethernet adapter module) cannot perform these functions.	Page 235, Section 12.2
	Remote Operation	△	△		Page 151, Section 9.8

9.2 Starting Diagnostics

This section describes how to use CC-Link IE Field Network diagnostics.

1. Connect GX Developer to the safety CPU module.

If a slave station cannot be monitored due to an error such as cable disconnection, directly connect a programming tool, which is supported by the programmable controller used, to the slave station. Connect GX Works2 to a slave station that uses a standard programmable controller, and connect GX Developer to a slave station that uses a safety programmable controller.

2. Start CC-Link IE Field Network diagnostics from the menu.

[Diagnostics] ⇒ [CC IE Field diagnostics]

Point










- When another station has been specified as a connected station
 CC-Link IE Field Network diagnostics cannot be started when another station has been specified in "Other Station Setting" of the "Transfer Setup" window. Directly connect a programming tool, which is supported by the programmable controller used, to the target station, and start CC-Link IE Field Network diagnostics.
- Start from the "System Monitor" window
 CC-Link IE Field Network diagnostics can also be started from the "System Monitor" window.

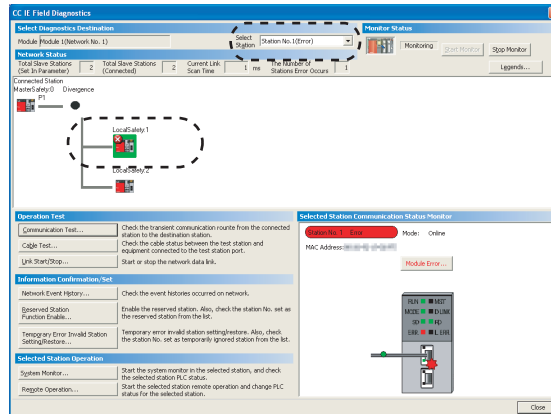
Click the master/local module. Click the **Diagnostics...** button.

Installed status		0	1	2	3
	MasterPLC>	-	-	-	-
Power supply	QS001CPU	Intelligent 32pt	Intelligent 32pt	Intelligent 32pt	Intelligent 32pt

Parameter status		0	1	2	3
	QS001CPU	Intelligent 32pt	Intelligent 32pt	Intelligent 32pt	Intelligent 32pt


3. Select the station to be diagnosed from "Select Station" or "Network Status".

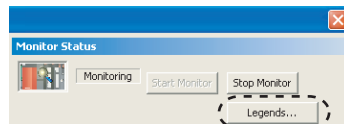
- , , or  is displayed on the module icon of the station where an error occurs.
- The module icon of a disconnected station is displayed in monochrome ()
-  is displayed on the icon of a cable where a communication error occurs. To check the details of the communication error, click the neighboring stations of .
-  is displayed if the network is configured in ring topology although the loopback function is disabled.
-  is displayed if the network is configured in star topology although the loopback function is enabled.
-  is displayed if the network is incorrectly configured in ring topology.



Point

- Descriptions of icons


Clicking the  button will display a brief description of the icon.



- Stations that cannot be selected

The following stations cannot be diagnosed:

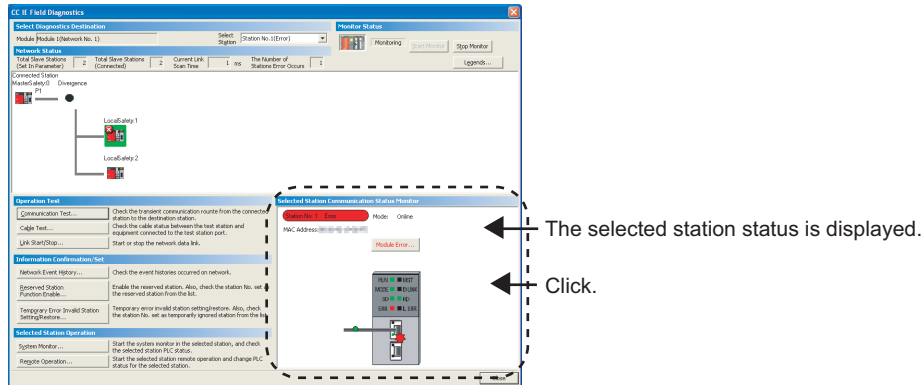
- A station whose network number mismatches
- A station where the master station is duplicated
- A station whose station number is duplicated
- A station whose station type is incorrect

Check the error details by directly connecting a programming tool, which is supported by the programmable controller used, to the faulty station, and opening the "System Monitor" window. ( Page 261, Section 12.6)

4. Status of a station selected in "Network Status" is displayed in "Selected Station Communication Status Monitor". (👉 Page 130, Section 9.3)

The station status is displayed on the top of "Selected Station Communication Status Monitor".

If an error occurs, a button indicating the error (e.g. **PORT2 Communication Error...** button) is displayed. Clicking the button allows checking of error details and corrective actions.

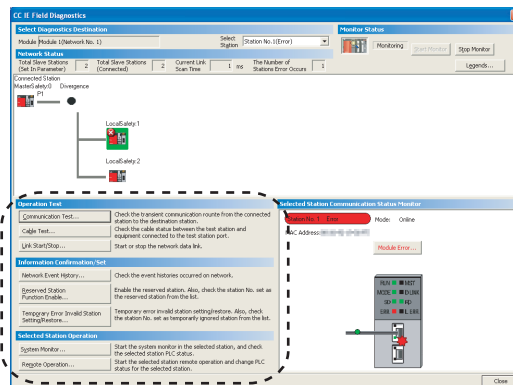


5. If an error occurs in the safety CPU module, click the **System Monitor... button to check the error details and corrective actions.**

6. Various tests and operations can be performed from "Operation" Test", "Information Confirmation/Set", and "Selected Station Operation" on the bottom left of the window.

(👉 Page 138, Section 9.4 to Page 151, Section 9.8)

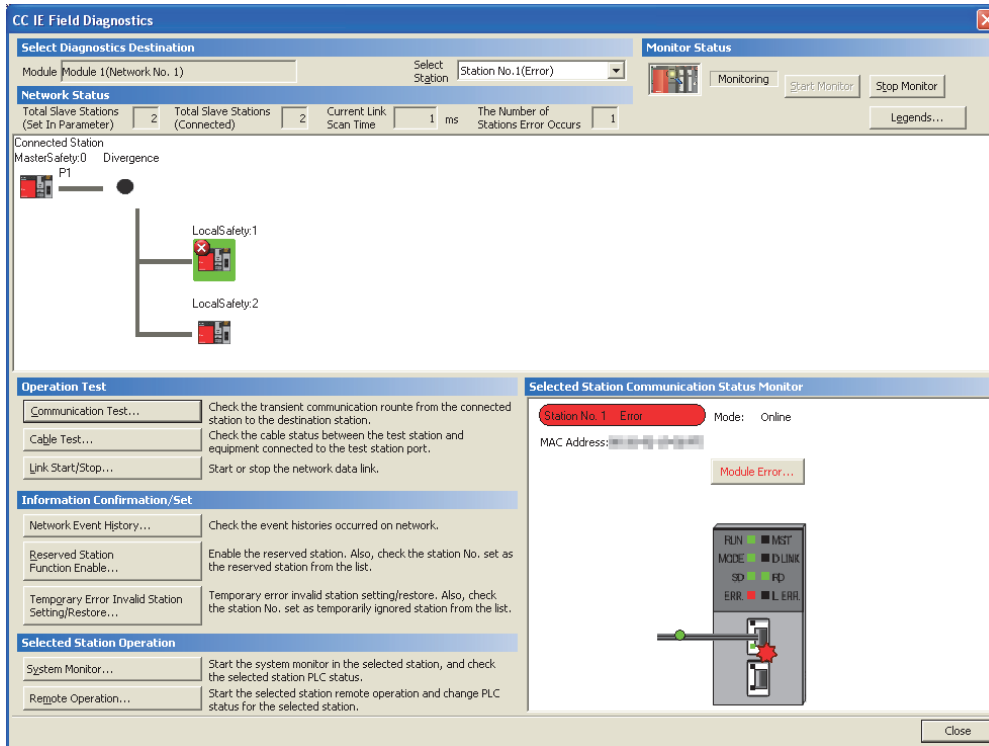
Various tests and operations can be performed.






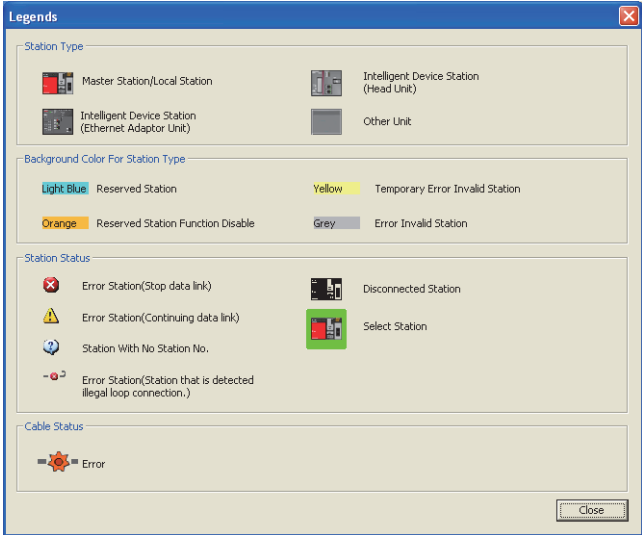
9.3 Diagnostic Window















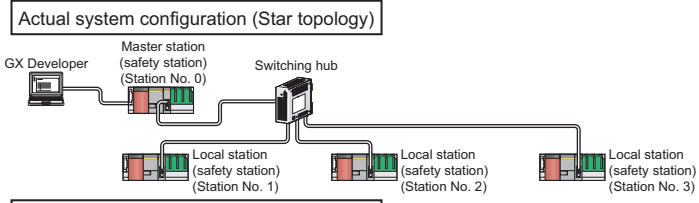
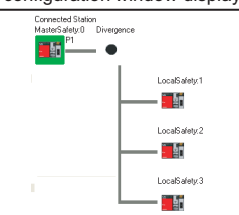
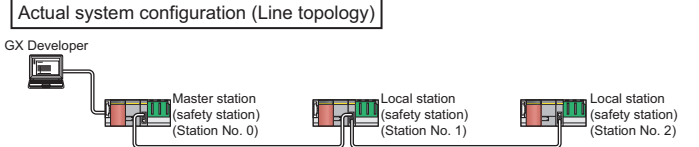
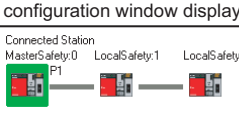
This section describes items displayed in the "CC IE Field Diagnostics" window.

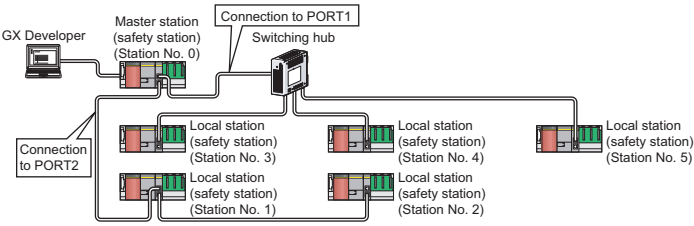
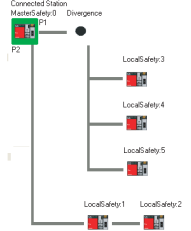
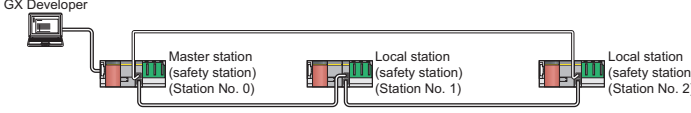
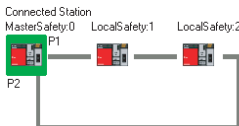
(1) Displayed items

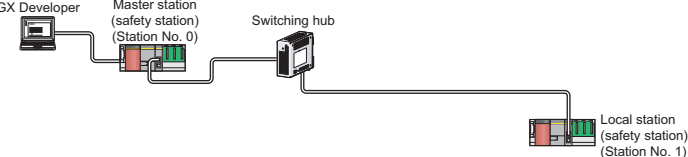

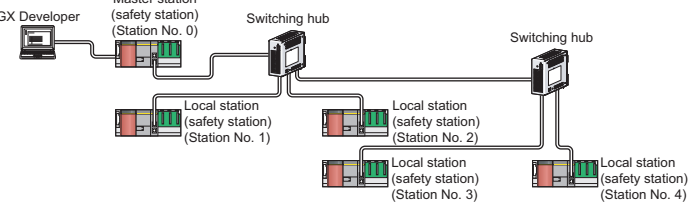
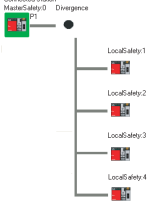


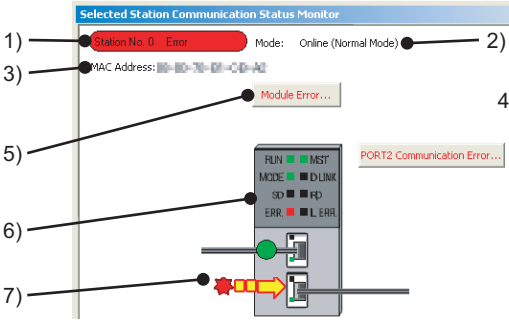
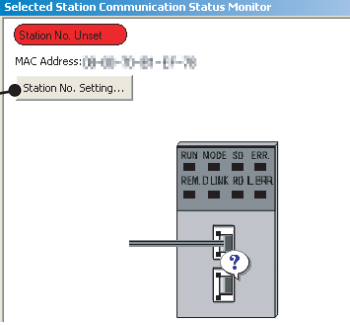
Item		Description
Select Diagnostics Destination	Module	Displays the master/local module being diagnosed.
	Select Station	Select a station to be diagnosed. If an error occurs in the selected station, "(Error)" is displayed after the station number. A station can also be selected by clicking the module icon displayed in "Network Status". In "Select Station", modules not displayed in "Network Status" can also be selected.
Monitor Status	 button	Starts monitoring of CC-Link IE Field Network diagnostics.
	 button	Stops monitoring of CC-Link IE Field Network diagnostics.

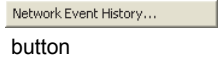
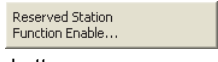
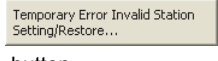

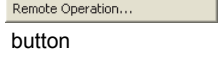
Item	Description	
<p> button</p>	<p>Displays the meaning of icons displayed in the "CC IE Field Diagnostics" window.</p> 	
<p>Network Status</p>	<p>Total Slave Stations (Set In Parameter)</p>	<p>Displays the total number of slave stations set by parameter.</p>
	<p>Total Slave Stations (Connected)</p>	<p>Displays the total number of slave stations during data link on CC-Link IE Field Network.</p>
	<p>Current Link Scan Time</p>	<p>Displays the link scan time of the displayed network.</p>
	<p>The Number of Stations Error Occurs</p>	<p>Displays the number of stations within the network where an error has occurred.</p>

Item	Description								
<p>Network Status</p> <p>Network configuration display area</p>	<p>Displays the configuration of CC-Link IE Field Network and each station status.</p> <p>If station status is not displayed, check if the master stations or the station numbers do not duplicate.</p> <p>(1) Icon</p> <p>The module type and station number are displayed with an icon.</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>1)  Connected Station</p> <p>2)  MasterSafety:0</p> <p>3)  LocalSafety:1</p> <p>4)  LocalSafety:2</p> </div> <div style="width: 45%;"> <ul style="list-style-type: none"> • Click : Selection • Double-click : Displays the "System Monitor" dialog box. • Right-click : Executes a test or debugging. •     keys on the keyboard : Move the focus to the module to be diagnosed, and determine it with the Space key. </div> </div> <table border="1" style="width: 100%; margin-top: 10px;"> <tr> <td style="width: 5%; text-align: center;">1)</td> <td>Indicates the station connected to GX Developer (own station).</td> </tr> <tr> <td style="text-align: center;">2)</td> <td>Displays the network type and station number. "?" is displayed when a station number has not been set. When the text's background is colored, the relevant station may have been configured as a reserved station or an error invalid station. Click the Legends... button to see a description of the background colors.</td> </tr> <tr> <td style="text-align: center;">3)</td> <td>Shows module status. Open the description window of the icon with the Legends... button. If  is displayed, refer to "If  is displayed in "Network Status"" and take corrective actions. (Page 136, Section 9.3 (2))</td> </tr> <tr> <td style="text-align: center;">4)</td> <td>Displays a port to which an Ethernet cable is connected.</td> </tr> </table>	1)	Indicates the station connected to GX Developer (own station).	2)	Displays the network type and station number. "?" is displayed when a station number has not been set. When the text's background is colored, the relevant station may have been configured as a reserved station or an error invalid station. Click the Legends... button to see a description of the background colors.	3)	Shows module status. Open the description window of the icon with the Legends... button. If  is displayed, refer to "If  is displayed in "Network Status"" and take corrective actions. (Page 136, Section 9.3 (2))	4)	Displays a port to which an Ethernet cable is connected.
	1)	Indicates the station connected to GX Developer (own station).							
2)	Displays the network type and station number. "?" is displayed when a station number has not been set. When the text's background is colored, the relevant station may have been configured as a reserved station or an error invalid station. Click the Legends... button to see a description of the background colors.								
3)	Shows module status. Open the description window of the icon with the Legends... button. If  is displayed, refer to "If  is displayed in "Network Status"" and take corrective actions. (Page 136, Section 9.3 (2))								
4)	Displays a port to which an Ethernet cable is connected.								
	<p>(2) Display of network configuration</p> <p>Network configuration is displayed according to the connection status.</p> <div style="margin-top: 20px;"> <p>Actual system configuration (Star topology)</p>  <p>Network configuration window display</p>  <p>Actual system configuration (Line topology)</p>  <p>Network configuration window display</p>  </div>								

Item	Description
<p>Network Status</p> <p>Network configuration display area</p>	<div data-bbox="622 241 1053 280" style="border: 1px solid black; padding: 2px; margin-bottom: 10px;"> Actual system configuration (Star and line mixed) </div>  <div data-bbox="622 515 1053 553" style="border: 1px solid black; padding: 2px; margin-bottom: 10px;"> Network configuration window display </div>  <div data-bbox="630 846 1002 884" style="border: 1px solid black; padding: 2px; margin-bottom: 10px;"> Actual system configuration (Ring topology) </div>  <div data-bbox="630 1008 1002 1046" style="border: 1px solid black; padding: 2px;"> Network configuration window display </div> 

Item	Description
Network Status	<p data-bbox="288 775 501 831">Network configuration display area</p> <p data-bbox="523 219 1406 277">However, in the following cases, network configuration displayed in the network configuration display area differs from the actual configuration.</p> <ul data-bbox="531 286 1203 342" style="list-style-type: none"> • Two stations are connected through a switching hub. Branches are not displayed in the network configuration display area. <div data-bbox="619 376 1310 707"> <p data-bbox="624 383 991 412">Actual system configuration</p>  <p data-bbox="624 600 991 629">Network configuration window display</p>  </div> <ul data-bbox="531 730 951 786" style="list-style-type: none"> • Switching hubs are in cascade connection. Only one branch is displayed. <div data-bbox="624 819 1315 1323"> <p data-bbox="628 826 995 855">Actual system configuration</p>  <p data-bbox="628 1081 995 1111">Network configuration window display</p>  </div>

Item	Description	
	<p>Displays status of the station selected in "Network Status".</p> <div style="display: flex; justify-content: space-around;"> <div style="width: 45%;"> <p>When a station where an error has occurred is selected</p>  </div> <div style="width: 45%;"> <p>When a station with no station No. setting is selected</p>  </div> </div>	
Selected Station Communication Status Monitor	1)	<p>Displays operating status.</p> <ul style="list-style-type: none"> Station No. 1 No Error : Normal Station No. 1 Error : Error (Data link is continued.) (yellow) Station No. 1 Error : Error (Data link is stopped.) (red)
	2)	Displays a mode.
	3)	Displays a MAC address.
	4)	<p>Sets a station number for a slave station to which a station number has not been set. This button is displayed only when a slave station meeting the following conditions has been selected in "Network Status".</p> <ul style="list-style-type: none"> • The slave station supports station number setting from the master station (safety station). • A station number has not been set to the slave station.*1 <p>When a station set in "Network Configuration Setting" is added, the external device on a slave station outputs data input from the master station (safety station), simultaneously with configuration of the station number setting. Therefore, set the safety CPU module to STOP or check that outputs from the external device will not cause a problem beforehand.</p>
	5)	Click this button to check error details. Take corrective actions, following description displayed in "Error Factor" and "Troubleshooting".
	6)	Displays the LED status of a module and communication status of PORT1 and PORT2. (☞ Page 30, CHAPTER 2)
	7)	<p>Displays status of the cables connected to PORT1 and PORT2.</p> <div style="display: flex; align-items: center; margin-bottom: 5px;"> : Normal </div> <div style="display: flex; align-items: center; margin-bottom: 5px;"> : Error (cable disconnection) </div> <div style="display: flex; align-items: center;"> : Error (other than cable disconnection) </div>
	<p>*1 For how to clear the station number set for a slave station in CC-Link IE Field Network diagnostics, refer to the manuals for modules used on slave stations.</p>	
Operation Test	<p>Communication Test... button</p>	Performs a communication test. (☞ Page 75, Section 6.4.3)
	<p>Cable Test... button</p>	Performs a cable test. (☞ Page 74, Section 6.4.2)
	<p>Link Start/Stop... button</p>	Starts or stops cyclic transmission. (☞ Page 138, Section 9.4)

Item		Description
Information Confirmation/ Set	 button	Displays event history of a network. (☞ Page 140, Section 9.5)
	 button	Temporarily cancels a reservation for a slave station or reserves the slave station again. (☞ Page 142, Section 9.6)
	 button	Sets a slave station as a temporary error invalid station. (☞ Page 146, Section 9.7)
Selected Station Operation	 button	Displays the System Monitor window. (☞ Page 235, Section 12.2)
	 button	Performs remote operation (RUN, STOP, and RESET operations) to the safety CPU module. (☞ Page 151, Section 9.8)

(2) If is displayed in "Network Status"


(a) If the system does not contain a switching hub

Ring topology is configured even though the loopback function is disabled.

Take the following measures:

- When not using the loopback function
 Disconnect an Ethernet cable connected to any station on the network (either PORT1 or PORT2).
 The network topology will become a line topology and data link will start.
- When using the loopback function
 Enable the loopback function and rewrite the network parameters to the safety CPU module.
 (☞ Page 121, Section 8.6)

(b) If the system contains a switching hub

-  is displayed due to any of the following causes:

- Ring topology is configured even though the loopback function is disabled.
- Star topology is configured even though the loopback function is enabled.
- The network is incorrectly configured in ring topology.


Take the following measures:

1. Check if the loopback function setting is correctly configured. ( Page 121, Section 8.6)

If incorrect, correct the network parameters and rewrite them to the safety CPU module.

When data link starts across the entire network, this procedure is successful.


2. When the loopback function is disabled, perform the following measures.

- 1) Disconnect one Ethernet cable connected to the switching hub and power off and then on the hub.
(Repeat this operation until data link starts over the network.)
- 2) When data link starts over the network, check the network configuration by CC-Link IE Field Network diagnostics. ( Page 124, CHAPTER 9)

3. When the loopback function is enabled, take the following measures.

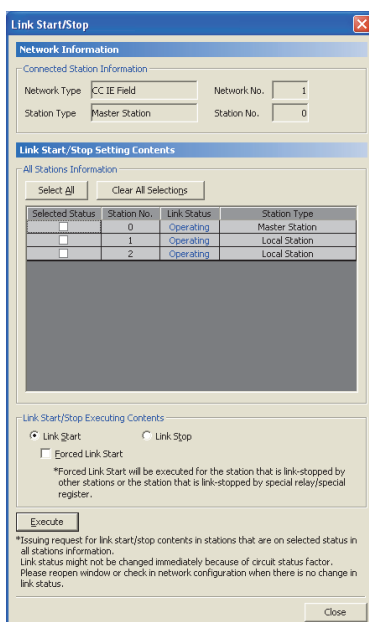
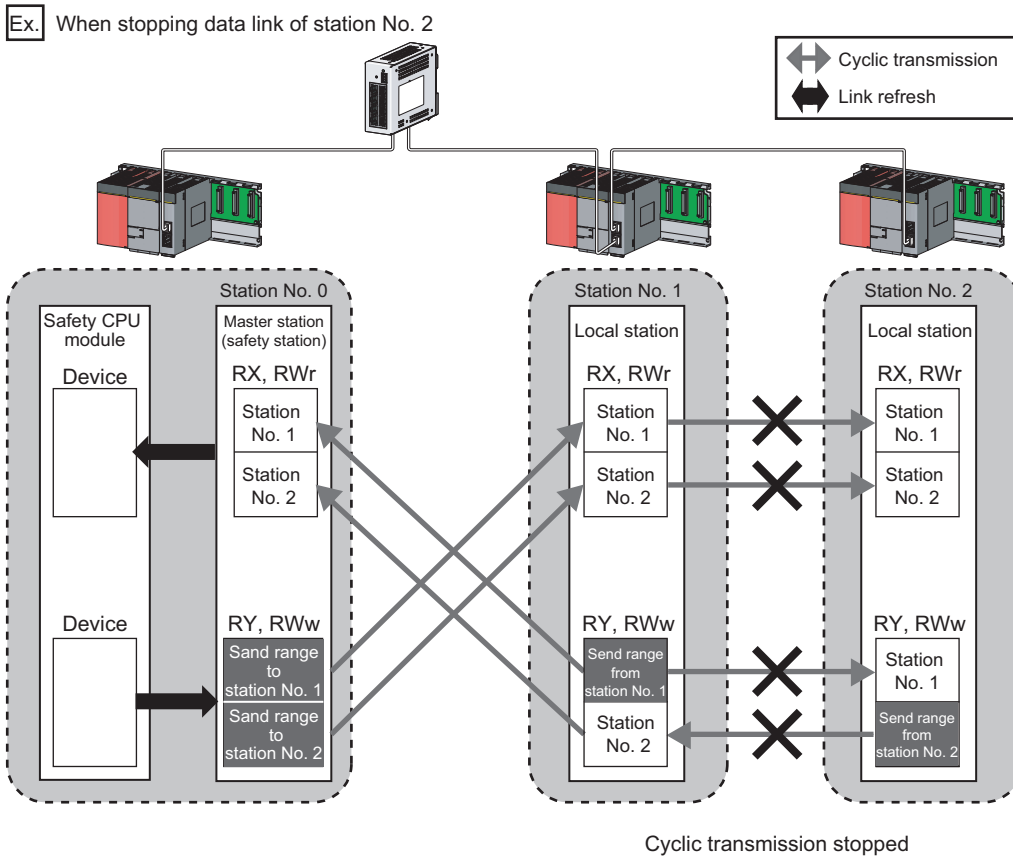
Configure the network in ring topology without a switching hub.


Connecting a switching hub will cause a problem such as data link failure.

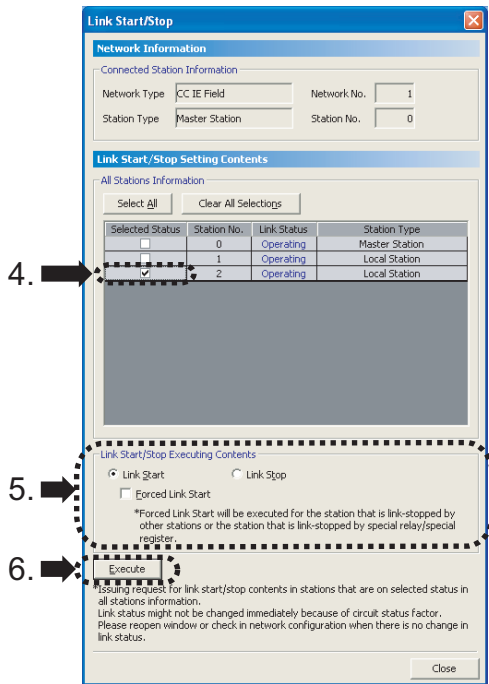
( Page 51, Section 5.1.1 (3))

9.4 Link Start/Stop

Cyclic transmission can be stopped or restarted. Receiving data from slave stations and sending data of the own station can be disabled in a case such as debugging. Also, stopped cyclic transmission can be restarted. Safety communication and transient transmission cannot be stopped by link start/stop.



1. Connect GX Developer to the safety CPU module.
2. Start CC-Link IE Field Network diagnostics from the menu.
 [Diagnostics] ⇒ [CC IE Field diagnostics]
3. Click the **Link Start/Stop...** button in the "CC IE Field Diagnostics" window.
 Or right-click a module icon in "Network Status", and click [Link Start/Stop].
 The "Link Start/Stop" window opens.



4. **Select a station for starting or stopping cyclic transmission in "Selected Status".**
When GX Developer is connected to a local station, only own station can be selected. The connected station can be checked in "Network Status".
5. **Select whether to start or stop cyclic transmission in "Link Start/Stop Executing Contents".**
Selecting "Forced Link Start" will forcibly start cyclic transmission of the station where cyclic transmission was stopped by a command from another station or by link special relay (SB) or link special register (SW).
6. **Click the button.**
The execution status of cyclic transmission can be checked in "Link Status".

Point

- **Mode**
The link start/stop is not available in loop test mode.
- **When the safety CPU module is reset or the system is powered off and on**
Even if cyclic transmission was stopped by link stop, it will be restarted by resetting the safety CPU module or powering off and on the system.
- **If the link stop is executed to an error invalid station or temporary error invalid station**
Note that the station is displayed as a station during data link in the "CC IE Field Diagnostics" window even after data link has been stopped. Check the data link status in Data link status (own station) (SB0049). (If SB0049 is on, data link is stopped.)
- **Station where link start cannot be performed**
Link start cannot be performed in the following cases.
 - Station where cyclic transmission was stopped due to an error
 - Station where link was stopped by a command from another station*1
 - Station where link was stopped by link special relay (SB) or link special register (SW)*1

*1 Selecting "Forced Link Start" will start the link.

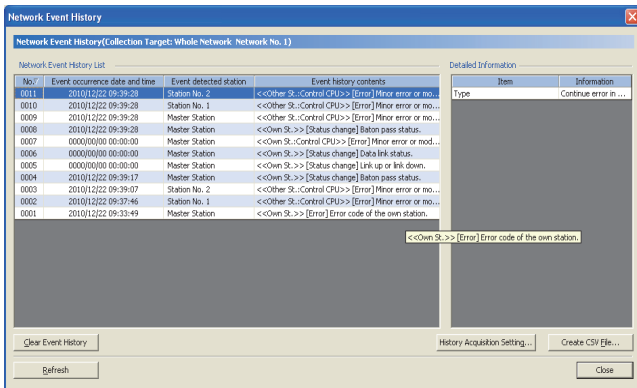
Remark

Cyclic transmission can be started and stopped with link special relay (SB) and link special register (SW). (Page 221, Section 11.3)

9.5 Network Event History

The history of events occurred in the own station and in the network can be displayed. When the master station (safety station) is the target module, event history of the entire network can be displayed. The history data are useful for troubleshooting at the start of the network system.

(1) Displaying event history



1. Connect GX Developer to the safety CPU module.
2. Start CC-Link IE Field Network diagnostics from the menu.

[Diagnostics] ⇨ [CC IE Field diagnostics]

3. Click the **Network Event History...** button in the "CC IE Field Diagnostics" window.

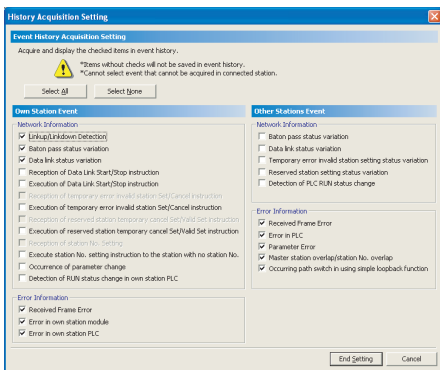
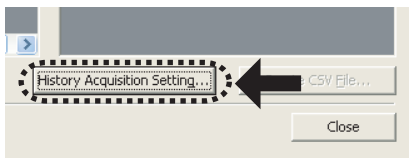
Or right-click a module icon in "Network Status", and click [Network Event History].

The "Network Event History" window opens.

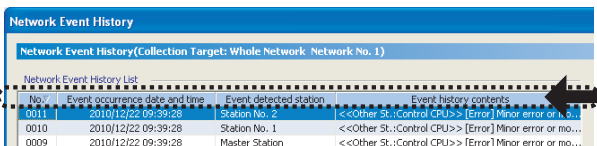
4. Click the **History Acquisition Setting...** button to select the events to be collected.

5. Select events to be collected and click the **End Setting** button.

Events that can be collected depend on the station type (master station (safety station) or local station).



6. Click each title to sort the events.

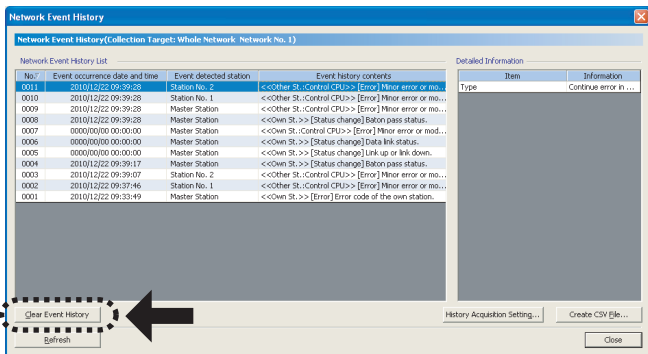


Point

- The number of displayed events
Up to 1000 events can be displayed. When the maximum is reached, the events will be erased in sequence starting from the oldest one and the latest events will be displayed.
- Incorrect display of error occurrence time and date
If an error occurs during initial processing of the safety CPU module, "0000/00/00 00:00:00" will be displayed.

(2) Clearing event history

1. Click the **Clear Event History** button in the "Network Event History" window.



(3) Storing event history data

(a) Auto-save feature

Since event history data are automatically saved on the flash ROM, they will not be lost by powering off and on or resetting the safety CPU module.

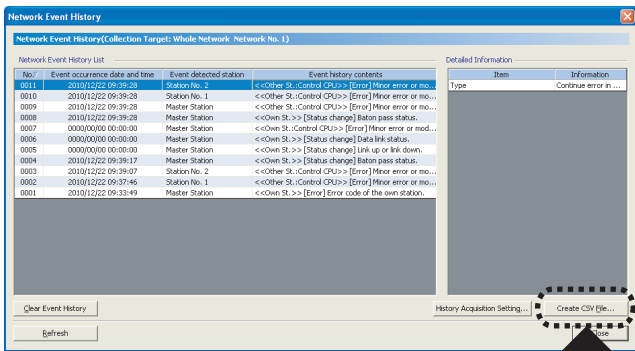
Remark

- Auto-save may fail if performed between the time that the safety CPU module is reset or is powered off and on and initial processing is completed. If failed, the event, "Invalid event history data." is displayed in "Event history contents".
- Events, generated one second before the safety CPU module is reset or is powered off, are not saved to event history.

(b) Storing event history data in a CSV file

Event history data can be saved as a CSV file.

1. Click the **Create CSV File...** button in the "Network Event History" window and save the event history data in a CSV file.

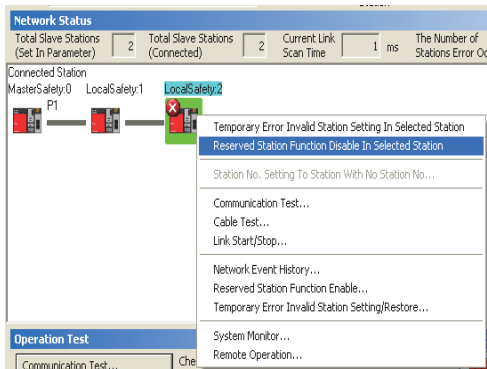


9.6 Canceling/Restoring Reserved Station Setting


A reservation for a slave station can be temporarily cancelled. Use this function to cancel the reservation of a slave station when it is connected to the network, or to reset it as a reserved station.

(1) Selecting the target module in "Network Status"

(a) Temporarily canceling a reservation



1. Connect a slave station specified as a reserved station to the network.
2. Connect GX Developer to the safety CPU module.
3. Start CC-Link IE Field Network diagnostics from the menu.

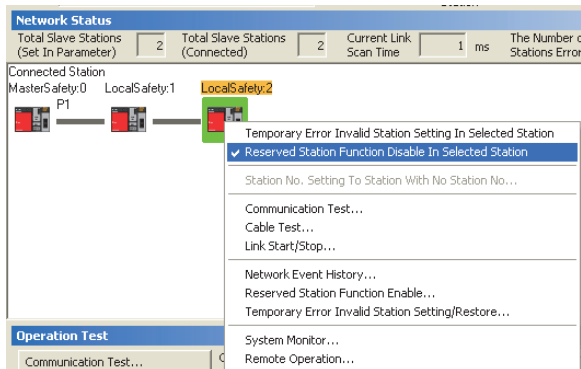
 [Diagnostics] ⇔ [CC IE Field diagnostics]

4. In "Network Status", right-click the icon of the station for which reservation is to be cancelled. Click [Reserved Station Function Disable In Selected Station].

The text background turns orange. The reservation for the slave station is temporarily cancelled.

5. Debug the slave station that has been added.

(b) Reserving the slave station again



1. In "Network Status", right-click the icon of the station to be reserved again. Click [Reserved Station Function Disable In Selected Station].

The text background turns light blue. The slave station is reserved again.

Point

- **Parameter setting**
The network parameter does not reflect the temporary cancellation of reserved station specification.
- **Resetting the master station (safety station) or powering off the system**
Temporary cancellation of reserved station setting is reset, and the slave station returns to the status set by the network parameter of the master station (safety station).
- **Disconnecting a station for which reservation has been temporarily cancelled**
If the safety CPU module on the master station (safety station) is reset, or the system is powered off, the master station (safety station) and local stations will differ in the following:
 - ERR. LED status
 - Reserved station setting status (SW00C0 to SW00C7) and Reserved station function disable status (SW0180 to SW0187)
 The difference can be corrected by the following procedure.
 1. Reconnect the disconnected station.
 2. Temporarily cancel the reservation and then reserve the station again.
- **Checking the number of a station specified as a reserved station**
The number of a station specified as a reserved station can be checked in the "Reserved Station Function Enable" window. (☞ Page 144, Section 9.6 (2))

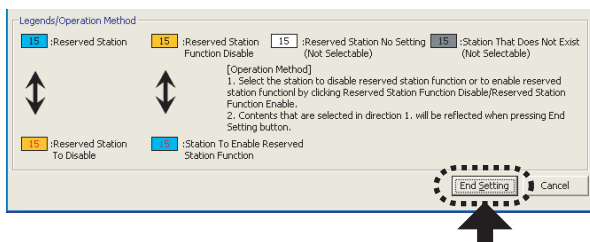
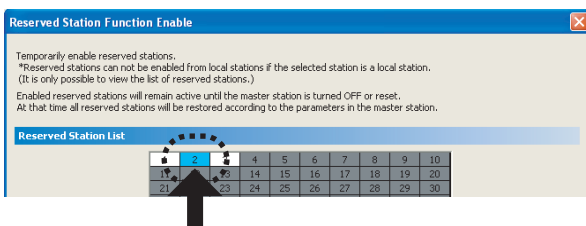
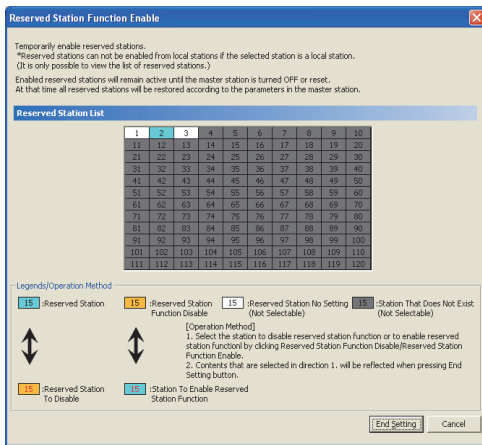
Remark

A reservation for a slave station can also be temporarily cancelled/reset using link special relay (SB) and link special register (SW) of the master station (safety station). (☞ Page 221, Section 11.3)

(2) Selecting the target module in the "Reserved Station Function Enable" window

Reservation of multiple slave stations can be temporarily cancelled through the "Reserved Station Function Enable" window all at once.

(a) Temporarily canceling a reservation



1. Connect a slave station specified as a reserved station to the network.
2. Connect GX Developer to the safety CPU module.
3. Start CC-Link IE Field Network diagnostics from the menu.

[Diagnostics] ⇒ [CC IE Field diagnostics]

4. Click the **Reserved Station Function Enable...** button in the "CC IE Field Diagnostics" window. The "Reserved Station Function Enable" window opens.

5. Click a station number for temporarily canceling the reservation in "Reserved Station List". The station number and the background turn red and orange, respectively.

Ex. : →

Only reserved stations can be selected. The background of a reserved station number is displayed in light blue.

6. Clicking the **End Setting** button will temporarily cancel the reservation.
7. Debug the slave station that has been added.

Point

- Parameter setting
The network parameter does not reflect the temporary cancellation of reserved station specification.
- Resetting the master station (safety station) or powering off the system
Temporary cancellation of reserved station setting is reset, and the slave station returns to the status set by the network parameter of the master station (safety station).
- Disconnecting a station for which reservation has been temporarily cancelled
If the safety CPU module on the master station (safety station) is reset, or the system is powered off, the master station (safety station) and local stations will differ in the following:
 - ERR. LED status
 - Reserved station setting status (SW00C0 to SW00C7) and Reserved station function disable status (SW0180 to SW0187)

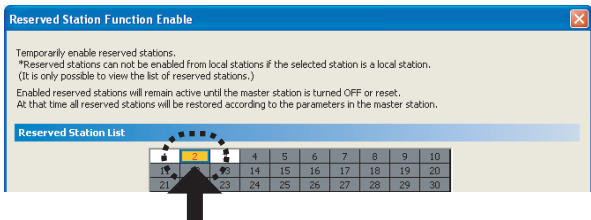
The difference can be corrected by the following procedure.

1. Reconnect the disconnected station.
2. Temporarily cancel the reservation and then reserve the station again.

Remark

A reservation for a slave station can also be temporarily cancelled/reset using link special relay (SB) and link special register (SW) of the master station (safety station). (Page 221, Section 11.3)

(b) Reserving the slave station again

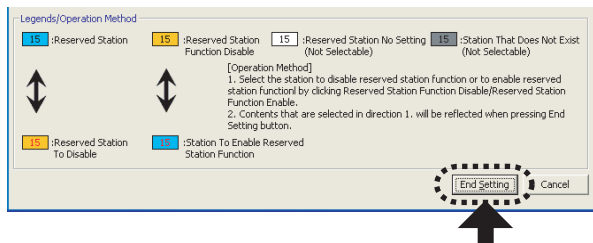


1. Open the "Reserved Station Function Enable" window in the same manner as shown in (a) Temporarily canceling a reservation.
2. In "Reserved Station List", click the number of the station to be reserved again. The station number and the background turn red and light blue, respectively.

Ex. : 2 → 2

Only stations not specified as a reserved station can be selected (displayed in orange).

3. Clicking the End Setting button will reserve the slave station again.



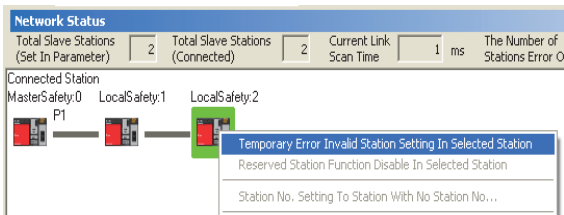
9.7 Setting/Canceling Temporary Error Invalid Station

A slave station not set as an error invalid station can be temporarily set as an error invalid station.


Use this function to temporarily prevent detection of a slave station error or to cancel temporary error invalid station setting. However, if a local station (safety station) set as a temporary error invalid station is disconnected, an error will occur in safety communication with the disconnected station.

(1) Selecting the target module in "Network Status"

(a) Temporary error invalid station setting

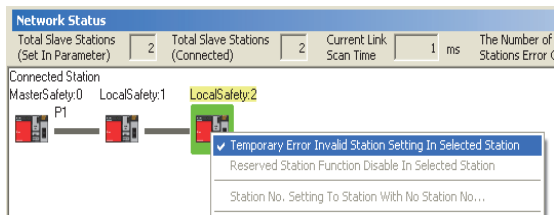


1. Connect GX Developer to the safety CPU module.
2. Start CC-Link IE Field Network diagnostics from the menu.

 [Diagnostics] ⇄ [CC IE Field diagnostics]

3. In "Network Status", right-click the icon of the station for which temporary error invalid station setting is to be configured. Click [Temporary Error Invalid Station Setting In Selected Station].
The text background turns yellow. The target station is temporarily set as an error invalid station.

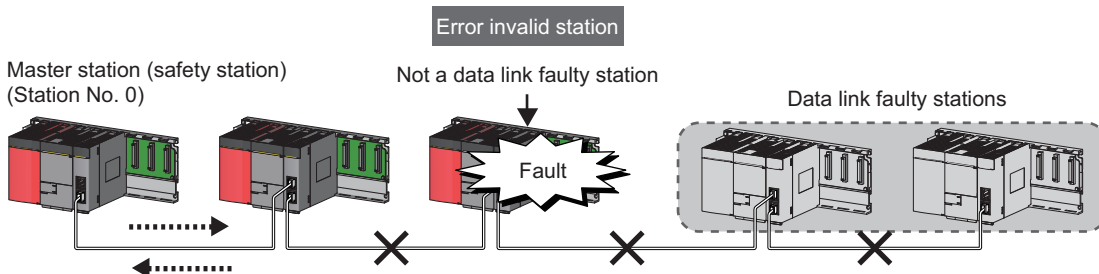
(b) Canceling temporary error invalid station setting



1. In "Network Status", right-click the icon of the station for which temporary error invalid station setting is to be cancelled. Click [Temporary Error Invalid Station Setting In Selected Station].
The text background turns white.
The temporary error invalid station setting is cancelled.

Point

- Station for which temporary error invalid station setting cannot be configured
When reservation for a slave station is temporarily cancelled, temporary error invalid station setting cannot be configured for the station.
- Using an error invalid station in line topology
In the following case, even if a data link error occurs in the station set as an error invalid station, the station is not detected as a data link faulty station. However, subsequently connected stations are detected as data link faulty stations.



- Parameter setting
The network parameter does not reflect temporary error invalid station setting.
- Resetting the master station (safety station) or powering off the system
Temporary error invalid station setting is reset, and the slave station returns to the status set by the network parameter of the master station (safety station).
- Disconnecting a station for which temporary error invalid station setting has been configured
If the safety CPU module on the master station (safety station) is reset, or the system is powered off, the master station (safety station) and local stations will differ in the following:
 - ERR. LED status
 - Temporary error invalid station setting (SW00E0 to SW00E7)
 The difference can be corrected by the following procedure.
 1. Reconnect the disconnected station.
 2. Configure temporary error invalid station setting and then cancel the setting.
- Checking error invalid station numbers
Error invalid station numbers can be checked in the "Temporary Error Invalid Station Setting/Restore" window. (☞ Page 148, Section 9.7 (2))

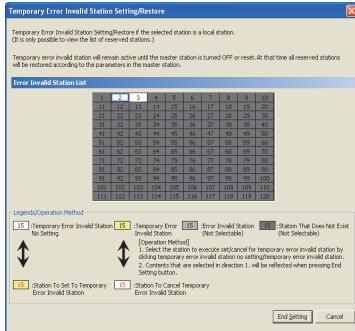
Remark

Temporary error invalid station can also be set/cancelled using link special relay (SB) and link special register (SW) of the master station (safety station). (☞ Page 221, Section 11.3)

(2) Selecting the target module in the "Temporary Error Invalid Station Setting/Restore" window

Temporary error invalid station setting can be configured to multiple slave stations through the "Temporary Error Invalid Station Setting/Restore" window all at once.

(a) Temporary error invalid station setting



1. Connect GX Developer to the safety CPU module.
2. Start CC-Link IE Field Network diagnostics from the menu.

[Diagnostics] ⇒ [CC IE Field diagnostics]

3. Click the **Temporary Error Invalid Station Setting/Restore...** button in the "CC IE Field Diagnostics" window.

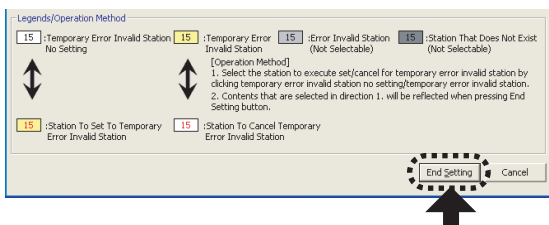
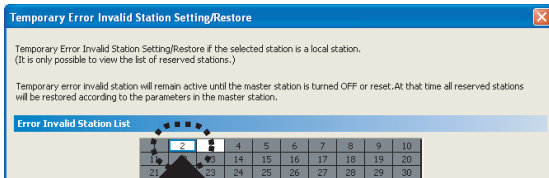
The "Temporary Error Invalid Station Setting/Restore" window opens.

4. In "Error Invalid Station List", click the number of the station for which temporary error invalid station setting is to be configured. The station number and the background turn red and yellow, respectively.

Ex. : →

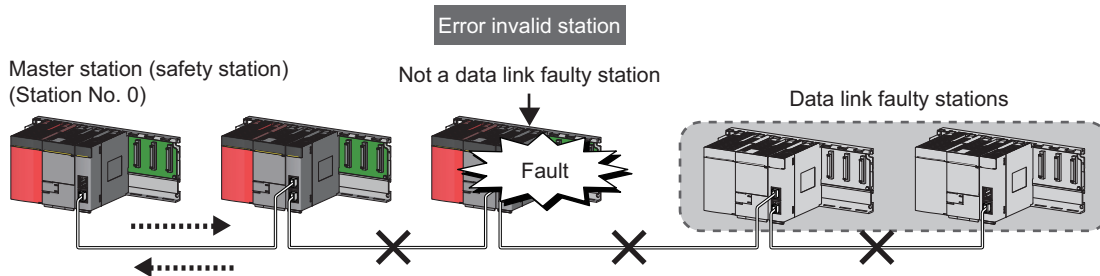
Only stations for which temporary error invalid station setting has not been configured can be selected (displayed in white).

5. Clicking the **End Setting** button will temporarily set the station as an error invalid station.



Point

- Station for which temporary error invalid station setting cannot be configured
When reservation for a slave station is temporarily cancelled, temporary error invalid station setting cannot be configured for the station.
- Using an error invalid station in line topology
In the following cases, even if a data link error occurs in a station set as an error invalid station, the station is not detected as a data link faulty station. However, stations subsequent to the disconnected station are detected as a data link faulty station.

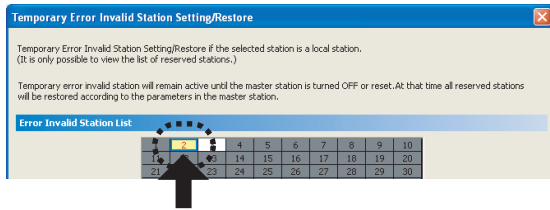


- Parameter setting
The network parameter does not reflect temporary error invalid station setting.
- Resetting the master station (safety station) or powering off the system
Temporary error invalid station setting is reset, and the slave station returns to the status set by the network parameter of the master station (safety station).
- Disconnecting a station for which temporary error invalid station setting has been configured
If the safety CPU module on the master station (safety station) is reset, or the system is powered off, the master station (safety station) and local stations will differ in the following:
 - ERR. LED status
 - Temporary error invalid station setting (SW00E0 to SW00E7)
 The difference can be corrected by the following procedure.
 1. Reconnect the disconnected station.
 2. Configure temporary error invalid station setting and then cancel the setting.

Remark

Temporary error invalid station can also be set/cancelled using link special relay (SB) and link special register (SW) of the master station (safety station). (☞ Page 221, Section 11.3)

(b) Canceling temporary error invalid station setting

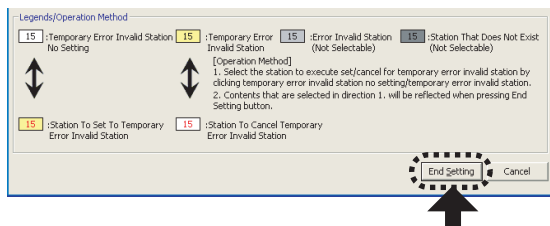


1. Open the "Temporary Error Invalid Station Setting/Restore" window in the same manner as shown in (a) Temporary error invalid station setting.
2. In "Error Invalid Station List", click the number of the station for which temporary error invalid station setting is to be cancelled. The station number and the background turn red and white, respectively.

Ex. : 2 → 2

Only temporary error invalid stations can be selected. The background of a temporary error invalid station number is displayed in yellow.

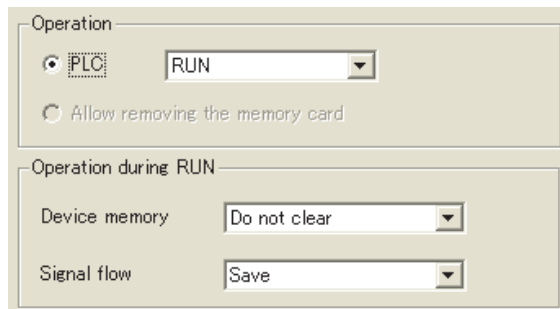
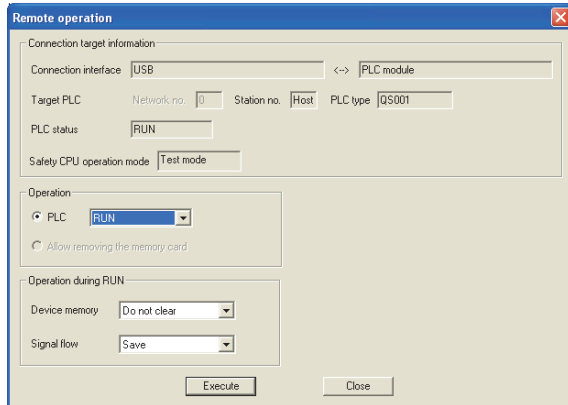
3. Clicking the End Setting button will cancel the temporary error invalid station setting.

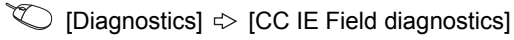


9.8 Remote Operation

Remote operations (RUN, STOP, and RESET operations) can be executed from GX Developer to the station selected in the "CC IE Field Diagnostics" window.

The displayed window varies depending on the station selected. For the operations with a module other than a master/local module selected, refer to the manual for the module used.



1. Connect GX Developer to the safety CPU module.
2. Start the CC-Link IE Field Network diagnostics from the menu.

3. Select the module where the remote operations are performed in the "CC IE Field Diagnostics" window.
4. Click the **Remote Operation...** button in the "CC IE Field Diagnostics" window.
 Or right-click a module icon in "Network Status", and click [Remote Operation].
 The "Remote operation" window will open.
5. Select a remote operation for the safety CPU module under "Operation" and "Operation during RUN".

Item	Description
RUN	Select a remote operation for the safety CPU module.
STOP	
Reset* ¹	
Device memory	Select whether to clear device memory data in the safety CPU module when remote RUN is performed.
Signal flow	Select whether to hold signal flow when remote RUN is performed.

6. Click the **Execute** button to perform the remote operation.

*1 To perform remote RESET, preset "Allow" in "Remote reset" in the "PLC system" of the PLC Parameter window.

CHAPTER 10 DEDICATED INSTRUCTIONS

Dedicated instructions facilitate programming for using intelligent function modules.
This chapter describes dedicated instructions that can be used in the master/local modules.

10.1 List of Dedicated Instructions

The following describes dedicated instructions that can be used in the master/local modules and their transmission range.

(1) Link dedicated instructions

These instructions are used for transient transmission to or from programmable controllers on other stations.
Each link dedicated instruction allows access to a station on a network other than CC-Link IE Field Network.

(a) List of dedicated instructions

Instruction	Description	Target station (other stations)	
		Target network	Target station type
<p>READ SREAD</p>	<p>Reads data from the device of another station's programmable controller. (In units of words)</p> <p>For the SREAD instruction, when data read is completed, the device on the other station is turned on. Data reading from the other station by the SREAD instruction can be checked.</p>		<ul style="list-style-type: none"> • QSCPU • QCPU • LCPU • QnACPU • Intelligent device station
<p>WRITE SWRITE</p>	<p>Writes data in the device of another station's programmable controller. (In units of words)</p> <p>For the SWRITE instruction, when data write is completed, the other station's device is turned on. It can be confirmed that data was written to the other station by the SWRITE instruction.</p>	<ul style="list-style-type: none"> • CC-Link IE Field Network • CC-Link IE Controller Network • MELSECNET/H • MELSECNET/10 • Ethernet 	<ul style="list-style-type: none"> • QCPU • LCPU • QnACPU • Intelligent device station
<p>REQ</p>	<p>Reads/write clock data from/to a programmable controller on another station.*1</p>		<ul style="list-style-type: none"> • QSCPU • QCPU • LCPU • QnACPU • Ethernet adapter module

* 1 Clock data cannot be written to a safety CPU module by the REQ instruction.


(b) Transient transmission range of the link dedicated instruction

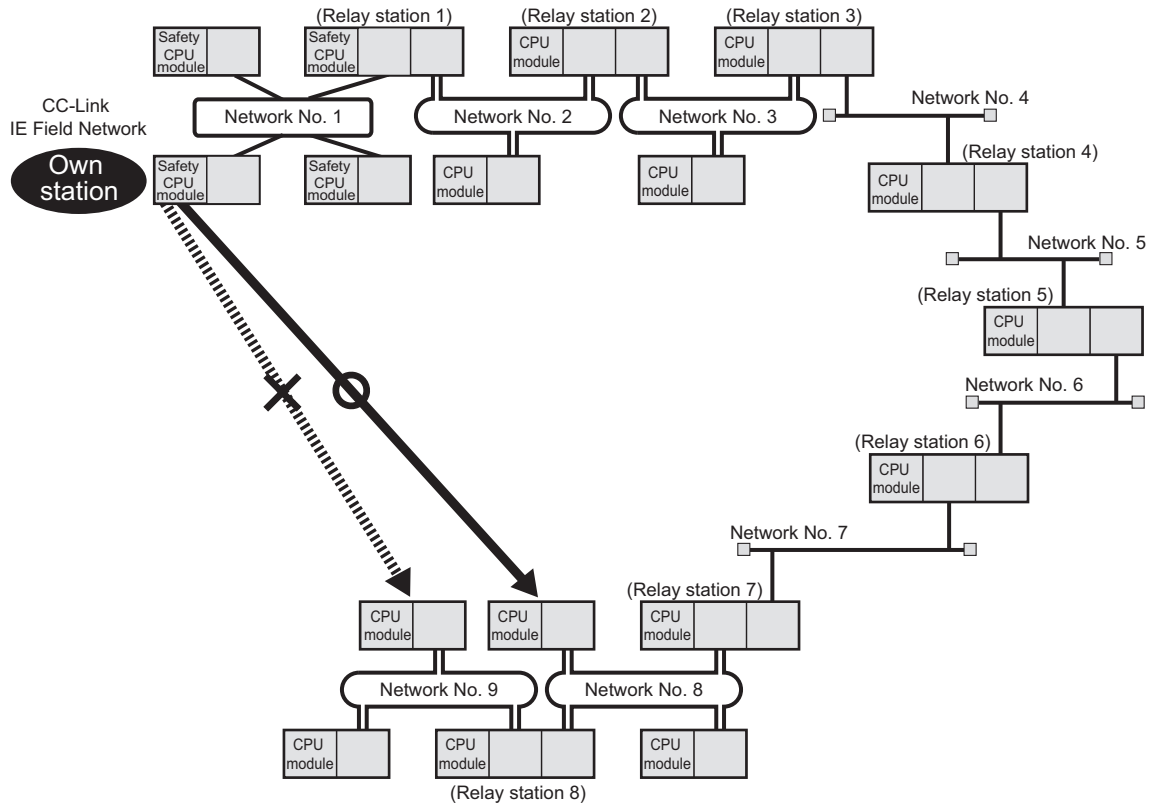
- Single network system

It is possible to communicate with all stations on the network.

- Multiple network system

Communications can be made with stations up to eight networks apart by setting routing parameters.

( Page 92, Section 7.7)



Point

- Only one master/local module can be mounted on a safety base unit. Therefore, a safety programmable controller cannot relay more than one CC-Link IE Field Network. To relay more than one CC-Link IE Field Network systems, use a standard programmable controller.
- Use the communication test in CC-Link IE Field Network diagnostics to check whether the routing of transient transmission from the own station to the destination is correctly performed or not.

10.2 Precautions for Dedicated Instructions

10.2.1 Precautions for link dedicated instructions

The following describes precautions when using link dedicated instructions.

(1) Changing data specified for dedicated instructions

Do not change each data (such as control data) until a dedicated instruction operation is completed.

(2) When a dedicated instruction cannot be completed

Check if the master/local module is in the online mode.

Under the offline mode, the instruction is not executed.

(3) Executing multiple link dedicated instructions simultaneously

When executing multiple link dedicated instructions simultaneously, make sure that the channels for the instructions are not duplicated. Link dedicated instructions with the same channel cannot be executed simultaneously. To use the same channel for multiple link dedicated instructions, execute one after completion of another. The completion status of the dedicated instruction can be checked by the completion device of the dedicated instruction.

(a) Channel

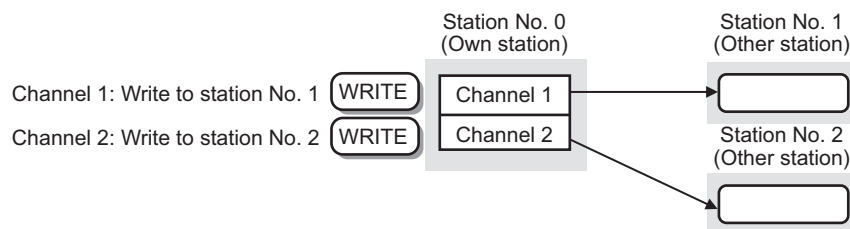
A channel is an area of a network module where data handled by a link dedicated instruction is stored. By using multiple channels, it is possible to simultaneously access from the own station to other stations or concurrently read from and write to the same network module.

(b) Number of channels

The master/local module has 2 channels that can be used for link dedicated instructions. By using 2 channels simultaneously, two instructions can be executed at the same time.

(c) Application example of channels

- Simultaneous access to other stations from the own station
Use a different own station channel for each request destination.



(4) Executing link dedicated instructions to AnUCPU stations

(a) Executing an instruction to AnUCPU stations

Never execute a master/local module dedicated instruction to AnUCPU stations.

Doing so will cause "MAIN CPU DOWN" or "WDT ERROR", and may result in an operation stop in the AnUCPU.

(b) Executing an instruction to all stations on a network that contains an AnUCPU station

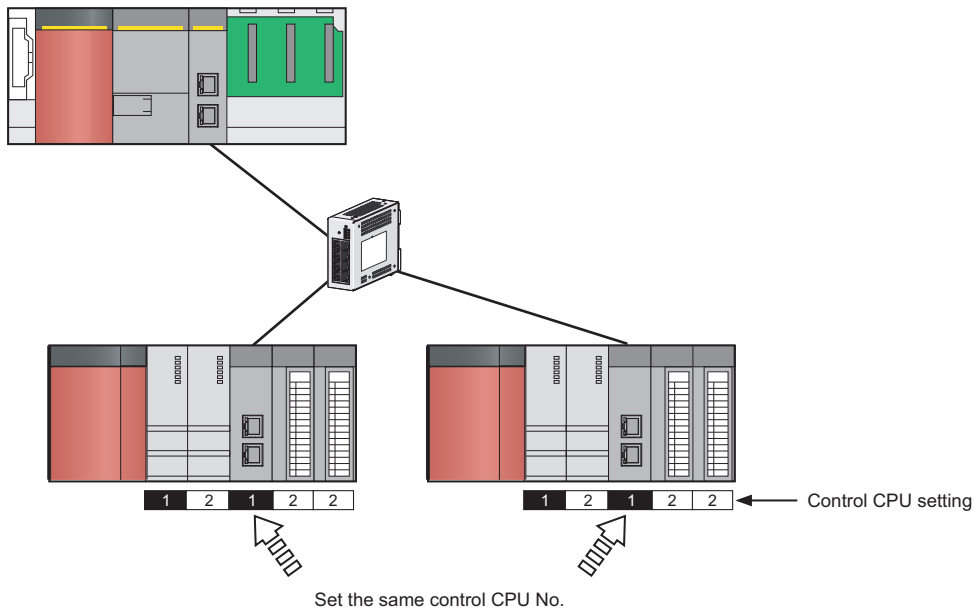
Use the group specification to exclude the AnUCPU.

(5) Executing link dedicated instructions to group-specified or all-specified stations in a multiple CPU system

The instruction can be executed to only the control CPUs of the stations. Specify 0000_H or 03FF_H for the target station's CPU type ((S1)+3) of the instruction.

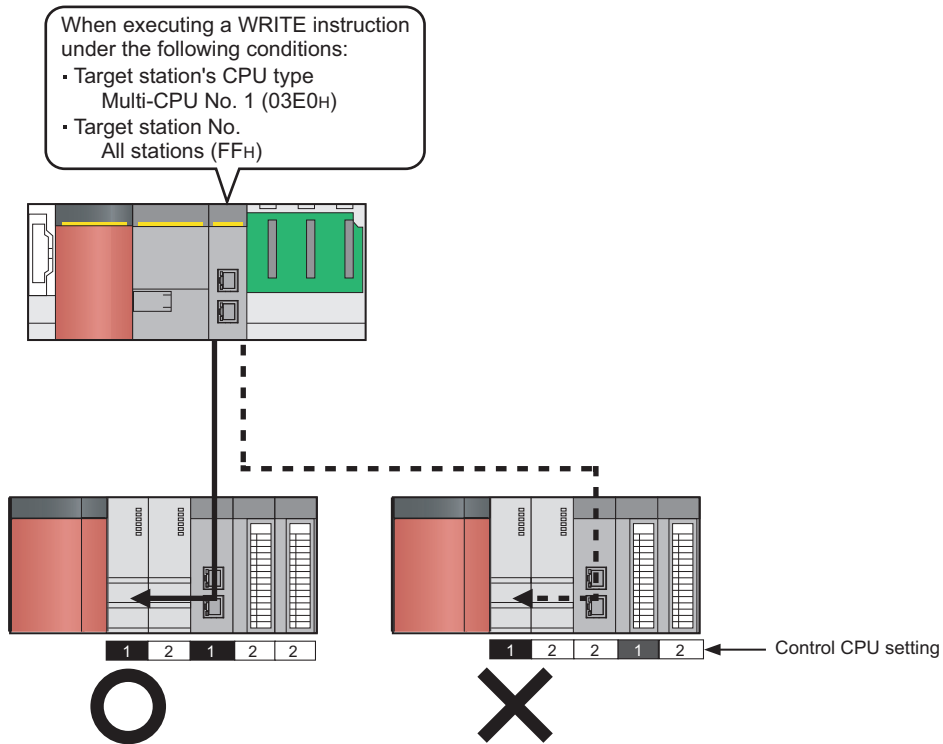
(a) Executing an instruction to all the specified stations

Configure the system so that the target stations have the same control CPU No.



(b) Specifying a CPU by the target station's CPU type

If the CPU No. set for the target station's CPU type is different than that of the control CPU, the instruction is not executed (However, an error does not occur in the request source).



Since the control CPU of the CC-Link IE Field Network module is No. 2, the instruction to multi-CPU No. 1 is not executed.

10.3 Understanding the Documentation on Dedicated Instructions

The following page illustration is for explanation purpose only, and should not be referred to as an actual documentation.

CHAPTER 10 DEDICATED INSTRUCTIONS

10.4 JP/GP.READ (Reading Data from Another Station's Programmable Controller)

Reads data from the device of another station's programmable controller. (In units of words)

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Execution condition of the instruction

Structure of the instruction in the ladder mode

○ shows the devices applicable to the instruction

Setting data	Available devices			
	Internal device (System, user)		Constant	Others
	Bit	Word	K, H	
(S1)	—	○	—	—
(S2)	○	○*	—	—
(D1)	—	○	—	—
(D2)	—	○	—	—

*1 T, C, D, W, ST, SB, and SW can be used.

Setting side

User : Device value is set by the user.
System: Device value is set by the CPU module.





Descriptions of setting data and data type

(1) Setting data		Set by	Data type
Setting data	Description		
Jn	Own station's network No. (1 to 254, 254: Network specified in Valid Module During Other Station Access)	User	16-bit binary
Un	Start I/O number of the master/slave module of the own station (00 to 3E ₁₆ ; Upper 2 digits of the I/O number expressed in 3 digits)		
(S1)	Start device of the own station where control data is stored ☞ Page 160, Section 10.4 (1)(a)	System	Device name
(S2)	Start device of the target station where data to be read is stored ☞ Page 162, Section 10.4 (1)(b)		
(D1)	Start device of the own station where read data is stored A continuous area for the read data length is required ☞ Page 162, Section 10.4 (1)(c)		
(D2)	Device of the own station, which is turned on for 1 scan upon completion of the instruction. (D2)*1 is turned on as well when the instruction fails.		

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10.4 JP/GP.READ (Reading Data from Another Station's Programmable Controller)

- Instruction execution conditions include the following types:

Any time	During on	On the rising edge	During off	On the falling edge
No symbol				

- The following types of devices are used for the dedicated instructions on CC-Link IE Field Network:


Internal device		Constant
Bit*1	Word	K, H
X, Y, M, F, V, B	T, ST, C, D, W	K□, H□

*1 For bit data, a bit-specified word device can be used. For example, is used for the bit specification of a word device. (The bit number is specified in hexadecimal.)

For example, bit 10 of D0 is specified by .

However, bit specification cannot be used for timer (T), retentive timer (ST), and counter (C).

For details on each device, refer to the following.

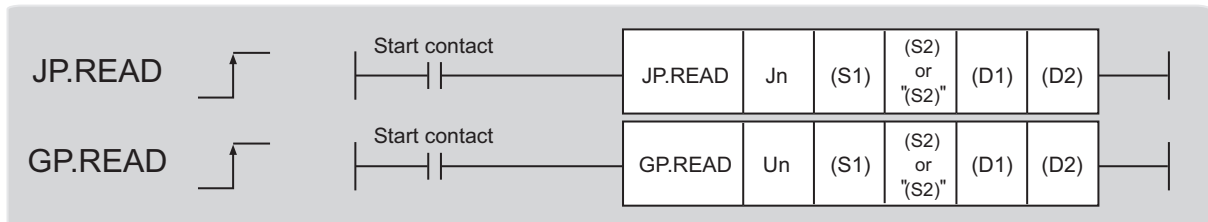
 QSCPU User's Manual (Function Explanation, Program Fundamentals)

- The following data types are available:

Data type	Description
Bit	Bit data or the start number of bit data
BIN 16-bit	16-bit binary data or the start number of word device
Device name	Device name data

10.4 JP/GP.READ (Reading Data from the Programmable Controller on Another Station)

This instruction reads data from the device of the programmable controller on another station. (In units of words)



Setting data	Available devices			Others
	Internal device (System, user)		Constant	
	Bit	Word	K, H	
(S1)	—	○	—	
(S2)	○	○*1	—	
(D1)	—	○	—	
(D2)	○		—	

*1 T, C, D, W, ST, SD, and SW can be used.

(1) Setting data

Setting data	Description	Set by	Data type
Jn	Own station's network No. (1 to 239, 254) 254: Network specified in Valid Module During Other Station Access	User	16-bit binary
Un	Start I/O number of the master/local module of the own station (00 to 3E _H ; Upper 2 digits of the I/O number expressed in 3 digits)		
(S1)	Start device of the own station where control data is stored (☞ Page 161, Section 10.4 (1) (a))	System	Device name
(S2)	Start device of the target station where data to be read is stored (☞ Page 163, Section 10.4 (1) (b))		
(D1)	Start device of the own station where read data is stored A continuous area for the read data length is required (☞ Page 163, Section 10.4 (1) (c))		
(D2)	Device of the own station, which is turned on for 1 scan upon completion of the instruction. (D2)+1 is turned on as well when the instruction fails.		Bit

(a) Control data

Device	Item	Setting data	Setting range	Set by																						
(S1)+0	Abnormal end type	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">b15</td> <td style="text-align: center;">to</td> <td style="text-align: center;">b7</td> <td style="text-align: center;">to</td> <td style="text-align: center;">b0</td> </tr> <tr> <td style="text-align: center;">0</td> <td></td> <td style="text-align: center;">①</td> <td style="text-align: center;">0</td> <td style="text-align: center;">1</td> </tr> </table> <p>1) Abnormal end type (bit 7) Specify the set status of data in case of abnormal end. 0: After (S1)+11, no data is set for abnormal end. 1: After (S1)+11, data is set for abnormal end.</p>	b15	to	b7	to	b0	0		①	0	1	0001 _H 0081 _H	User												
b15	to	b7	to	b0																						
0		①	0	1																						
(S1)+1	Completion status	The status of the instruction completion is stored. 0: Normal Other than 0: Error (☞ Page 246, Section 12.5)	—	System																						
(S1)+2	Channels used by own station	Specify the channels to be used by the own station. (☞ Page 155, Section 10.2.1)	1 to 2	User																						
(S1)+3	Target station's CPU type	Specify the CPU module on the station to be accessed.	0000 _H 03D0 _H to 03D3 _H 03E0 _H to 03E3 _H 03FF _H	User																						
		<table border="1" style="width: 100%;"> <thead> <tr> <th style="width: 20%;">Set value</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0000_H</td> <td>Control CPU (The access destination is the same as that of when 03FF_H is selected.)</td> </tr> <tr> <td>03D0_H</td> <td>Control system CPU (redundant CPU only)</td> </tr> <tr> <td>03D1_H</td> <td>Standby system CPU (redundant CPU only)</td> </tr> <tr> <td>03D2_H</td> <td>System A CPU (redundant CPU only)</td> </tr> <tr> <td>03D3_H</td> <td>System B CPU (redundant CPU only)</td> </tr> <tr> <td>03E0_H</td> <td>• Control CPU (single CPU system) • CPU No.1 (multiple CPU system)</td> </tr> <tr> <td>03E1_H</td> <td>CPU No.2 (multiple CPU system)</td> </tr> <tr> <td>03E2_H</td> <td>CPU No.3 (multiple CPU system)</td> </tr> <tr> <td>03E3_H</td> <td>CPU No.4 (multiple CPU system)</td> </tr> <tr> <td>03FF_H</td> <td>Control CPU</td> </tr> </tbody> </table>			Set value	Description	0000 _H	Control CPU (The access destination is the same as that of when 03FF _H is selected.)	03D0 _H	Control system CPU (redundant CPU only)	03D1 _H	Standby system CPU (redundant CPU only)	03D2 _H	System A CPU (redundant CPU only)	03D3 _H	System B CPU (redundant CPU only)	03E0 _H	• Control CPU (single CPU system) • CPU No.1 (multiple CPU system)	03E1 _H	CPU No.2 (multiple CPU system)	03E2 _H	CPU No.3 (multiple CPU system)	03E3 _H	CPU No.4 (multiple CPU system)	03FF _H	Control CPU
		Set value			Description																					
		0000 _H			Control CPU (The access destination is the same as that of when 03FF _H is selected.)																					
		03D0 _H			Control system CPU (redundant CPU only)																					
		03D1 _H			Standby system CPU (redundant CPU only)																					
		03D2 _H			System A CPU (redundant CPU only)																					
		03D3 _H			System B CPU (redundant CPU only)																					
		03E0 _H			• Control CPU (single CPU system) • CPU No.1 (multiple CPU system)																					
		03E1 _H			CPU No.2 (multiple CPU system)																					
		03E2 _H			CPU No.3 (multiple CPU system)																					
		03E3 _H			CPU No.4 (multiple CPU system)																					
03FF _H	Control CPU																									
When the instruction is executed by specifying a control system CPU (03D0 _H) or standby system CPU (03D1 _H), if system switching occurs in the target station, the instruction may fail (CPU module error code: 4244 _H , 4248 _H). If the above error occurs and the instruction fails, execute the instruction again.																										
(S1)+4	Target station's network No.	Specify the network No. of the target station. 1 to 239: Network No. 254: Specify this when 254 is set for Jn.	1 to 239 254	User																						
(S1)+5	Target station number	Specify the target station number. Master station: 125 (7D _H) Local station, intelligent device station: 1 to 120	125 (7D _H) 1 to 120	User																						
(S1)+6	—	Unused	0	User																						
(S1)+7	Number of resends	During instruction execution For the case where the instruction is not completed within the monitoring time specified by (S1)+8, specify the number of times the instruction is resent.	0 to 15	User																						
		When the instruction is completed The number of resends (result) is stored.	—	System																						
(S1)+8	Arrival monitoring time	Specify the monitoring time until instruction completion. If the instruction is not completed within the specified time, the instruction is resent for the number of resends specified by (S1)+7. 0: 10 seconds 1 to 32767: 1 to 32767 seconds	0 to 32767	User																						

Device	Item	Setting data	Setting range	Set by																									
(S1)+9	Read data length	Specify the number of words to be read.	1 to 960 From QnACPU: 1 to 480 words	User																									
(S1)+10	—	Unused	0	User																									
(S1)+11	Clock set flag	The valid or invalid status of data after (S1)+12 is stored. (Data is stored when "1: Data at the time of abnormal end is set in the area starting from (S1)+11." is set in the abnormal end type in (S1)+0.) The stored data is not cleared even if the dedicated instruction is normally completed. 0: Invalid 1: Valid	—	System																									
(S1)+12 to (S1)+15	Clock data of abnormal end	Clock data of abnormal end are stored in BCD format. (Data is stored when "1: Data at the time of abnormal end is set in the area starting from (S1)+11." is set in the abnormal end type in (S1)+0.) The stored data is not cleared even if the dedicated instruction is normally completed. <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">b15</td> <td style="text-align: center;">~</td> <td style="text-align: center;">b8 b7</td> <td style="text-align: center;">~</td> <td style="text-align: center;">b0</td> </tr> <tr> <td>(S1)+12</td> <td>Month (01H to 12H)</td> <td>Year (00H to 99H), last 2 digits</td> <td></td> <td></td> </tr> <tr> <td>(S1)+13</td> <td>Hour (00H to 23H)</td> <td>Day (01H to 31H)</td> <td></td> <td></td> </tr> <tr> <td>(S1)+14</td> <td>Second (00H to 59H)</td> <td>Minute (00H to 59H)</td> <td></td> <td></td> </tr> <tr> <td>(S1)+15</td> <td>Year (00H to 99H), first 2 digits</td> <td>Day of week (00H to 06H)</td> <td></td> <td></td> </tr> </table> <p style="text-align: center;">00H (Sun.) to 06H (Sat.)</p> When the target station is QnACPU, 00 _H is stored in the year (the first two digits of the year).	b15	~	b8 b7	~	b0	(S1)+12	Month (01H to 12H)	Year (00H to 99H), last 2 digits			(S1)+13	Hour (00H to 23H)	Day (01H to 31H)			(S1)+14	Second (00H to 59H)	Minute (00H to 59H)			(S1)+15	Year (00H to 99H), first 2 digits	Day of week (00H to 06H)			—	System
b15	~	b8 b7	~	b0																									
(S1)+12	Month (01H to 12H)	Year (00H to 99H), last 2 digits																											
(S1)+13	Hour (00H to 23H)	Day (01H to 31H)																											
(S1)+14	Second (00H to 59H)	Minute (00H to 59H)																											
(S1)+15	Year (00H to 99H), first 2 digits	Day of week (00H to 06H)																											
(S1)+16	Error-detected station's network No.*1	The network No. of the station in which an error was detected is stored. (Data is stored when "1: Data at the time of abnormal end is set in the area starting from (S1)+11." is set in the abnormal end type in (S1)+0.) The stored data is not cleared even if the dedicated instruction is normally completed. 1 to 239: Network No.	—	System																									
(S1)+17	Error-detected station number*1	The station number of the station in which an error was detected is stored. (Data is stored when "1: Data at the time of abnormal end is set in the area starting from (S1)+11." is set in the abnormal end type in (S1)+0.) The stored data is not cleared even if the dedicated instruction is normally completed. Master station: 125 (7D _H) Local station, intelligent device station: 1 to 120	—	System																									

*1 If Completion status ((S1)+1) is "Channel in use (dedicated instruction) (error codes: D25A_H and D25B_H)", data is not stored.

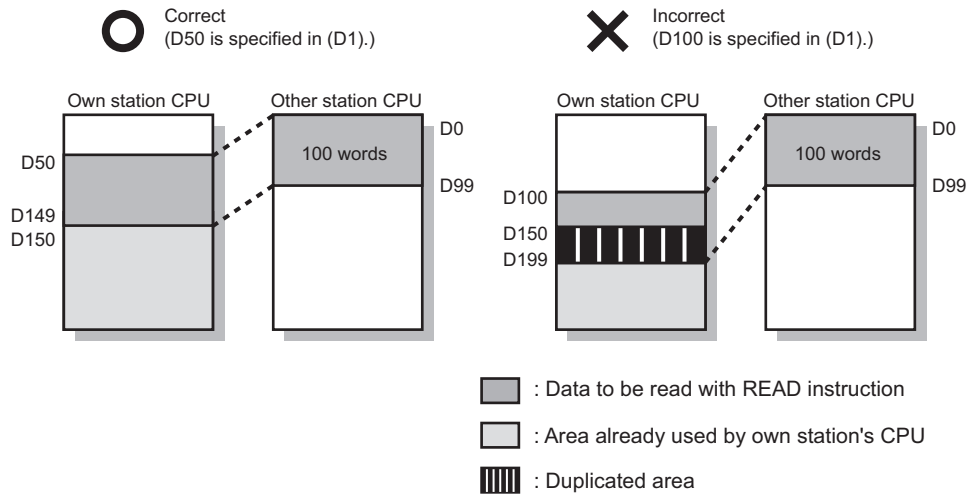
(b) Start device of the target station where data to be read is stored

If the device setting in PLC Parameter is different between the own and target stations, use "(S2)" (with double-quotation marks) to specify.

(c) Start device of the own station where read data is stored

Specify the own station's start device (D1), within the available range so that the read data can be stored.

Ex. When the area addressed D150 or higher of the own station CPU is already used



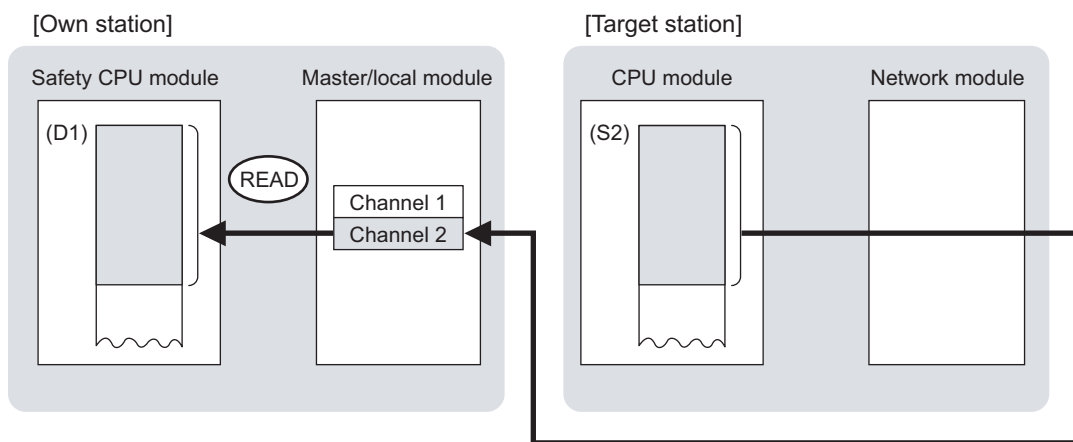
(2) Function

(a) READ instruction overview

The instruction reads data by the specified number of words (control data ((S1)+9)) from the target station start device (S2) into the own station word devices (after (D1)).

Specify the target stations in control data ((S1)+4 and (S1)+5).

When the reading from devices of the target station is completed, the completion device (D2) turns on.



(b) Target stations which can be specified

For details on target stations which can be specified, refer to the following.

Page 152, Section 10.1 (1))

10.4 JP/GP READ (Reading Data from the Programmable Controller on Another Station)

(c) Checking the execution status of the READ instruction

The execution status (completion or error) of the READ instruction can be checked using the following device specified for the setting data.

- Completion device (D2)

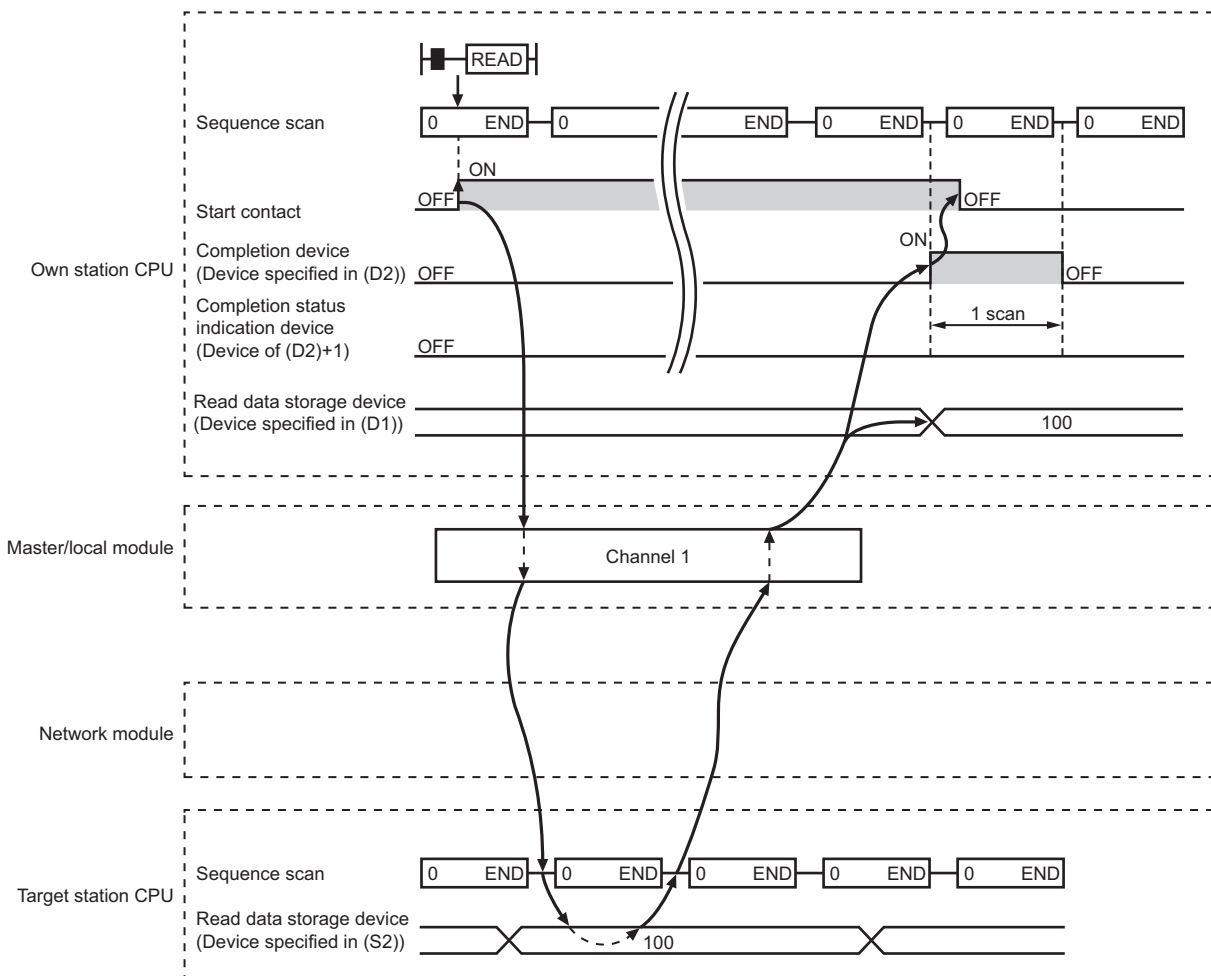
It is turned on in the END processing of the scan after completion of the READ instruction, and is turned off in the next END processing.

- Completion status indication device ((D2)+1)

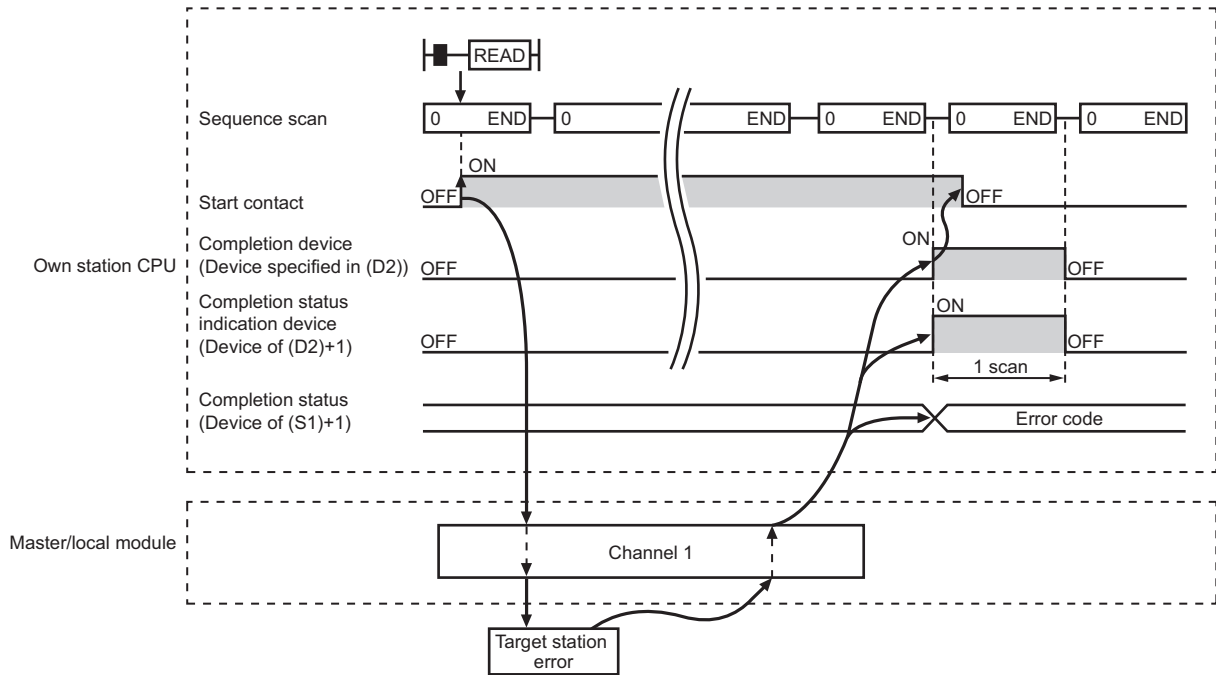
It is turned on in the END processing of the scan after completion of the READ instruction, and is turned off in the next END processing only if the READ instruction fails.

(d) READ instruction execution timing

- When completed



- When failed



(3) Error

When the dedicated instruction fails, error details can be checked by any of the following methods:

(a) In GX Developer

Error details can be checked using CC-Link IE Field Network diagnostics. (☞ Page 124, CHAPTER 9)

(b) By devices

Completion status indication device ((D2)+1) is turned on and an error code is stored in Completion status ((S1)+1) of the control data.

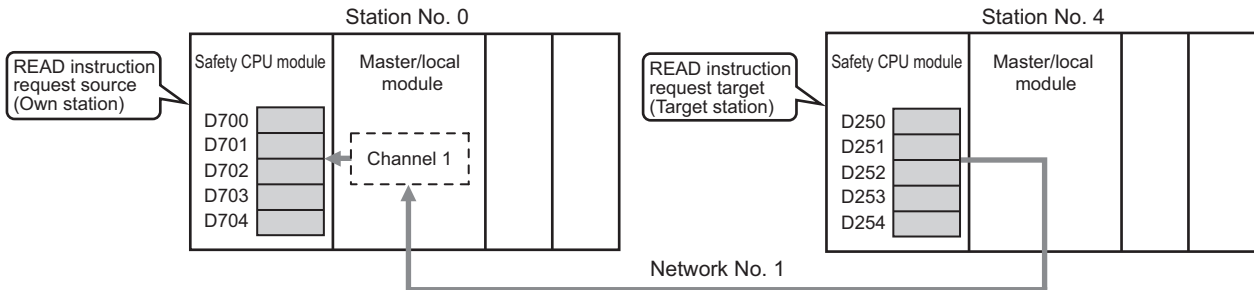
According to the error code, check the error details and take a corrective action. (☞ Page 246, Section 12.5)

10.4 J/P/GP.READ (Reading Data from the Programmable Controller on Another Station)

(4) Program example

The following program is for reading data of D250 to D254 of station No. 4 (target station) into D700 to D704 of station No. 0 (own station) when M101 is turned on.

(a) System configuration example



(b) Devices used in the program example

- Link special relay (SB), link special register (SW)

Device	Description	Device	Description
SB0047	Baton pass status (own station)	SW00A0.3	Baton pass status (each station) of station No. 4

- Devices used by the user

Device	Description	Device	Description
M100	Control data setting command	D200 to D217	Control data
M101	Start contact	D700 to D704	Read data storage device (station No. 0)
M105	Completion device		—
M106	Completion status indication device		

(c) READ instruction setting

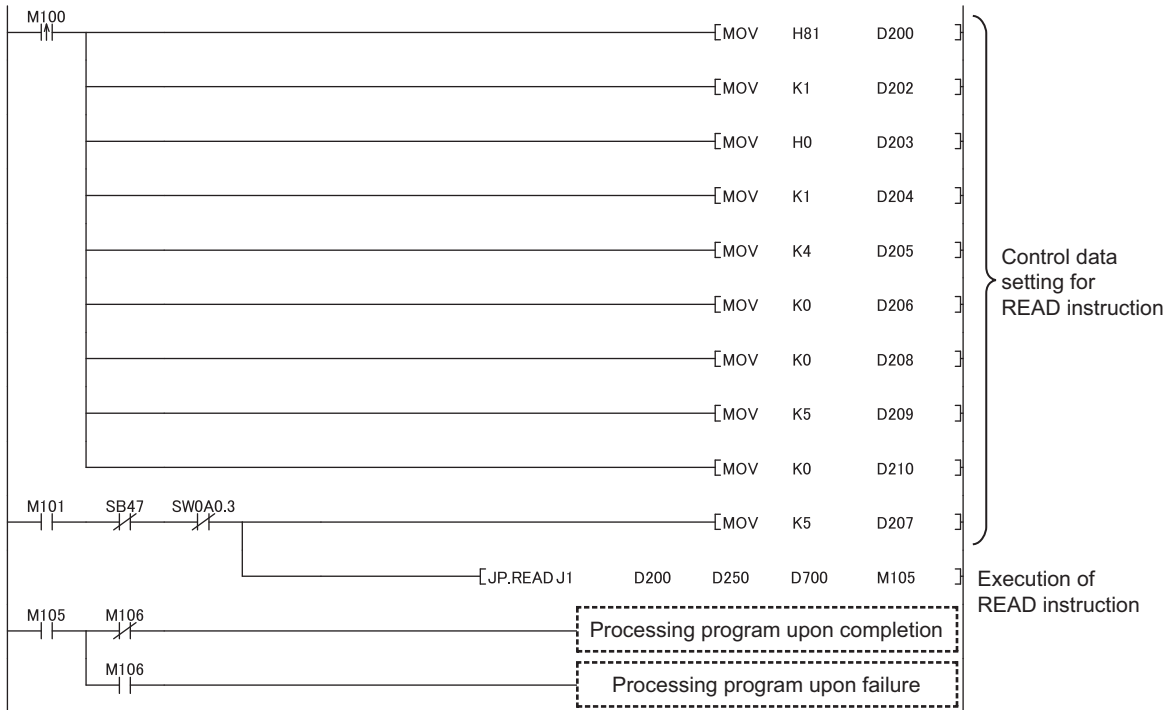
The setting of READ instruction control data is as follows.

Device	Item	Set value
(S1)+0	D200	Abnormal end type 0081 _H (Sets data for abnormal end)
(S1)+1	D201	Completion status (Setting is not required because it is set by the system)
(S1)+2	D202	Channels used by own station 1
(S1)+3	D203	Target station's CPU type 0000 _H (control CPU)
(S1)+4	D204	Target station's network No. 1
(S1)+5	D205	Target station number 4
(S1)+6	D206	(Unused) 0
(S1)+7	D207	Number of resends 5 times
(S1)+8	D208	Arrival monitoring time 0 (10 seconds)
(S1)+9	D209	Read data length 5 words
(S1)+10	D210	(Unused) 0
(S1)+11	D211	Clock set flag
(S1)+12 to (S1)+15	D212 to D215	Clock data of abnormal end
(S1)+16	D216	Error-detected station's network No.
(S1)+17	D217	Error-detected station number

(Setting is not required because it is set by the system)

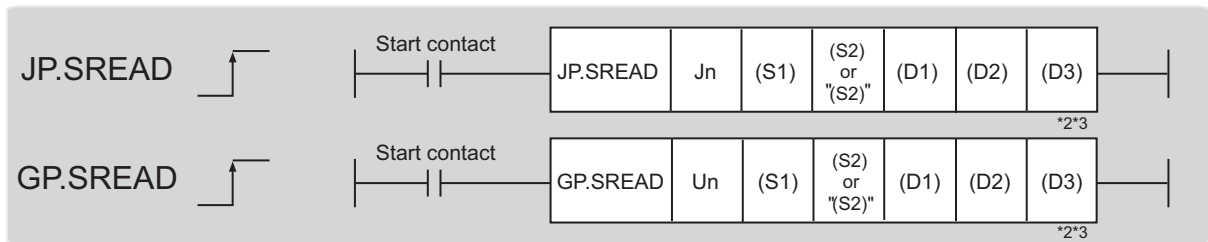
(d) Program example

The following program is written to the safety CPU module of station No. 0.



10.5 JP/GP.SREAD (Reading Data from the Programmable Controller on Another Station)

This instruction reads data from the device of the programmable controller on another station. (In units of words)
 With the SREAD instruction, when data read is completed, the device of the other station is turned on. Data reading with the SREAD instruction can be confirmed by this.



Setting data	Available devices			Others
	Internal device (System, user)		Constant	
	Bit	Word	K, H	
(S1)	—	○	—	
(S2)	—	○*1	—	
(D1)	—	○	—	
(D2)		○	—	
(D3)		○	—	

*1 T, C, D, W, ST, SD, and SW can be used.

*2 For the SREAD instruction, the read notification device (D3) can be omitted in the programming. However, the operation is the same as the READ instruction.

The SREAD instruction can operate differently depending on whether read notification device (D3) is omitted or not.

*3 When the target station is a Basic model QCPU or a safety CPU module, the data set in the read notification device (D3) is ignored. (Operation is the same as the READ instruction.)

(1) Setting data

Setting data	Description	Set by	Data type
Jn	Own station's network No. (1 to 239, 254) 254: Network specified in Valid Module During Other Station Access	User	16-bit binary
Un	Start I/O number of the master/local module of the own station (00 to 3E _H : Upper 2 digits of the I/O number expressed in 3 digits)		
(S1)	Start device of the own station where control data is stored (☞ Page 169, Section 10.5 (1) (a))		
(S2)	Start device of the target station where data to be read is stored (☞ Page 169, Section 10.5 (1) (b))	System	Device name
(D1)	Start device of the own station where read data is stored A continuous area for the read data length is required. (☞ Page 169, Section 10.5 (1) (c))		
(D2)	Device of the own station, which is turned on for 1 scan upon completion of the instruction. (D2)+1 is turned on as well when the instruction fails.		
(D3)	Device of the target station, which is turned on for 1 scan upon completion of the instruction. Data reading from another station can be confirmed.		Bit

(a) Control data

The SREAD instruction control data is the same as that of the READ instruction
(☞ Page 160, Section 10.4)

(b) Start device of the target station where data to be read is stored

The target station's start device where data to be read by the SREAD instruction is stored is the same as that of the READ instruction. (☞ Page 160, Section 10.4)

(c) Start device of the own station where read data is stored

The start device of the own station where data read by the SREAD instruction is stored is the same as that of the READ instruction. (☞ Page 160, Section 10.4)

(2) Function

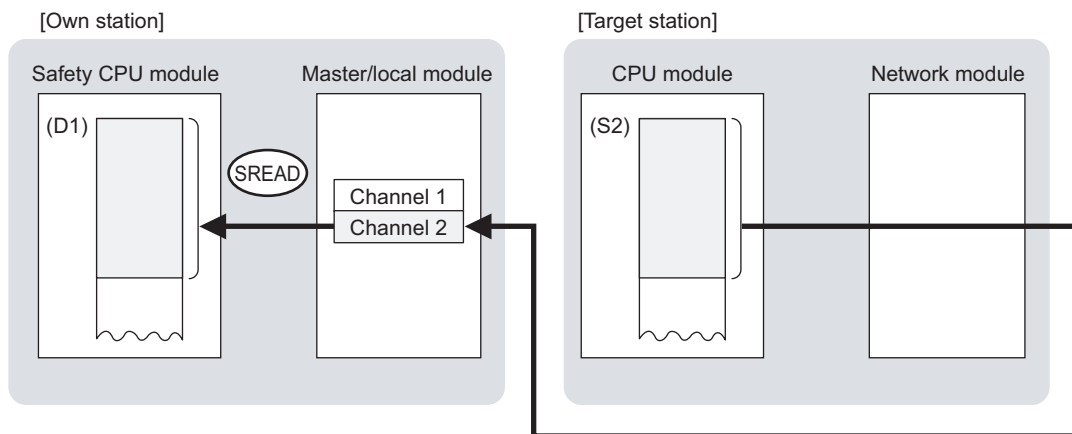
(a) SREAD instruction overview

The instruction reads data by the specified number of words (control data $((S1)+9)$) from the target station start device (S2) into the own station word devices (after (D1)).

Specify the target stations in control data $((S1)+4$ and $((S1)+5)$.

When the reading of the data specified in (S2) is completed, the following devices are turned on.

- Own station: Completion device (D2)
- Target station: Read notification device (D3)



(b) Target stations which can be specified

For details on target stations which can be specified, refer to the following.

☞ Page 152, Section 10.1 (1)

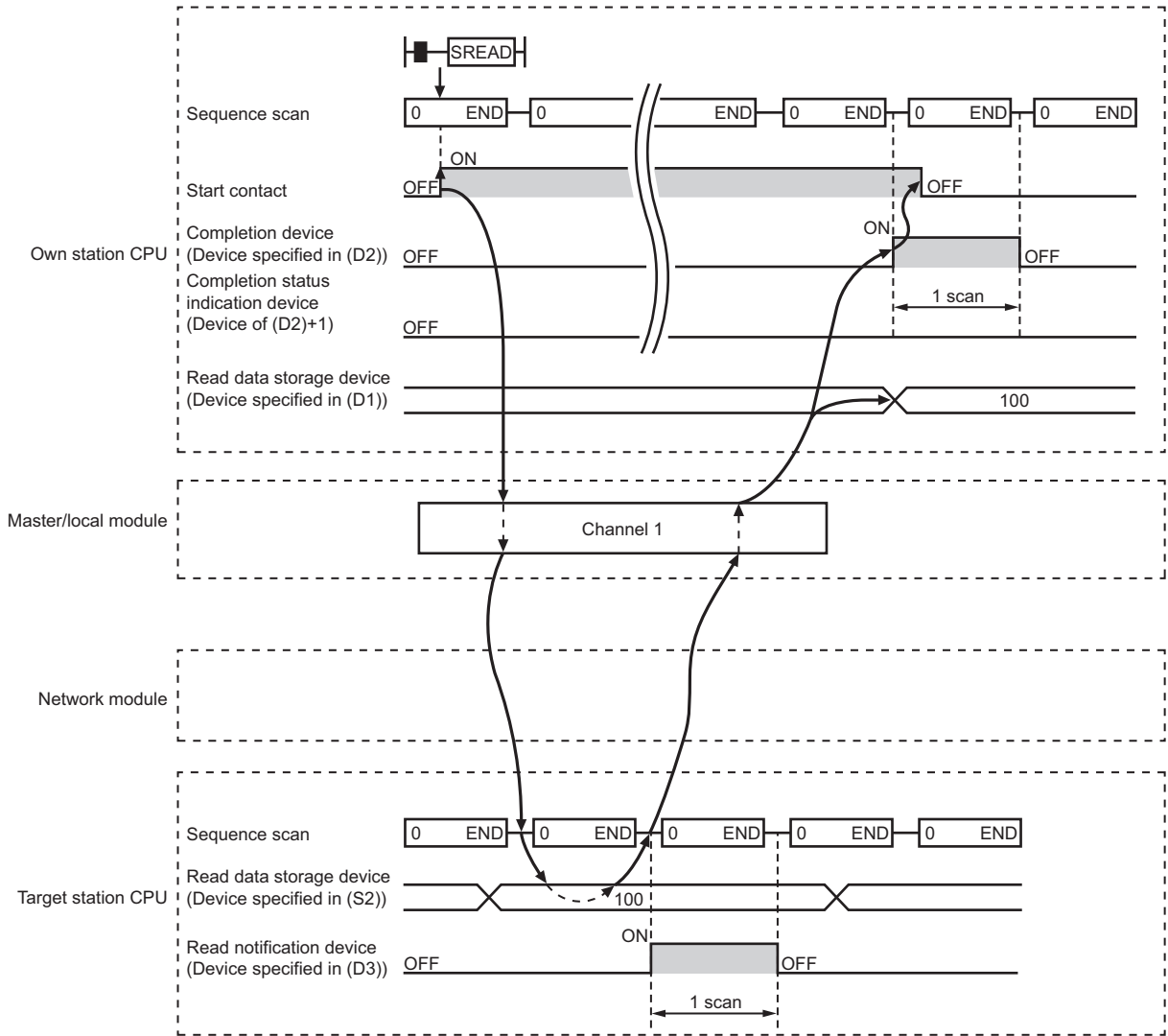
(c) Checking the execution status of the SREAD instruction

The execution status (completion or error) of the SREAD instruction can be checked using the following device specified for the setting data.

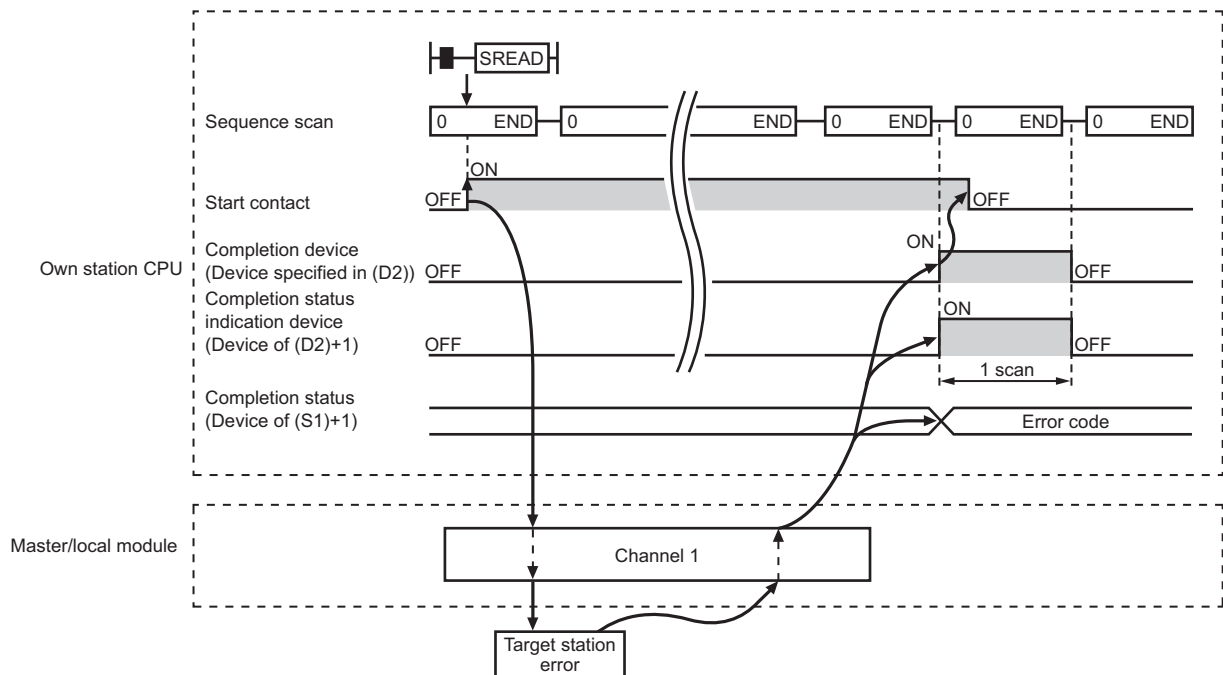
- Completion device (D2)
It is turned on in the END processing of the scan after completion of the SREAD instruction, and is turned off in the next END processing.
- Completion status indication device $((D2)+1)$
It is turned on in the END processing of the scan after completion of the SREAD instruction, and is turned off in the next END processing only if the SREAD instruction fails.

(d) SREAD instruction execution timing

- When completed



- When failed



(3) Error

When the dedicated instruction fails, error details can be checked by any of the following methods:

(a) In GX Developer

Error details can be checked using CC-Link IE Field Network diagnostics.

(👉 Page 124, CHAPTER 9)

(b) By devices

Completion status indication device ((D2)+1) is turned on and an error code is stored in Completion status ((S1)+1) of the control data.


According to the error code, check the error details and take a corrective action.

(👉 Page 246, Section 12.5)

(4) Program example

Just like the READ instruction program example, this program example is for reading data of D250 to D254 of station No. 4 (target station) into D700 to D704 of station No. 0 (own station) when M101 is turned on. Furthermore, when the read notification device (D3) of the target station is turned on, Y60 of the target station is turned on.

Remark

Compared to the READ instruction program example, the SREAD instruction program example has a different section where the read notification device (D3) is specified at the end of the arguments. ( Page 166, Section 10.4 (4))

(a) System configuration example

Same as the READ instruction program example.

(b) Devices used in the program example

- Link special relay (SB), link special register (SW)
Same as the READ instruction program example.

- Devices used by users

The devices used in the SREAD instruction request source (station No. 0) are the same as those in the READ instruction program example.

Devices used in the SREAD instruction request destination (station No. 4)

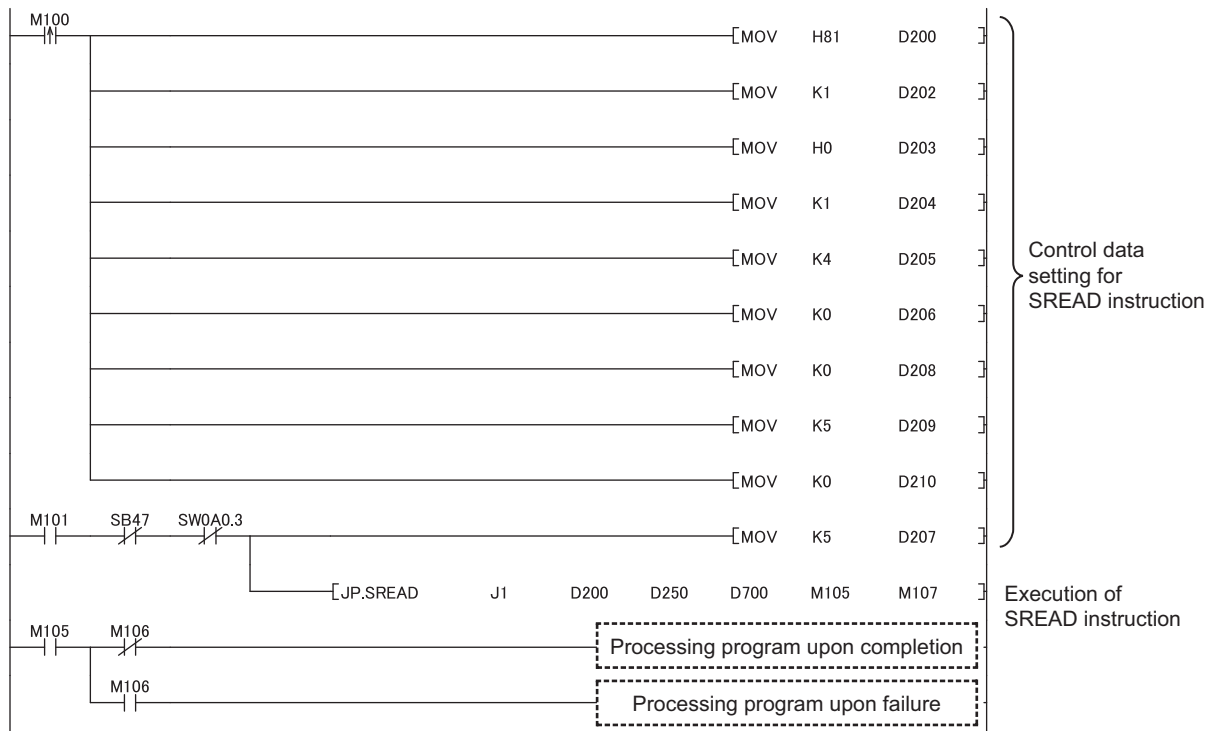
Device	Description	Device	Description
M107	Read notification device	Y60	Read completion device

(c) SREAD instruction setting

Same as the READ instruction program example.

(d) Program example

- Program example in SREAD instruction request source (station No. 0)

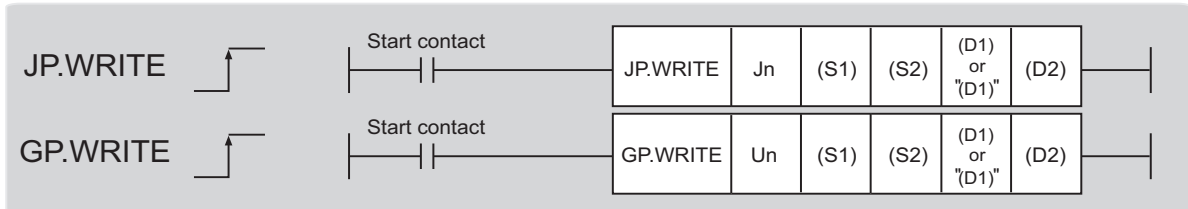


- Program example in SREAD instruction request destination (station No. 4)



10.6 JP/GP.WRITE (Writing Data to the Programmable Controller on Another Station)

This instruction writes data to the device of the programmable controller on another station. (In units of words)



Setting data	Available devices			Others
	Internal device (System, user)		Constant	
	Bit	Word	K, H	
(S1)	—	○	—	—
(S2)	—	○	—	—
(D1)	—	○ ^{*1}	—	—
(D2)	○		—	—

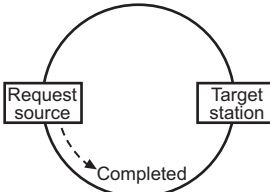
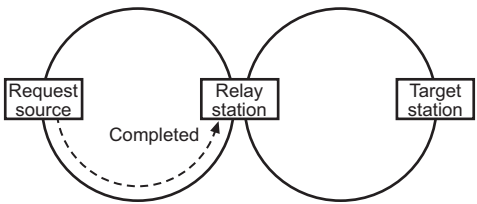
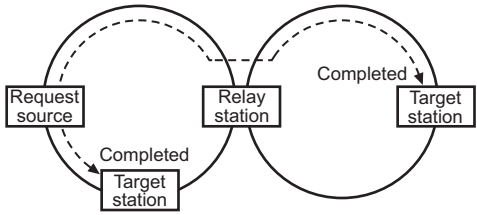
*1 T, C, D, W, ST, SD, and SW can be used.
When specifying SD/SW, data can be written in the range that the user can set.
For details on SD/SW, refer to the following.


Manuals for the CPU module and network module of the target station


(1) Setting data

Setting data	Description	Set by	Data type
Jn	Own station's network No. (1 to 239, 254) 254: Network specified in Valid Module During Other Station Access	User	16-bit binary
Un	Start I/O number of the master/local module of the own station (00 to 3E _H : Upper 2 digits of the I/O number expressed in 3 digits)		
(S1)	Start device of the own station where control data is stored (Page 176, Section 10.6 (1) (a))		System
(S2)	Start device of the own station where data to be written is stored (Page 179, Section 10.6 (1) (b))		
(D1)	Start device of the target station where data is to be written (A continuous area for with the write data length is required.) (Page 179, Section 10.6 (1) (c))		
(D2)	Device of the own station, which is turned on for 1 scan upon completion of the instruction. (D2)+1 is turned on as well when the instruction fails.	Bit	

(a) Control data

Device	Item	Setting data	Setting range	Set by										
(S1)+0	Execution/abnormal end type	<div style="text-align: center; margin-bottom: 10px;"> <table border="1" style="margin: auto;"> <tr> <td style="padding: 2px;">b15</td> <td style="padding: 2px;">to</td> <td style="padding: 2px;">b7</td> <td style="padding: 2px;">to</td> <td style="padding: 2px;">b0</td> </tr> <tr> <td style="text-align: center; padding: 2px;">0</td> <td></td> <td style="text-align: center; padding: 2px;">②</td> <td></td> <td style="text-align: center; padding: 2px;">①</td> </tr> </table> </div> <p>1) Execution type (bit 0)</p> <p>0: Without arrival confirmation</p> <ul style="list-style-type: none"> • When the target station is on the same network The process is completed when data is sent from the own station. <div style="text-align: center; margin: 10px 0;">  </div> <ul style="list-style-type: none"> • When the target station is on another network The process is completed when data arrives at the relay station on the same network. <div style="text-align: center; margin: 10px 0;">  </div> <p>1: With arrival confirmation</p> <p>The process is completed when data is written in the target station.</p> <div style="text-align: center; margin: 10px 0;">  </div> <p>When "0: Without arrival confirmation" is specified, the result is regarded as normal on the own station even if the writing to the target station fails, as follows.</p> <ul style="list-style-type: none"> • When communication ends normally even though sent data are abnormal • When data cannot be written to the target station, because instructions are executed to the same station from multiple stations (The target station generates an error code (D202_H or D282_H)) <p>2) Abnormal end type (bit 7)</p> <p>Specify the data set status in case of abnormal end.</p> <p>0: After (S1)+11, no data is set for abnormal end.</p> <p>1: After (S1)+11, data for abnormal end is set.</p>	b15	to	b7	to	b0	0		②		①	<p>0000_H 0001_H 0080_H 0081_H</p>	<p>User</p>
b15	to	b7	to	b0										
0		②		①										
(S1)+1	Completion status	<p>The status of the instruction completion is stored.</p> <p>0: Normal</p> <p>Other than 0: Error (Page 246, Section 12.5)</p>	<p>—</p>	<p>System</p>										

Device	Item	Setting data	Setting range	Set by																						
(S1)+2	Channels used by own station	Specify the channels to be used by the own station. ( Page 155, Section 10.2.1 (3))	1 to 2	User																						
(S1)+3	Target station's CPU type	Specify the CPU module on the station to be accessed.	0000 _H 03D0 _H to 03D3 _H 03E0 _H to 03E3 _H 03FF _H	User																						
		<table border="1"> <thead> <tr> <th>Set value</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0000_H</td> <td>Control CPU (The access destination is the same as that of when 03FF_H is selected.)</td> </tr> <tr> <td>03D0_H</td> <td>Control system CPU (redundant CPU only)</td> </tr> <tr> <td>03D1_H</td> <td>Standby system CPU (redundant CPU only)</td> </tr> <tr> <td>03D2_H</td> <td>System A CPU (redundant CPU only)</td> </tr> <tr> <td>03D3_H</td> <td>System B CPU (redundant CPU only)</td> </tr> <tr> <td>03E0_H</td> <td>• Control CPU (single CPU system) • CPU No.1 (multiple CPU system)</td> </tr> <tr> <td>03E1_H</td> <td>CPU No.2 (multiple CPU system)</td> </tr> <tr> <td>03E2_H</td> <td>CPU No.3 (multiple CPU system)</td> </tr> <tr> <td>03E3_H</td> <td>CPU No.4 (multiple CPU system)</td> </tr> <tr> <td>03FF_H</td> <td>Control CPU</td> </tr> </tbody> </table>			Set value	Description	0000 _H	Control CPU (The access destination is the same as that of when 03FF _H is selected.)	03D0 _H	Control system CPU (redundant CPU only)	03D1 _H	Standby system CPU (redundant CPU only)	03D2 _H	System A CPU (redundant CPU only)	03D3 _H	System B CPU (redundant CPU only)	03E0 _H	• Control CPU (single CPU system) • CPU No.1 (multiple CPU system)	03E1 _H	CPU No.2 (multiple CPU system)	03E2 _H	CPU No.3 (multiple CPU system)	03E3 _H	CPU No.4 (multiple CPU system)	03FF _H	Control CPU
		Set value			Description																					
		0000 _H			Control CPU (The access destination is the same as that of when 03FF _H is selected.)																					
		03D0 _H			Control system CPU (redundant CPU only)																					
		03D1 _H			Standby system CPU (redundant CPU only)																					
		03D2 _H			System A CPU (redundant CPU only)																					
		03D3 _H			System B CPU (redundant CPU only)																					
		03E0 _H			• Control CPU (single CPU system) • CPU No.1 (multiple CPU system)																					
		03E1 _H			CPU No.2 (multiple CPU system)																					
		03E2 _H			CPU No.3 (multiple CPU system)																					
		03E3 _H			CPU No.4 (multiple CPU system)																					
03FF _H	Control CPU																									
When the instruction is executed by specifying a control system CPU (03D0 _H) or standby system CPU (03D1 _H), if system switching occurs in the target station, the instruction may fail (CPU module error code: 4244 _H , 4248 _H).																										
If the above error occurs and the instruction fails, execute the instruction again.																										
(S1)+4	Target station's network No.	Specify the network No. of the target station. 1 to 239: Network No. 254: Specify this when 254 is set for Jn.	1 to 239 254	User																						

Device	Item	Setting data	Setting range	Set by
(S1)+5	Target station number	<p>Specify the target station number.</p> <p>(1) Station number specification Master station: 125 (7D_H) Local station, intelligent device station: 1 to 120</p> <p>To increase the reliability of data, it is recommended to execute the instruction with the execution type in (S1)+0 set to "1: With arrival confirmation".</p> <p>(2) Group specification (The target station is on a network other than CC-Link IE Field Network.) 81_H to A0_H: All stations in Group No. 1 to No. 32 (It can be set when the execution type set for (S1)+0 is "0: Without arrival confirmation".)</p> <p style="text-align: center;">Group No. 1: 81_H Group No. 2: 82_H ⋮ Group No. 32: A0_H</p> <p>(3) All stations specification FF_H: All stations on the target station's network No. (excluding the own station) (It can be set when the execution type set for (S1)+0 is "0: Without arrival confirmation".)</p> <p>When using the group specification or all stations specification</p> <ul style="list-style-type: none"> Specify 0000_H or 03FF_H for the target station's CPU type ((S1)+3) ( Page 156, Section 10.2.1 (5)) The group specification cannot be used for CC-Link IE Field Network stations. Writing of the data cannot be confirmed on the target station. For whether data was written normally, check the device of the write target station. Data cannot be written to the station with the station number already in use or the station with no station number setting. Correct the error then execute the instruction. 	125 (7D _H) 1 to 120 81 _H to A0 _H FF _H	User
(S1)+6	—	Unused	0	User
(S1)+7	Number of resends	During instruction execution For the case where the instruction is not completed within the monitoring time specified by (S1)+8, specify the number of times the instruction is resent. (It can be set when the execution type set by (S1)+0 is "1: With arrival confirmation".)	0 to 15	User
		When the instruction is completed The number of resends (result) is stored. (Valid when the execution type set by (S1)+0 is "1: With arrival confirmation".)	—	System
(S1)+8	Arrival monitoring time	Specify the monitoring time until instruction completion. (It can be set when the execution type set by (S1)+0 is "1: With arrival confirmation".) If the instruction is not completed within the specified time, the instruction is resent for the number of resends specified by (S1)+7. 0: 10 seconds 1 to 32767: 1 to 32767 seconds	0 to 32767	User
(S1)+9	Write data length	Specify the number of words to be written.	1 to 960 To QnACPU: 1 to 480 words	User
(S1)+10	—	Unused	0	User

Device	Item	Setting data	Setting range	Set by																																			
(S1)+11	Clock set flag	The valid or invalid status of data after (S1)+12 is stored. (Data is stored when "1: Data at the time of abnormal end is set in the area starting from (S1)+11." is set in the abnormal end type in (S1)+0.) The stored data is not cleared even if the dedicated instruction is normally completed. 0: Invalid 1: Valid	—	System																																			
(S1)+12 to (S1)+15	Clock data of abnormal end	Clock data of abnormal end is stored in BCD format. (Data is stored when "1: Data at the time of abnormal end is set in the area starting from (S1)+11." is set in the abnormal end type in (S1)+0.) The stored data is not cleared even if the dedicated instruction is normally completed. <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td>b15</td> <td>~</td> <td>b8</td> <td>b7</td> <td>~</td> <td>b0</td> </tr> <tr> <td>(S1)+12</td> <td colspan="2">Month (01H to 12H)</td> <td colspan="4">Year (00H to 99H), last 2 digits</td> </tr> <tr> <td>(S1)+13</td> <td colspan="2">Hour (00H to 23H)</td> <td colspan="4">Day (01H to 31H)</td> </tr> <tr> <td>(S1)+14</td> <td colspan="2">Second (00H to 59H)</td> <td colspan="4">Minute (00H to 59H)</td> </tr> <tr> <td>(S1)+15</td> <td colspan="2">Year (00H to 99H), first 2 digits</td> <td colspan="4">Day of week (00H to 06H) 00H (Sun.) to 06H (Sat.)</td> </tr> </table> When the target station is QnACPU, 00 _H is stored in the year (the first two digits of the year).		b15	~	b8	b7	~	b0	(S1)+12	Month (01H to 12H)		Year (00H to 99H), last 2 digits				(S1)+13	Hour (00H to 23H)		Day (01H to 31H)				(S1)+14	Second (00H to 59H)		Minute (00H to 59H)				(S1)+15	Year (00H to 99H), first 2 digits		Day of week (00H to 06H) 00H (Sun.) to 06H (Sat.)				—	System
	b15	~	b8	b7	~	b0																																	
(S1)+12	Month (01H to 12H)		Year (00H to 99H), last 2 digits																																				
(S1)+13	Hour (00H to 23H)		Day (01H to 31H)																																				
(S1)+14	Second (00H to 59H)		Minute (00H to 59H)																																				
(S1)+15	Year (00H to 99H), first 2 digits		Day of week (00H to 06H) 00H (Sun.) to 06H (Sat.)																																				
(S1)+16	Error-detected station's network No.*1	The network No. of the station in which an error was detected is stored. (Data is stored when "1: Data at the time of abnormal end is set in the area starting from (S1)+11." is set in the abnormal end type in (S1)+0.) The stored data is not cleared even if the dedicated instruction is normally completed. 1 to 239: Network No.	—	System																																			
(S1)+17	Error-detected station number*1	The station number of the station in which an error was detected is stored. (Data is stored when "1: Data at the time of abnormal end is set in the area starting from (S1)+11." is set in the abnormal end type in (S1)+0.) The stored data is not cleared even if the dedicated instruction is normally completed. Master station: 125 (7D _H) Local station, intelligent device station: 1 to 120	—	System																																			

*1 If Completion status ((S1)+1) is "Channel in use (dedicated instruction) (error codes: D25A_H and D25B_H)", data is not stored.

(b) Start device of the own station where data to be written is stored

Specify the start device of the own station that stores data to be written.

(c) Start device of the target station where data is to be written

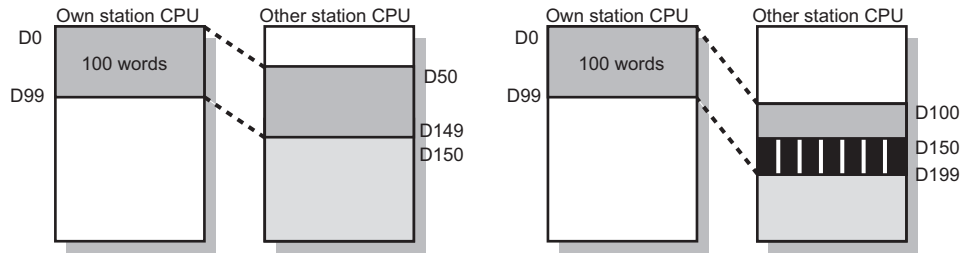
If the device setting in PLC Parameter is different between the own and target stations, use "(D1)" (with double-quotation marks) to specify.

Specify the start device (D1) of the target station, within the available range so that the write data can be stored.

Ex. When the area addressed D150 or higher of the target station CPU is already used

○ Correct
(D50 is specified in (D1).)

✗ Incorrect
(D100 is specified in (D1).)



- : Data to be write with WRITE instruction
- : Area already used by own station's CPU
- ▨ : Duplicated area

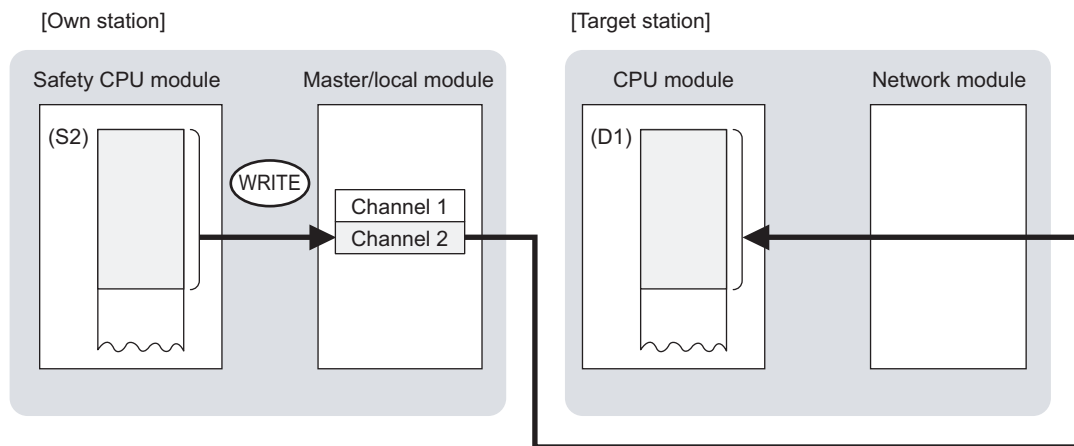
(2) Function

(a) WRITE instruction overview

The instruction writes data by the specified number of words (control data ((S1) + 9)) from the own station start device (S2) into the target station word devices (after (D1)).


Specify the target stations in control data ((S1)+4 and (S1)+5).

When the writing to devices of the target station is completed, the completion device (D2) turns on.



(b) Target stations which can be specified

For details on target stations which can be specified, refer to the following.

 Page 152, Section 10.1 (1)

(c) Checking the execution status of the WRITE instruction

The execution status (completion or error) of the WRITE instruction can be checked using the following device specified by the setting data.

- Completion device (D2)

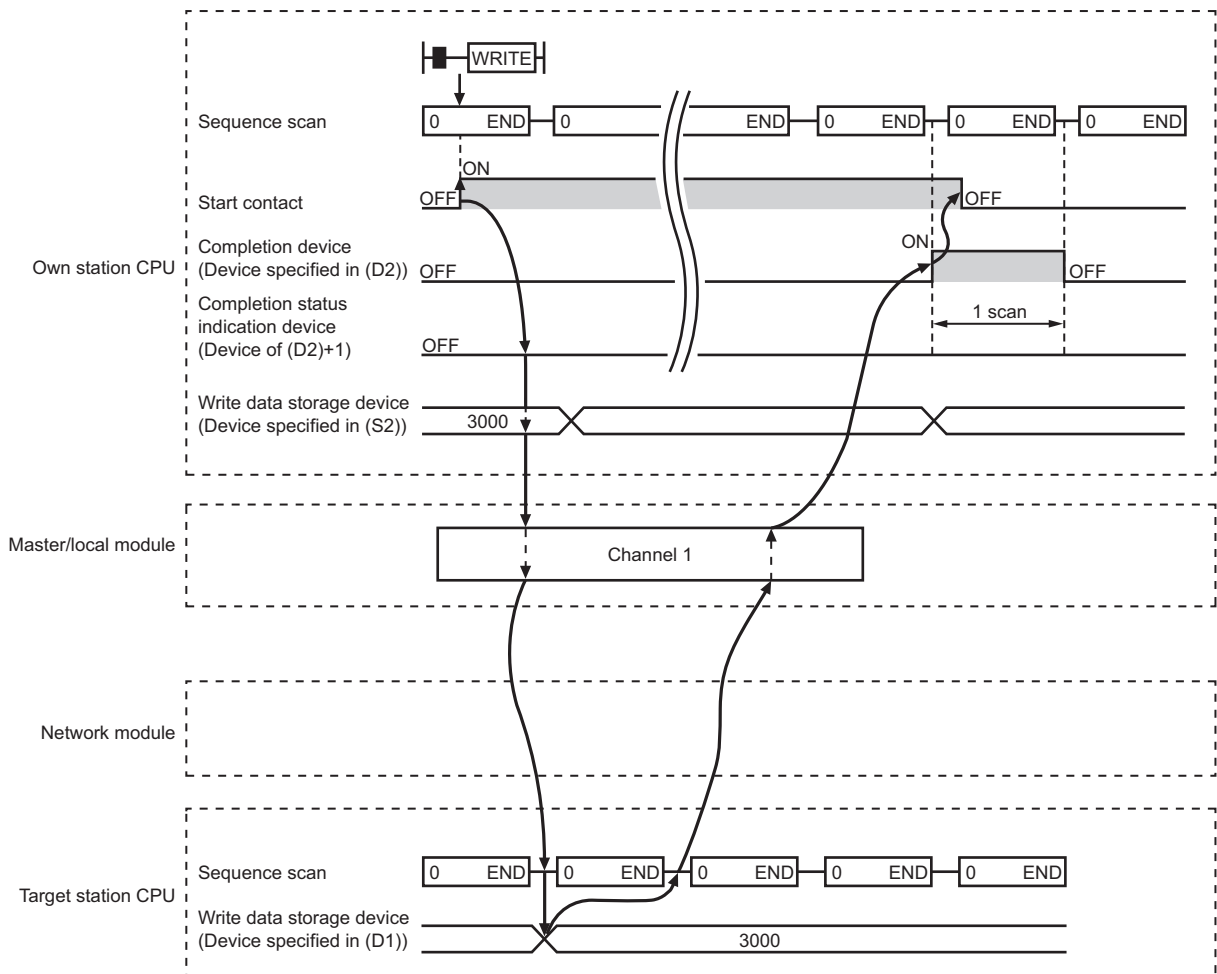
It is turned on in the END processing of the scan after completion of the WRITE instruction, and is turned off in the next END processing.

- Completion status indication device ((D2)+1)

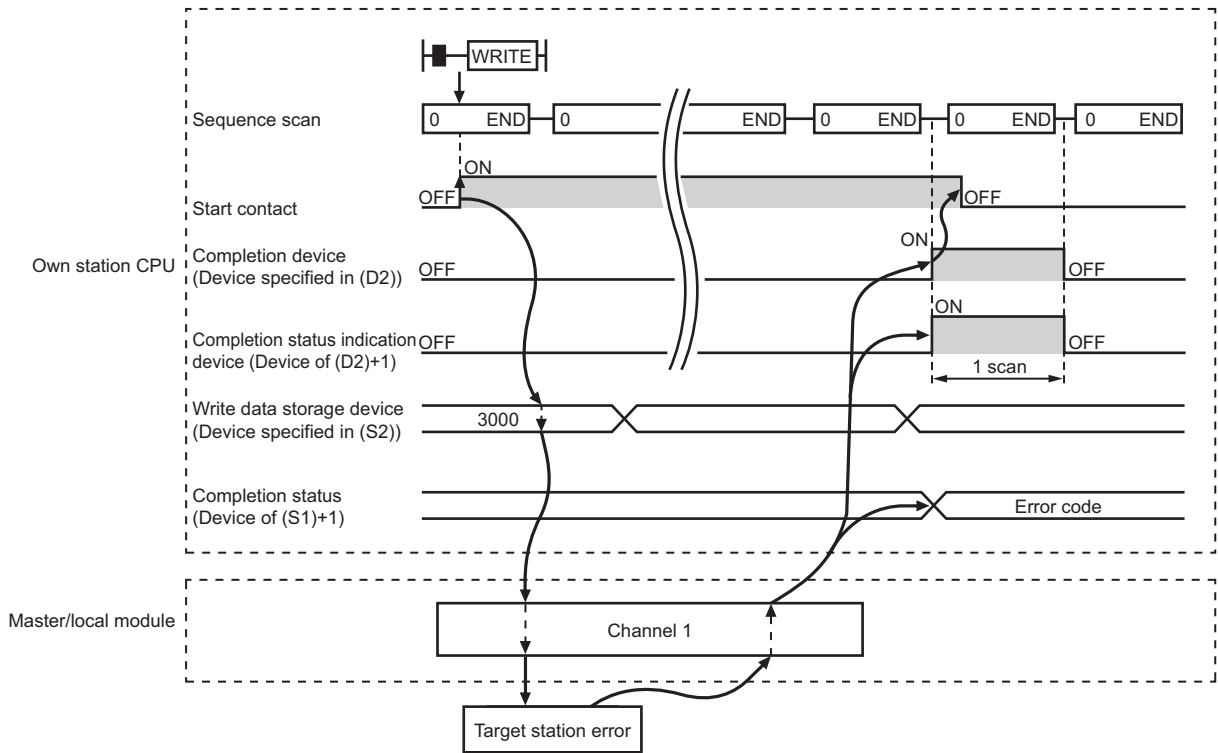
It is turned ON in the END processing of the scan after completion of the WRITE instruction, and is turned off in the next END processing only if the WRITE instruction fails.

(d) WRITE instruction execution timing

- When completed



- When failed



(3) Error

When the dedicated instruction fails, error details can be checked by any of the following methods:

(a) In GX Developer

Error details can be checked using CC-Link IE Field Network diagnostics. (Page 124, CHAPTER 9)

(b) By devices

Completion status indication device ((D2)+1) is turned on and an error code is stored in Completion status ((S1)+1) of the control data.

According to the error code, check the error details and take a corrective action.

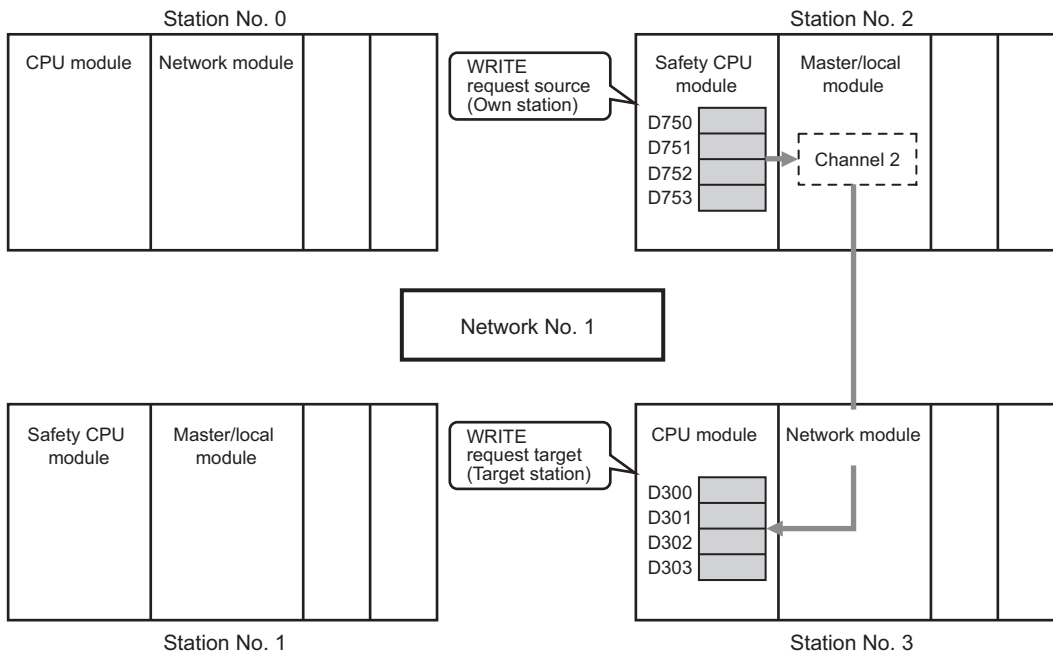
(Page 246, Section 12.5)

10.6 J/P/GP.WRITE (Writing Data to the Programmable Controller on Another Station)

(4) Program example

The following program is for writing data of D750 to D753 of station No. 2 (own station) into D300 to D303 of station No. 3 (target station) when M112 is turned on.

(a) System configuration example




(b) Devices used in the program example

- Link special relay (SB), link special register (SW)

Device	Description	Device	Description
SB0047	Baton pass status (own station)	SW00A0.2	Baton pass status (each station) of station No. 3

Remark

For details on link special relay (SB) and link special register (SW), refer to the following:

 Page 273, Appendix 3, Page 286, Appendix 4

- Devices used by the user

Device	Description	Device	Description
M110	Control data setting command	D220 to D237	Control data
M111	Write data setting command	D750 to D753	Write data storage device (station No. 2)
M112	Start contact		—
M115	Completion device		
M116	Completion status indication device		

(c) WRITE instruction setting

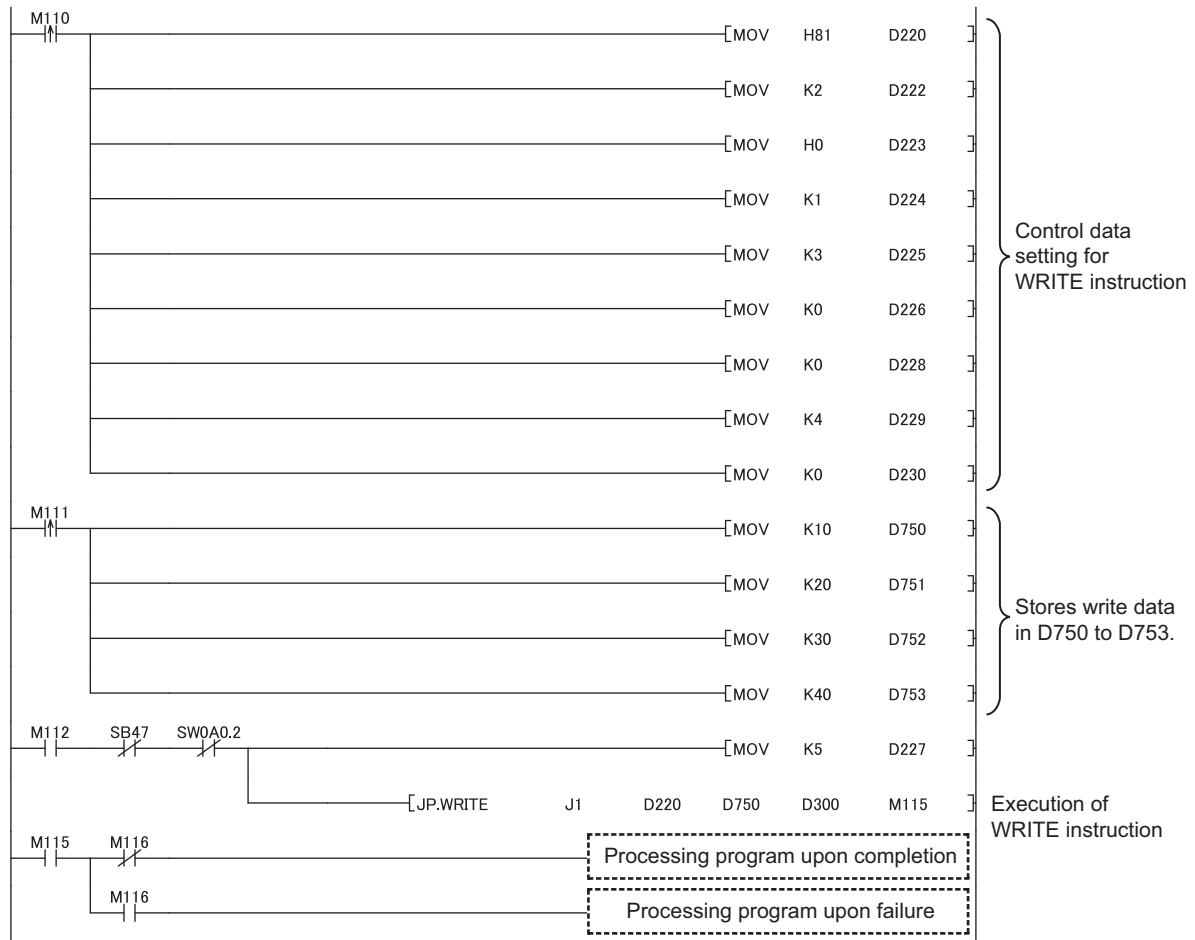
The setting of WRITE instruction control data is as follows.

Device	Item	Set value
(S1)+0	D220	Execution/abnormal end type 0081 _H . (With arrival confirmation, sets data for abnormal end)
(S1)+1	D221	Completion status — (Setting is not required because it is set by the system)
(S1)+2	D222	Channels used by own station 2
(S1)+3	D223	Target station's CPU type 0000 _H (control CPU)
(S1)+4	D224	Target station's network No. 1
(S1)+5	D225	Target station number 3
(S1)+6	D226	(Unused) 0
(S1)+7	D227	Number of resends 5 times
(S1)+8	D228	Arrival monitoring time 0 (10 seconds)
(S1)+9	D229	Write data length 4 words
(S1)+10	D230	(Unused) 0
(S1)+11	D231	Clock set flag
(S1)+12 to (S1)+15	D232 to D235	Clock data of abnormal end
(S1)+16	D236	Error-detected station's network No.
(S1)+17	D237	Error-detected station number

(Setting is not required because it is set by the system)

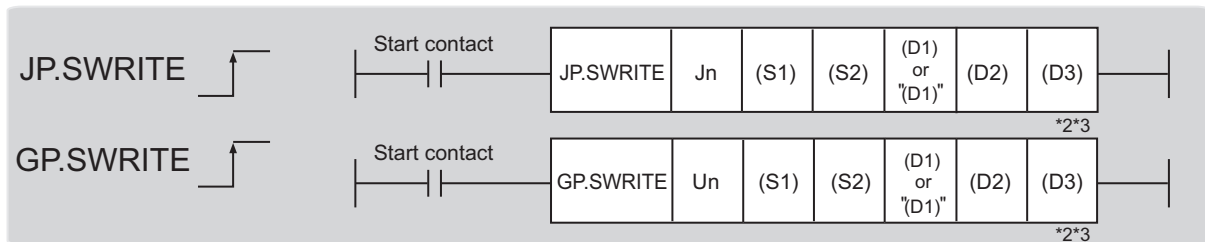
(d) Program example

The following program is written to the safety CPU module of station No. 2.



10.7 JP/GP.SWRITE (Writing Data to the Programmable Controller on Another Station)

This instruction writes data to the device of the programmable controller on another station. (In units of words)
With the SWRITE instruction, the device of the other station is turned on when data writing is completed. Data writing with the SREAD instruction can be confirmed by this.



Setting data	Available devices			Others
	Internal device (System, user)		Constant	
	Bit	Word	K, H	
(S1)	—	○	—	
(S2)	—	○	—	
(D1)	—	○ ^{*1}	—	
(D2)		○	—	
(D3)		○	—	

*1 T, C, D, W, ST, SD, and SW can be used.

When specifying SD/SW, it can be written in the range that the user can set.
For details on SD/SW, refer to the following.

Manuals for the CPU module and network module of the target station




*2 For the SWRITE instruction, the write notification device (D3) can be omitted in the programming.

However, the operation is the same as the WRITE instruction.


The SWRITE instruction can operate differently depending on whether the write notification device (D3) is omitted or not.

*3 When the target station is a Basic model QCPU, the data set in the write notification device (D3) is ignored. (Operation is the same as the WRITE instruction.)


(1) Setting data

Setting data	Description	Set by	Data type
Jn	Own station's network No. (1 to 239, 254) 254: Network specified in Valid Module During Other Station Access	User	16-bit binary
Un	Start I/O number of the master/local module of the own station (00 to 3E _H ; Upper 2 digits of the I/O number expressed in 3 digits)		
(S1)	Start device of the own station where control data is stored ( Page 188, Section 10.7 (1) (a))		Device name
(S2)	Start device of the own station where data to be written is stored ( Page 188, Section 10.7 (1) (b))		
(D1)	Start device of the target station where data is to be written (A continuous area with the write data length is required.) ( Page 188, Section 10.7 (1) (c))	System	Bit
(D2)	Device of the own station, which is turned on for 1 scan upon completion of the instruction. (D2)+1 is turned on as well when the instruction fails.		
(D3)	Device of the target station, which is turned on for 1 scan upon completion of the instruction. (Data writing from another station can be confirmed.)		


(a) Control data

The control data of the SWRITE instruction control data is the same as that of the WRITE instruction
( Page 175, Section 10.6)

(b) Start device of the own station where data to be written is stored

The start device of the own station where data to be written by the SWRITE instruction is stored, is the same as that of the WRITE instruction ( Page 175, Section 10.6)

(c) Start device of the target station where data is to be written

The start device of the target station, is the same as that of the WRITE instruction
( Page 175, Section 10.6)

(2) Function

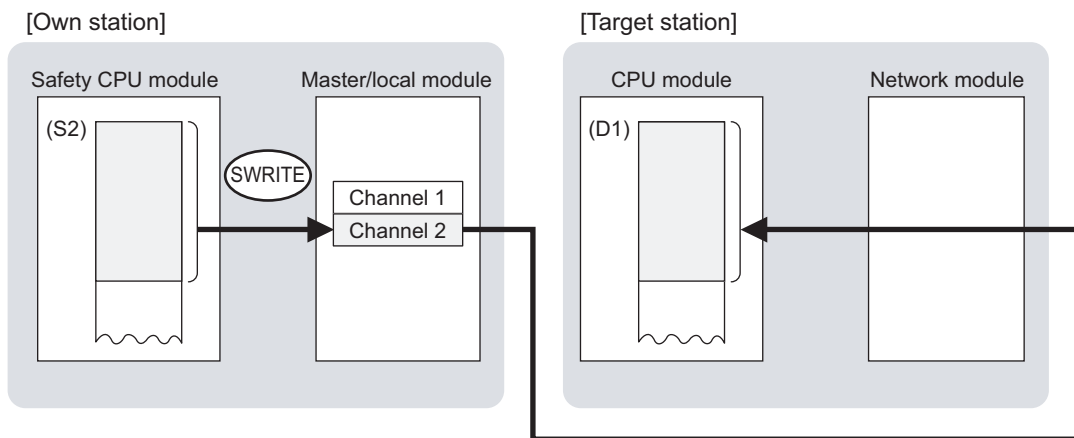
(a) SWRITE instruction overview

The instruction writes data by the specified number of words (control data $((S1) + 9)$) from the own station start device (S2) into the target station word devices (after (D1)).

Specify the target stations in control data $((S1)+4$ and $(S1)+5$.

When the writing of the data specified by (S2) is completed, the following devices are turned on.

- Own station: Completion device (D2)
- Target station: Write notification device (D3)



(b) Target stations which can be specified

For details on target stations which can be specified, refer to the following.

☞ Page 152, Section 10.1 (1)

(c) Checking the execution status of the SWRITE instruction

The execution status (completion or error) of the SWRITE instruction can be checked using the following device specified for the setting data.

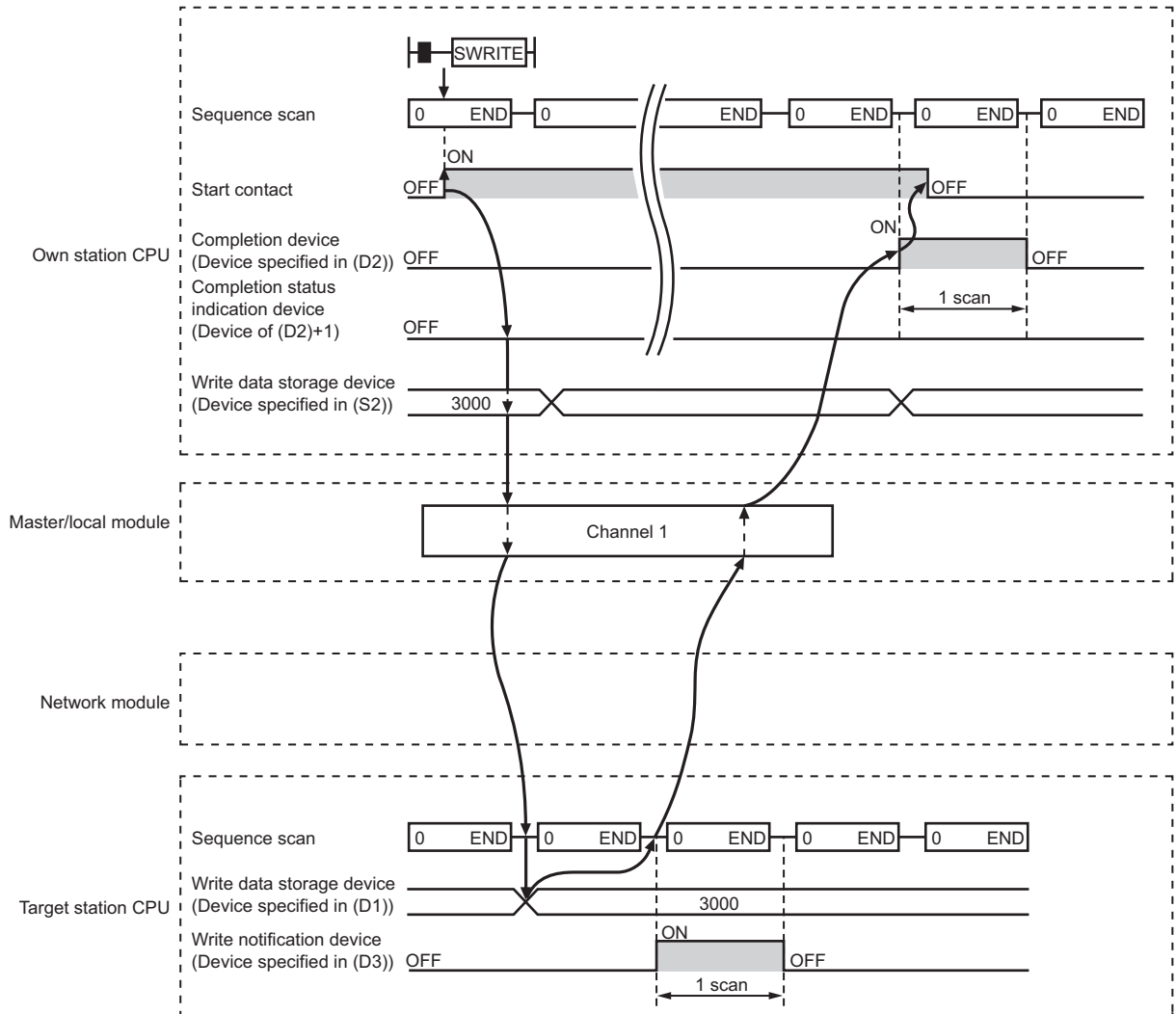
- Completion device (D2)

It is turned on in the END processing of the scan after completion of the SWRITE instruction, and is turned off in the next END processing.
- Completion status indication device $((D2)+1)$

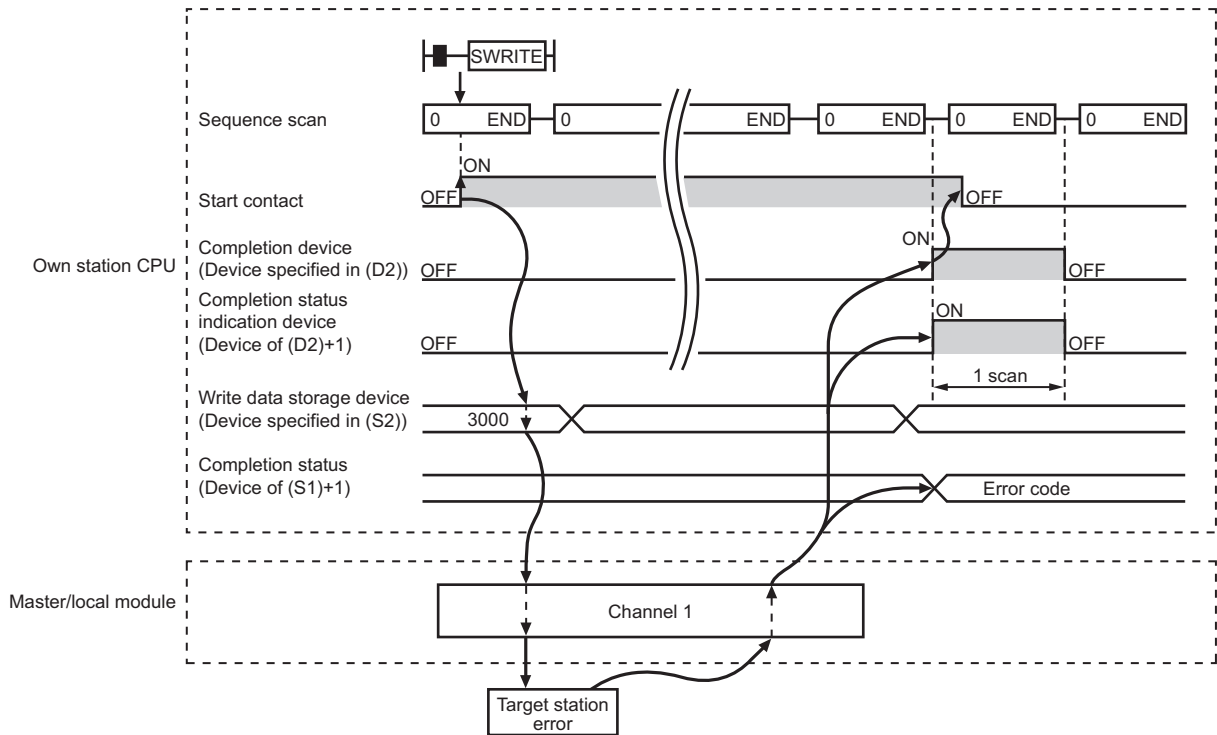
It is turned on in the END processing of the scan after completion of the SWRITE instruction, and is turned off in the next END processing only if the SWRITE instruction fails.

(d) SWRITE instruction execution timing

- When completed



- When failed



(3) Error

When the dedicated instruction fails, error details can be checked by any of the following methods:

(a) In GX Developer

Error details can be checked using CC-Link IE Field Network diagnostics. (👉 Page 124, CHAPTER 9)

(b) By devices

Completion status indication device ((D2)+1) is turned on and an error code is stored in Completion status ((S1)+1) of the control data.


According to the error code, check the error details and take a corrective action. (👉 Page 246, Section 12.5)

(4) Program example

Compared to the WRITE instruction program example, the SWRITE instruction program example has a different section where the write notification device (D3) is specified at the end of the arguments.

Remark

For details on the WRITE instruction sample program, refer to the following.

 Page 184, Section 10.6 (4)

Just like the WRITE instruction program example, this program example is for writing data of D750 to D753 of station No. 2 (own station) into D300 to D303 of station No. 3 (target station) when M112 is turned on. Furthermore, when the write notification device (D3) of the target station is turned on, the data of D300 to D303 are stored in D500 to D503.

(a) System configuration example

Same as the WRITE instruction program example.

(b) Devices used in the program example

- Link special relay (SB), link special register (SW)
Same as the WRITE instruction program example.

- Devices used by users

The devices used in the SWRITE instruction request source (station No. 2) are the same as those in WRITE instruction program example.

Device used in the SWRITE instruction request destination (station No. 3)

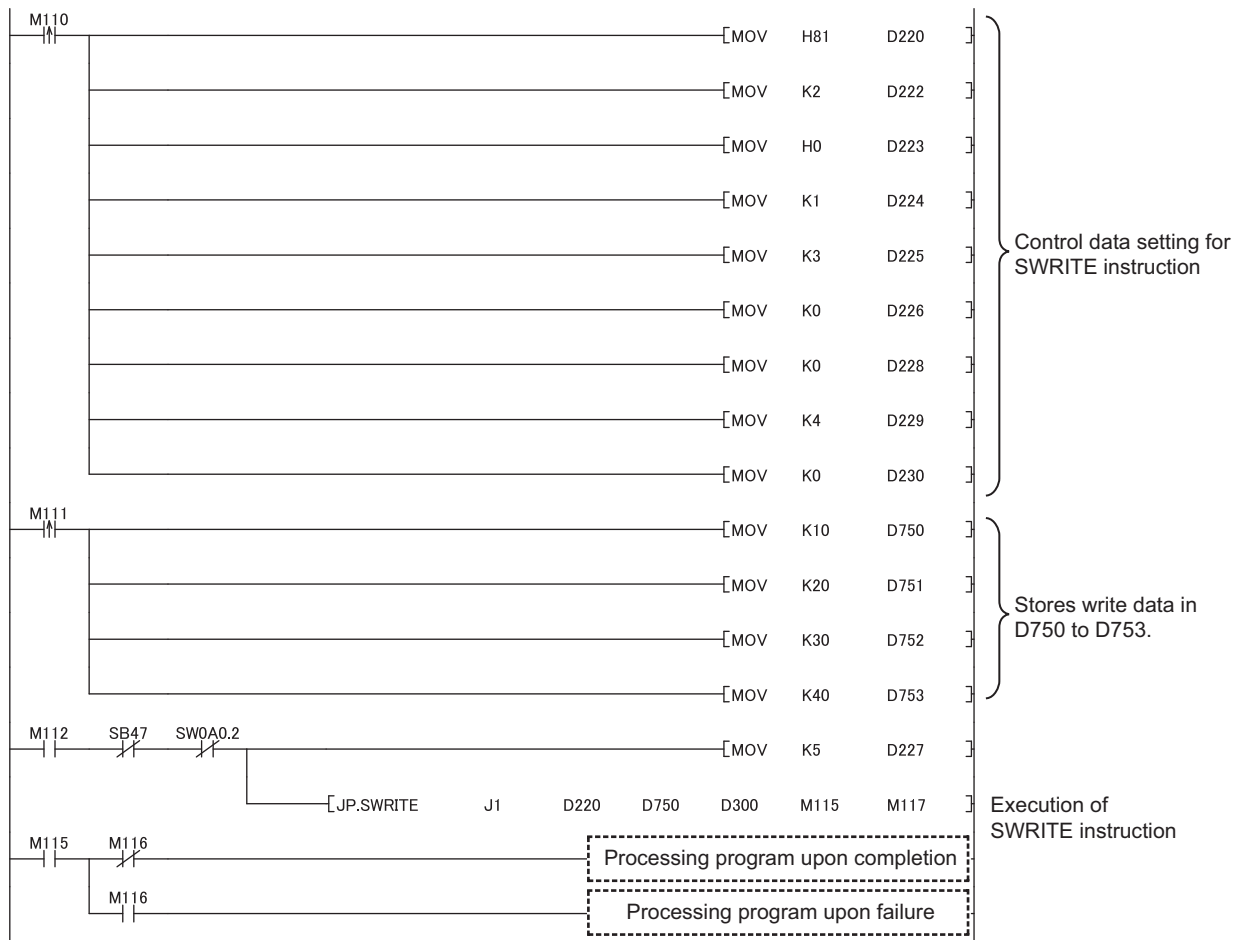
Device	Description	Device	Description
M117	Write notification device	D500 to D503	Devices that store the data of D300 to D303

(c) SWRITE instruction setting

Same as the WRITE instruction program example.

(d) Program example

- Program example in SWRITE instruction request source (station No. 2)

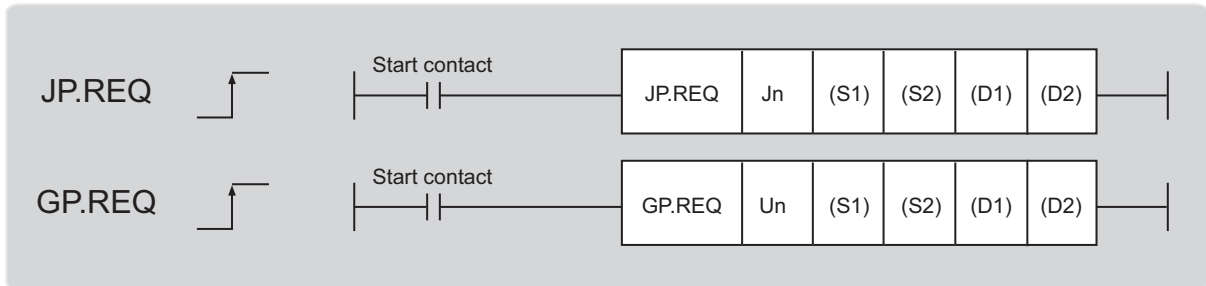


- Program example in SWRITE instruction request destination (station No. 3)



10.8 JP/GP.REQ (Reading/Writing Clock Data)

This instruction reads and writes the clock data of the programmable controller on another station.



Setting data	Available devices			Others
	Internal device (System, user)		Constant	
	Bit	Word	K, H	
(S1)	—	○	—	
(S2)	—	○	—	
(D1)	—	○	—	
(D2)	○		—	


(1) Setting data

Setting data	Description	Set by	Data type
Jn	Own station's network No. (1 to 239, 254) 254: Network specified in Valid Module During Other Station Access	User	16-bit binary
Un	Start I/O number of the master/local module of own station (00 to 3E _H ; Upper 2 digits of the I/O number expressed in 3 digits)		
(S1)	Start device of the own station where control data is stored (☞ Page 195, Section 10.8 (1) (a))		
(S2)	Start device of the own station where receive data is stored (☞ Page 198, Section 10.8 (1) (b))	System	Device name
(D1)	Start device of the own station where response data is stored (☞ Page 199, Section 10.8 (1) (c))		
(D2)	Device of the own station, which is turned on for 1 scan upon completion of the instruction (D2)+1 is turned on as well when the instruction fails.		Bit

(a) Control data

Device	Item	Setting data	Setting range	Set by																						
(S1)+0	Abnormal end type	<div style="text-align: center;"> <table border="1" style="margin: auto;"> <tr> <td style="padding: 2px;">b15</td> <td style="padding: 2px;">to</td> <td style="padding: 2px;">b7</td> <td style="padding: 2px;">to</td> <td style="padding: 2px;">b4</td> <td style="padding: 2px;">to</td> <td style="padding: 2px;">b0</td> </tr> <tr> <td style="padding: 2px;">0</td> <td></td> <td style="padding: 2px;">①</td> <td></td> <td style="padding: 2px;">0</td> <td></td> <td style="padding: 2px;">1</td> </tr> </table> </div> <p>1) Abnormal end type (bit 7) Specify the set status of data in case of abnormal end. 0: After (S1)+11, no data is set for abnormal end 1: After (S1)+11, data is set for abnormal end</p>	b15	to	b7	to	b4	to	b0	0		①		0		1	0011 _H 0091 _H	User								
b15	to	b7	to	b4	to	b0																				
0		①		0		1																				
(S1)+1	Completion status	The status of the instruction completion is stored. 0: Normal Other than 0: Error (Page 246, Section 12.5)	—	System																						
(S1)+2	Channels used by own station	Specify the channels to be used by the own station. (Page 155, Section 10.2.1 (3))	1 to 2	User																						
(S1)+3	Target station's CPU type	Specify the CPU module on the station to be accessed.	0000 _H 03D0 _H to 03D3 _H 03E0 _H to 03E3 _H 03FF _H	User																						
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;">Set value</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0000_H</td> <td>Control CPU (The access destination is the same as that of when 03FF_H is selected.)</td> </tr> <tr> <td>03D0_H</td> <td>Control system CPU (redundant CPU only)</td> </tr> <tr> <td>03D1_H</td> <td>Standby system CPU (redundant CPU only)</td> </tr> <tr> <td>03D2_H</td> <td>System A CPU (redundant CPU only)</td> </tr> <tr> <td>03D3_H</td> <td>System B CPU (redundant CPU only)</td> </tr> <tr> <td>03E0_H</td> <td>• Control CPU (single CPU system) • CPU No.1 (multiple CPU system)</td> </tr> <tr> <td>03E1_H</td> <td>CPU No.2 (multiple CPU system)</td> </tr> <tr> <td>03E2_H</td> <td>CPU No.3 (multiple CPU system)</td> </tr> <tr> <td>03E3_H</td> <td>CPU No.4 (multiple CPU system)</td> </tr> <tr> <td>03FF_H</td> <td>Control CPU</td> </tr> </tbody> </table>			Set value	Description	0000 _H	Control CPU (The access destination is the same as that of when 03FF _H is selected.)	03D0 _H	Control system CPU (redundant CPU only)	03D1 _H	Standby system CPU (redundant CPU only)	03D2 _H	System A CPU (redundant CPU only)	03D3 _H	System B CPU (redundant CPU only)	03E0 _H	• Control CPU (single CPU system) • CPU No.1 (multiple CPU system)	03E1 _H	CPU No.2 (multiple CPU system)	03E2 _H	CPU No.3 (multiple CPU system)	03E3 _H	CPU No.4 (multiple CPU system)	03FF _H	Control CPU
		Set value			Description																					
		0000 _H			Control CPU (The access destination is the same as that of when 03FF _H is selected.)																					
		03D0 _H			Control system CPU (redundant CPU only)																					
		03D1 _H			Standby system CPU (redundant CPU only)																					
		03D2 _H			System A CPU (redundant CPU only)																					
		03D3 _H			System B CPU (redundant CPU only)																					
		03E0 _H			• Control CPU (single CPU system) • CPU No.1 (multiple CPU system)																					
		03E1 _H			CPU No.2 (multiple CPU system)																					
		03E2 _H			CPU No.3 (multiple CPU system)																					
		03E3 _H			CPU No.4 (multiple CPU system)																					
03FF _H	Control CPU																									
When the instruction is executed by specifying a control system CPU (03D0 _H) or standby system CPU (03D1 _H), if system switching occurs in the target station, the instruction may fail (CPU module error code: 4244 _H , 4248 _H).																										
If the above error occurs and the instruction fails, execute the instruction again.																										

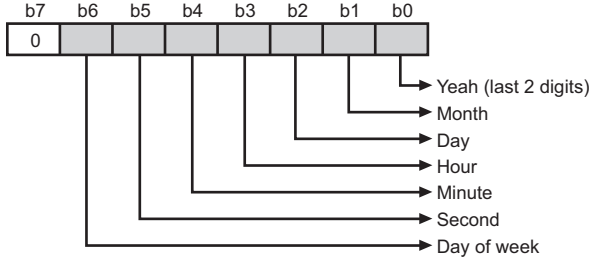
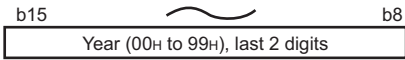
(S1)+4	Target station's network No.	Specify the network No. of the target station. 1 to 239: Network No. 254: Specify this when 254 is set for Jn.	1 to 239 254	User
--------	------------------------------	--	-----------------	------

Device	Item	Setting data	Setting range	Set by
(S1)+5	Target station's number	<p>Specify the target station number.</p> <p>(1) Station number specification Master station: 125 (7D_H) Local station, intelligent device station: 1 to 120</p> <p>(2) Group specification (The target station is on a network other than a CC-Link IE Field Network.) 81_H to A0_H: All stations in Group No. 1 to 32 Can only be specified for clock data write.</p> <p style="text-align: center;">Group No. 1: 81_H Group No. 2: 82_H ⋮ Group No. 32: A0_H</p> <p>(3) All stations specification FF_H: All stations on the target station network No. (excluding own station) Can only be specified for clock data write.</p> <p>When executing instructions using the group specification or all stations specification</p> <ul style="list-style-type: none"> Specify "0000_H" or "03FF_H" for the target station CPU type ((S1)+3) ( Page 156, Section 10.2.1 (5)) The group specification cannot be used for CC-Link IE Field Network stations. Arrival confirmation as to whether data was written in the target station cannot be used. To check whether data was written normally, check the clock data of the write target station. Clock data cannot be written to the station with the station number already in use or the station with no station number setting. Correct the error then execute the instruction. 	125 (7D _H) 1 to 120 81 _H to A0 _H FF _H	User
(S1)+6	—	Unused	0	User
(S1)+7	Number of resends	During instruction execution For the case where the instruction is not completed within the monitoring time specified by (S1)+8, specify the number of times the instruction is resent.	0 to 15	User
		When the instruction is completed The number of resends (result) is stored.	—	System
(S1)+8	Arrival monitoring time	Specify the monitoring time until instruction completion. If the instruction is not completed within the specified time, the instruction is resent for the number of resends specified by (S1)+7. 0: 10 seconds 1 to 32767: 1 to 32767 seconds	0 to 32767	User
(S1)+9	Request data length	Specify the request data count (word). (Word count of data to be stored in own station start device (S2) where request data is stored) 2: Clock data read 6: Clock data write	2, 6	User
(S1)+10	Response data length	Store the response data count (word). (Word count of data to be stored in own station start device (D1) where response data is stored) 6: Clock data read 2: Clock data write	—	System

Device	Item	Setting data	Setting range	Set by																														
(S1)+11	Clock set flag	The valid or invalid status of data after (S1)+12 is stored. (Data is stored when "1: Data at the time of abnormal end is set in the area starting from (S1)+11." is set in the abnormal end type in (S1)+0.) The stored data is not cleared even if the dedicated instruction is normally completed. 0: Invalid 1: Valid	—	System																														
(S1)+12 to (S1)+15	Clock data of abnormal end	Clock data of abnormal end are stored in the BCD format. (Data is stored when "1: Data at the time of abnormal end is set in the area starting from (S1)+11." is set in the abnormal end type in (S1)+0.) The stored data is not cleared even if the dedicated instruction is normally completed. <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td style="text-align: center;">b15</td> <td style="text-align: center;">~</td> <td style="text-align: center;">b8 b7</td> <td style="text-align: center;">~</td> <td style="text-align: center;">b0</td> </tr> <tr> <td>(S1)+12</td> <td colspan="2" style="text-align: center;">Month (01H to 12H)</td> <td colspan="3" style="text-align: center;">Year (00H to 99H), last 2 digits</td> </tr> <tr> <td>(S1)+13</td> <td colspan="2" style="text-align: center;">Hour (00H to 23H)</td> <td colspan="3" style="text-align: center;">Day (01H to 31H)</td> </tr> <tr> <td>(S1)+14</td> <td colspan="2" style="text-align: center;">Second (00H to 59H)</td> <td colspan="3" style="text-align: center;">Minute (00H to 59H)</td> </tr> <tr> <td>(S1)+15</td> <td colspan="2" style="text-align: center;">Year (00H to 99H), first 2 digits</td> <td colspan="3" style="text-align: center;">Day of week (00H to 06H)</td> </tr> </table> <p style="text-align: center;">00H (Sun.) to 06H (Sat.)</p> When the target station is QnACPU, "00 _H " is stored in the year (the first two digits of the year).		b15	~	b8 b7	~	b0	(S1)+12	Month (01H to 12H)		Year (00H to 99H), last 2 digits			(S1)+13	Hour (00H to 23H)		Day (01H to 31H)			(S1)+14	Second (00H to 59H)		Minute (00H to 59H)			(S1)+15	Year (00H to 99H), first 2 digits		Day of week (00H to 06H)			—	System
	b15	~	b8 b7	~	b0																													
(S1)+12	Month (01H to 12H)		Year (00H to 99H), last 2 digits																															
(S1)+13	Hour (00H to 23H)		Day (01H to 31H)																															
(S1)+14	Second (00H to 59H)		Minute (00H to 59H)																															
(S1)+15	Year (00H to 99H), first 2 digits		Day of week (00H to 06H)																															
(S1)+16	Error-detected station's network No.*1	The network No. of the station in which an error was detected is stored. (Data is stored when "1: Data at the time of abnormal end is set in the area starting from (S1)+11." is set in the abnormal end type in (S1)+0.) The stored data is not cleared even if the dedicated instruction is normally completed. 1 to 239: Network No.	—	System																														
(S1)+17	Error-detected station number *1	The station number of the station in which an error was detected is stored. (Data is stored when "1: Data at the time of abnormal end is set in the area starting from (S1)+11." is set in the abnormal end type in (S1)+0.) The stored data is not cleared even if the dedicated instruction is normally completed. Master station: 125 (7D _H) Local station, intelligent device station: 1 to 120	—	System																														

*1 If Completion status ((S1)+1) is "Channel in use (dedicated instruction) (error codes: D25A_H and D25B_H)", data is not stored.

(b) Request data (a user sets all)

Device	Item	Setting data	Clock data read	Clock data write																								
(S2)+0	Request type	0001 _H : Clock data read 0011 _H : Clock data write (when station number is specified by (S1)+5) 0031 _H : Clock data write (when all stations or groups are specified by (S1)+5)	○	○																								
(S2)+1	Sub-request type	0002 _H : Clock data read 0001 _H : Clock data write	○	○																								
(S2)+2	Change pattern, clock data to be changed	<p>1) Change pattern (bit 0 to 7) From ((S2)+2 upper byte) to ((S2)+5), specify the item to be changed. 0 : Do not change 1 : Change</p>  <p>2) Change year (bit 8 to 15) Use BCD format to specify the year (lower 2 digits of the year).</p> 	—	○																								
(S2)+3	Clock data to be changed (continued)	Use BCD format to specify the clock data to be changed.	—	○																								
(S2)+4		<table border="1" style="margin-left: 40px;"> <tr> <td>b15</td> <td>~</td> <td>b8</td> <td>b7</td> <td>~</td> <td>b0</td> </tr> <tr> <td>(S2)+3</td> <td>Day (01_H to 31_H)</td> <td>Month (01_H to 12_H)</td> <td></td> <td></td> <td></td> </tr> <tr> <td>(S2)+4</td> <td>Minute (00_H to 59_H)</td> <td>Hour (00_H to 23_H)</td> <td></td> <td></td> <td></td> </tr> <tr> <td>(S2)+5</td> <td>Day of week (00_H to 06_H)</td> <td>Second (00_H to 59_H)</td> <td></td> <td></td> <td></td> </tr> </table>	b15	~	b8	b7	~	b0	(S2)+3	Day (01 _H to 31 _H)	Month (01 _H to 12 _H)				(S2)+4	Minute (00 _H to 59 _H)	Hour (00 _H to 23 _H)				(S2)+5	Day of week (00 _H to 06 _H)	Second (00 _H to 59 _H)				—	○
b15		~	b8	b7	~	b0																						
(S2)+3	Day (01 _H to 31 _H)	Month (01 _H to 12 _H)																										
(S2)+4	Minute (00 _H to 59 _H)	Hour (00 _H to 23 _H)																										
(S2)+5	Day of week (00 _H to 06 _H)	Second (00 _H to 59 _H)																										
(S2)+5	00 _H (Sun.) to 06 _H (Sat.)	—	○																									

○: Sets —: Does not set

Point

- When system protection is applied to the target station CPU, clock data cannot be written in.
- In the clock data write by the REQ instruction, the first two digits of the year cannot be changed. To change the first two digits of the year, connect a programming tool to the CPU module to which clock data is written. Then change the clock data.

(c) Response data (the system sets all)

When the target station No. ((S1)+5) is all stations or group specification (81_H to A0_H, FF_H), response data are not stored.

Device	Item	Setting data	Clock data read	Clock data write																									
(D1)+0	Request type	0081 _H : Clock data read 0091 _H : Clock data write (when station number is specified by (S1)+5)	○	○																									
(D1)+1	Sub-request type	0002 _H : Clock data read 0001 _H : Clock data write	○	○																									
(D1)+2	Read clock data	Read clock data is stored in the BCD format.	○	—																									
(D1)+3		<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">b15</td> <td style="text-align: center;">~</td> <td style="text-align: center;">b8 b7</td> <td style="text-align: center;">~</td> <td style="text-align: center;">b0</td> </tr> <tr> <td>(D1)+2</td> <td>Month (01_H to 12_H)</td> <td>Year (00_H to 99_H), last 2 digits</td> <td></td> <td></td> </tr> <tr> <td>(D1)+3</td> <td>Hour (00_H to 23_H)</td> <td>Day (01_H to 31_H)</td> <td></td> <td></td> </tr> <tr> <td>(D1)+4</td> <td>Second (00_H to 59_H)</td> <td>Minute (00_H to 59_H)</td> <td></td> <td></td> </tr> <tr> <td>(D1)+5</td> <td>00_H</td> <td>Day of week (00_H to 06_H)</td> <td></td> <td></td> </tr> </table>	b15	~	b8 b7	~	b0	(D1)+2	Month (01 _H to 12 _H)	Year (00 _H to 99 _H), last 2 digits			(D1)+3	Hour (00 _H to 23 _H)	Day (01 _H to 31 _H)			(D1)+4	Second (00 _H to 59 _H)	Minute (00 _H to 59 _H)			(D1)+5	00 _H	Day of week (00 _H to 06 _H)			○	—
b15		~	b8 b7	~	b0																								
(D1)+2		Month (01 _H to 12 _H)	Year (00 _H to 99 _H), last 2 digits																										
(D1)+3		Hour (00 _H to 23 _H)	Day (01 _H to 31 _H)																										
(D1)+4	Second (00 _H to 59 _H)	Minute (00 _H to 59 _H)																											
(D1)+5	00 _H	Day of week (00 _H to 06 _H)																											
(D1)+4	○	—																											
(D1)+5	○	—																											

○: Stores —: Does not store

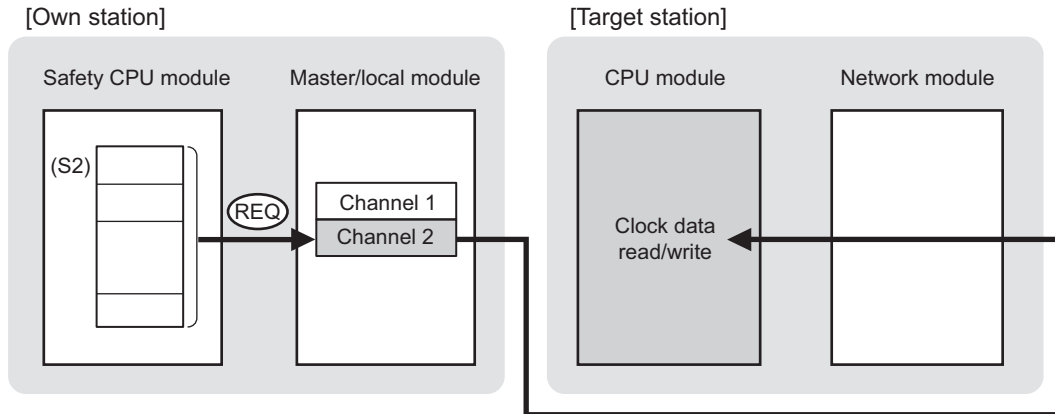
(2) Function

(a) REQ instruction overview

The instruction sends request data (S2) to the target station for requesting service.

Specify the target stations in control data ((S1)+4 and (S1)+5).

When the request to the target station is completed, the completion device (D2) turns on.



(b) Target stations which can be specified

For details on target stations which can be specified, refer to the following.

☞ Page 152, Section 10.1 (1)

(c) Checking the execution status of an REQ instruction

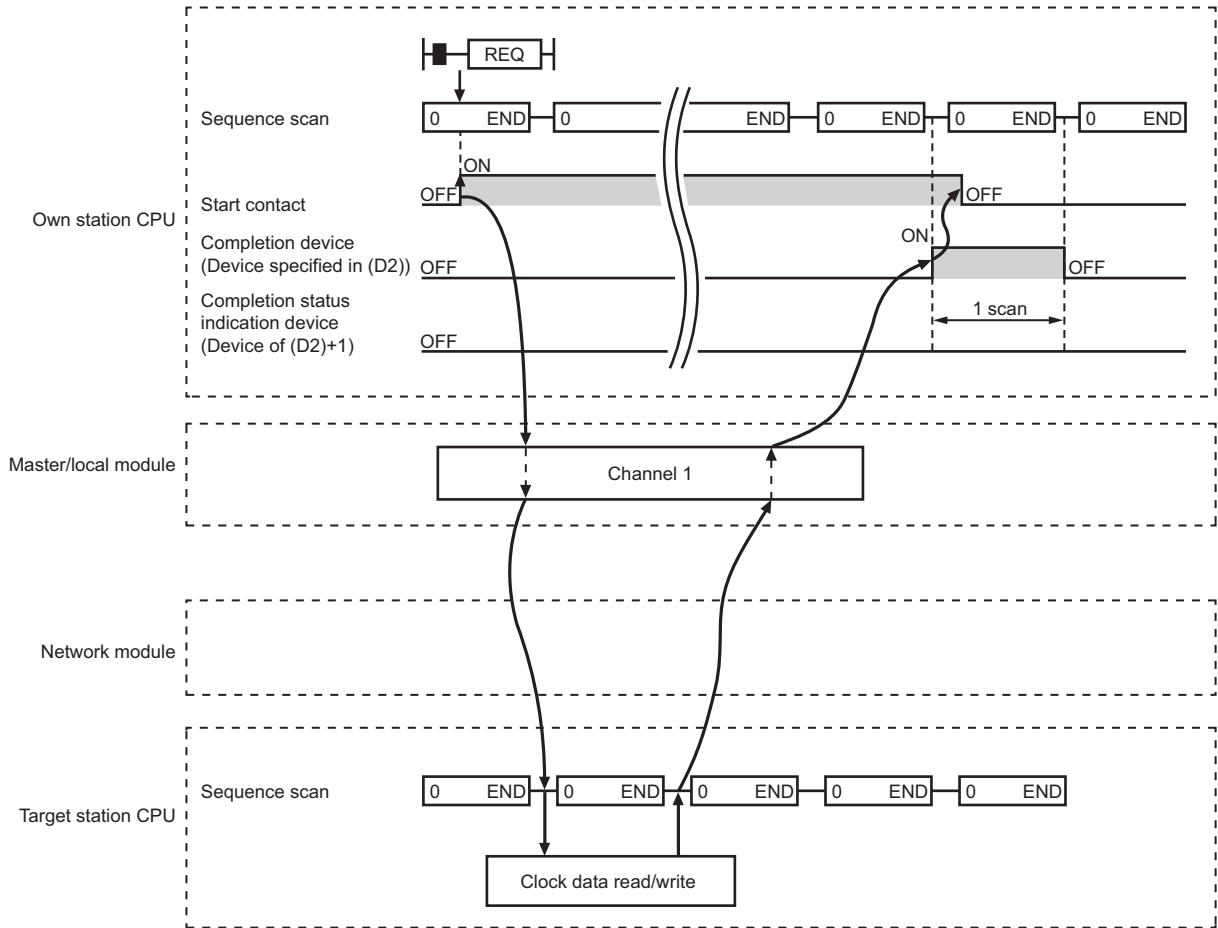
The execution status (completion or error) of the REQ instruction can be checked using the following device specified for the setting data.

- Completion device (D2)
It is turned on in the END processing of the scan after completion of the REQ instruction, and is turned off in the next END processing.
- Completion status indication device ((D2)+1)
It is turned on in the END processing of the scan after completion of the REQ instruction, and is turned off in the next END processing only if the REQ instruction fails.

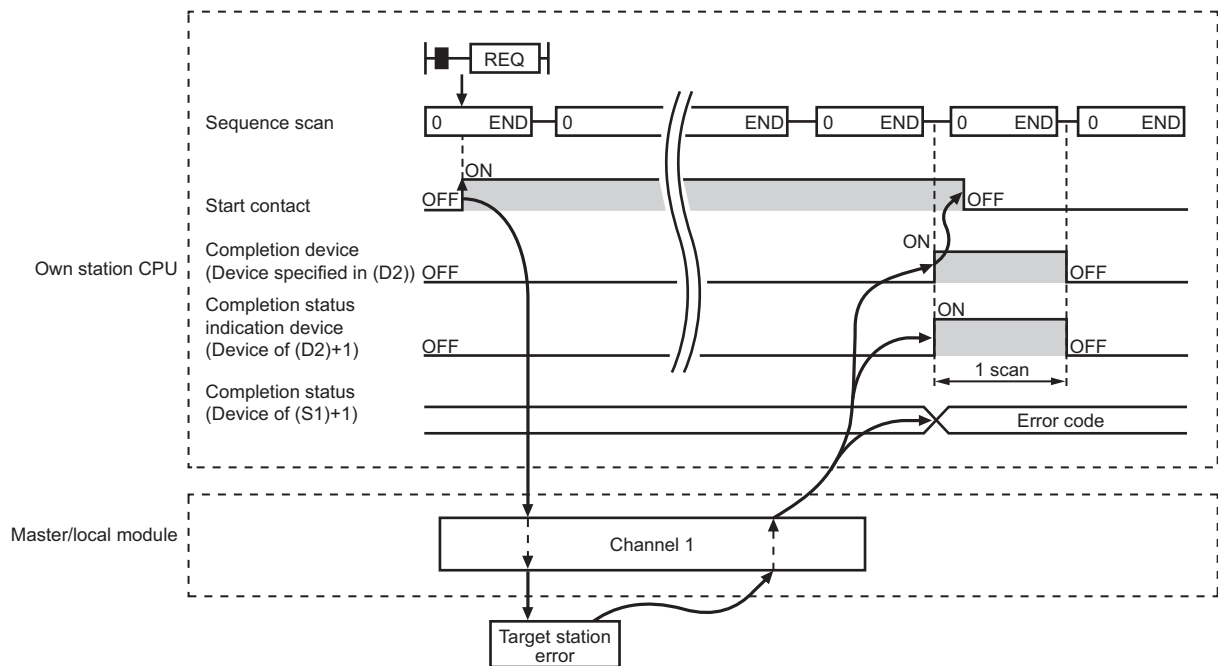
(d) REQ instruction execution timing

When the start contact starts up from OFF to ON, the processing is performed one time.

- When completed



- When failed



(3) Error

When the dedicated instruction fails, error details can be checked by any of the following methods:

(a) In GX Developer

Error details can be checked using CC-Link IE Field Network diagnostics. (☞ Page 124, CHAPTER 9)

(b) By devices

Completion status indication device ((D1)+1) is turned on, and an error code is stored in Completion status ((S1)+1) of the control data.

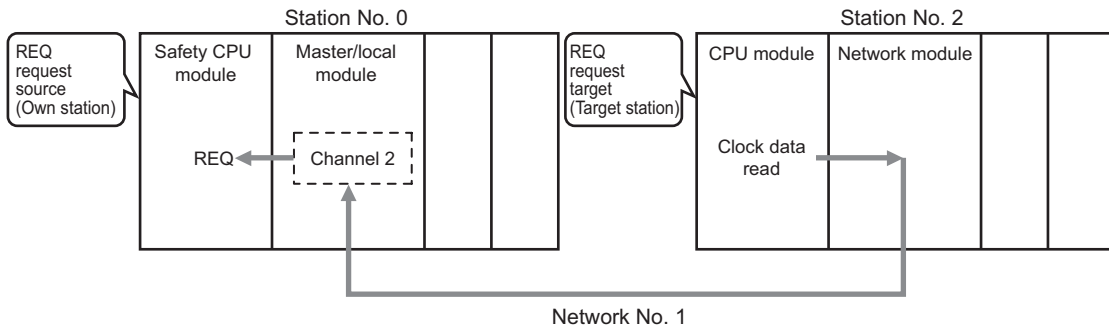
According to the error code, check the error details and take a corrective action.

(☞ Page 246, Section 12.5)

(4) Program example (Reading clock data)

The following program is for reading clock data of the safety CPU module of the station No. 2 (target station) to the station No. 0 (own station) when M131 is turned on.

(a) System configuration example



(b) Devices used in the program example

- Link special relay (SB), Link special register (SW)

Device	Description	Device	Description
SB0047	Baton pass status (own station)	SW00A0.1	Baton pass status (each station) of station No. 2

Remark

For details on link special relay (SB) and link special register (SW), refer to the following:

☞ Page 273, Appendix 3, Page 286, Appendix 4

- Devices used by a user

Device	Description	Device	Description
M130	Control data, request data setting command	D270 to D287	Control data
M131	Start contact	D290 to D291	Request data
M135	Completion device	D300 to D305	Response data
M136	Completion status indication device		—

(c) REQ instruction (clock data read) setting

The following program is for the setting of REQ instruction (clock data read).

- Control data

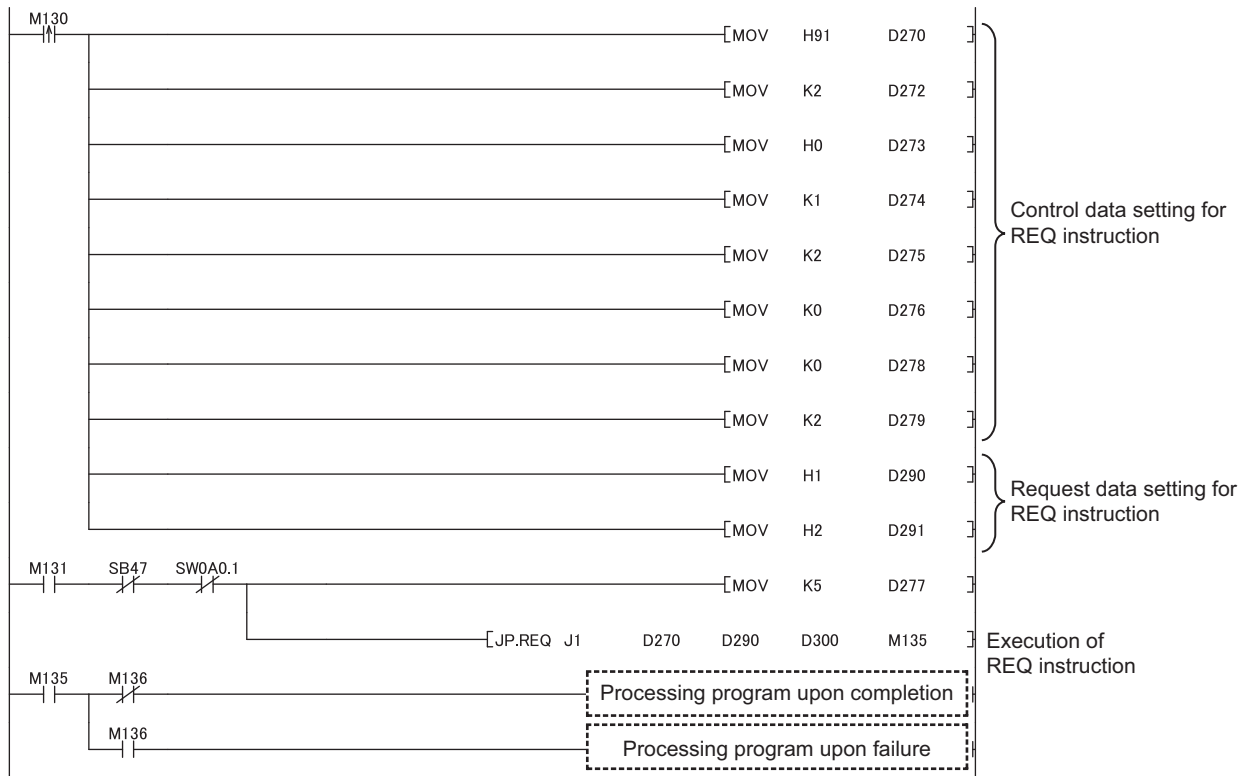
Device		Item	Set value
(S1)+0	D270	Abnormal end type	0091 _H (Sets data for abnormal end)
(S1)+1	D271	Completion status	— (Setting is not required because it is set by the system.)
(S1)+2	D272	Channels used by own station	2
(S1)+3	D273	Target station's CPU type	0000 _H (control CPU)
(S1)+4	D274	Target station's network No.	1
(S1)+5	D275	Target station number	2
(S1)+6	D276	(Unused)	0
(S1)+7	D277	Number of resends	5 times
(S1)+8	D278	Arrival monitoring time	0 (10 seconds)
(S1)+9	D279	Request data length	2 (clock data read)
(S1)+10	D280	Response data length	— (Setting is not required because it is set by the system.)
(S1)+11	D281	Clock set flag	
(S1)+12 to (S1)+15	D282 to D285	Clock data of abnormal end	
(S1)+16	D286	Error-detected station's network No.	
(S1)+17	D287	Error-detected station number	

- Request data

Device		Item	Set value
(S2)+0	D290	Request type	0001 _H (clock data read)
(S2)+1	D291	Sub-request type	0002 _H (clock data read)

(d) Program example

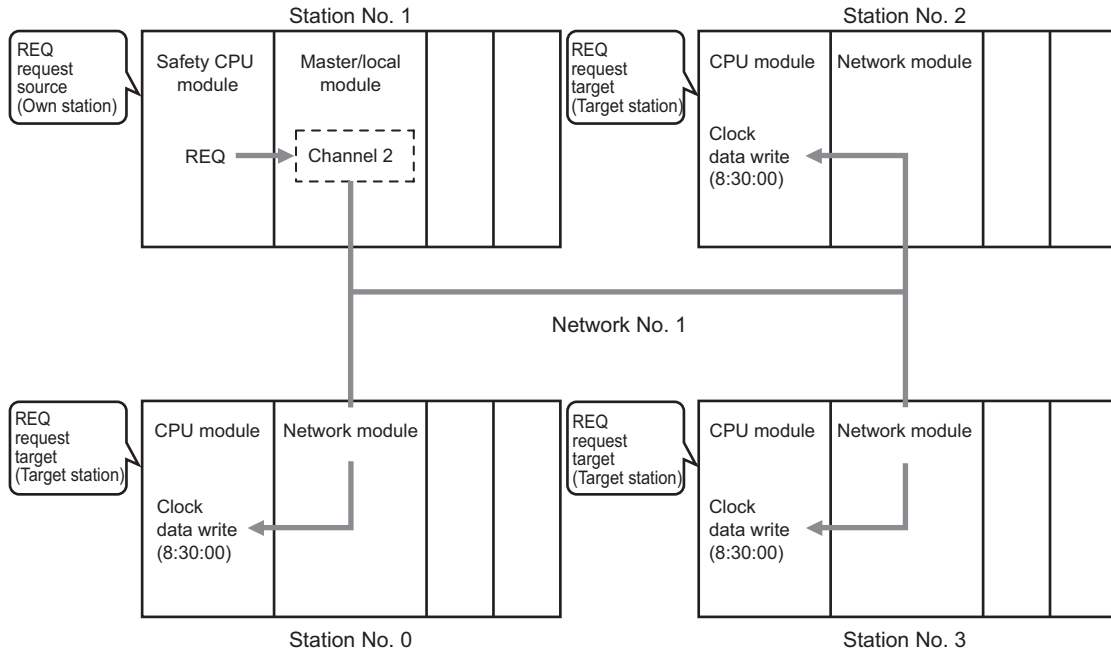
The following program is written to the safety CPU module of station No. 0.



(5) Program example (Writing clock data)

The following program is for writing clock data (8:30:00) in all stations of network No. 1 when M141 is turned on.

- System configuration example




(a) Devices used in the program example

- Link special relay (SB)

Device	Description	Device	Description
SB0047	Baton pass status (own station)	SB00A0	Baton pass status (each station)

Remark

For details on the link special relay (SB), refer to the following.

 Page 273, Appendix 3

- Devices used by users

Device	Description	Device	Description
M140	Control data, request data setting command	D310 to D327	Control data
M141	Start contact	D330 to D335	Request data
M145	Completion device	D340 to D341	Response data
M146	Completion status indication device		—

(b) REQ instruction (clock data write) setting

The following shows the setting of REQ instruction (clock data write).

- Control data

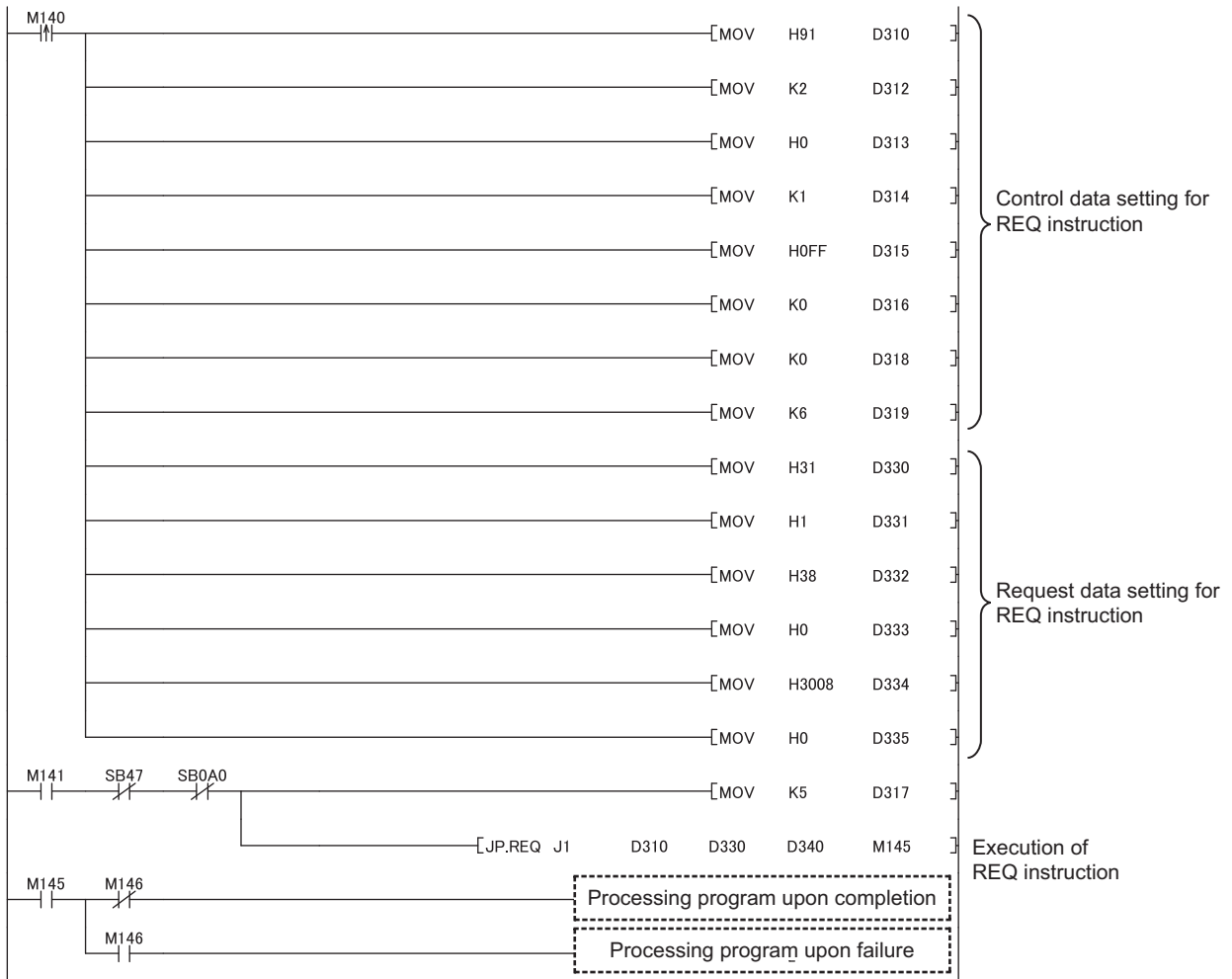
Device		Item	Set value
(S1)+0	D310	Abnormal end type	0091 _H (Sets data for abnormal end)
(S1)+1	D311	Completion status	— (Setting is not required because it is set by the system.)
(S1)+2	D312	Channels used by own station	2
(S1)+3	D313	Target station's CPU type	0000 _H (control CPU)
(S1)+4	D314	Target station's network No.	1
(S1)+5	D315	Target station number	FF _H (all stations)
(S1)+6	D316	(Unused)	0
(S1)+7	D317	Number of resends	5 times
(S1)+8	D318	Arrival monitoring time	0 (10 seconds)
(S1)+9	D319	Request data length	6 (clock data write)
(S1)+10	D320	Response data length	— (Setting is not required because it is set by the system.)
(S1)+11	D321	Clock set flag	
(S1)+12 to (S1)+15	D322 to D325	Clock data of abnormal end	
(S1)+16	D326	Error-detected station's network No.	
(S1)+17	D327	Error-detected station number	

- Request data

Device		Item	Set value
(S2)+0	D330	Request type	0031 _H (Clock data write (when all stations or groups are specified by (S1)+5))
(S2)+1	D331	Sub-request type	0001 _H (clock data write)
(S2)+2	D332	Change pattern, clock data to be changed	0038 _H (change hours, minutes, and seconds)
(S2)+3	D333	Clock data to be changed	0000 _H (date, month (no setting))
(S2)+4	D334		3008 _H (minutes, hours (8:30))
(S2)+5	D335		0000 _H (The day of the week (no setting), second (00 seconds))

(c) Program example

The following program is written to the safety CPU module of station No. 1.



CHAPTER 11 PROGRAMMING

This chapter describes programming and startup examples of when safety and standard communications are made among safety and standard stations on CC-Link IE Field Network.

For programming and startup examples not described in this chapter, refer to the following

Item	Reference
Safety communication between the master station (safety station) and a local station (safety station)	Safety Application Guide
Standard communication between local stations (standard stations)	User's manual for the CC-Link IE Field Network master/local module used

11.1 Precautions for Programming


This section describes precautions to create CC-Link IE Field Network programs.

(1) Safety communication program

Refer to the following.

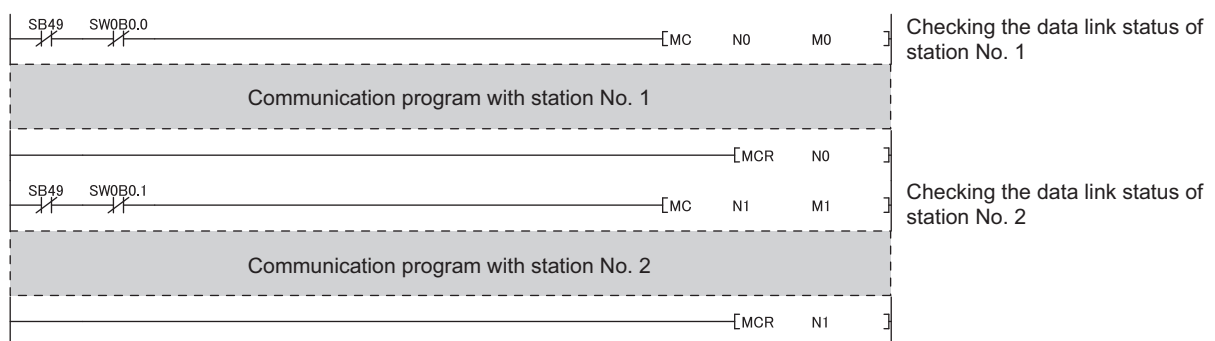
 Safety Application Guide

(2) Cyclic transmission program

For a cyclic transmission program, interlock with the following link special relay (SB) and link special register (SW). ( Page 273, Appendix 3, Page 286, Appendix 4)

- Data link status (own station) (SB0049)
- Data link status (each station) (SW00B0 to SW00B7)

Ex. Interlock example



(3) Transient transmission program

For a transient transmission program, interlock with the following link special relay (SB) and link special register (SW). (☞ Page 273, Appendix 3, Page 286, Appendix 4)

- Baton pass status (own station) (SB0047)
- Baton pass status (each station) (SW00A0 to SW00A7)

Ex. Interlock example



11.2 Communication Example of when Safety Stations and a Standard Station are Used

This section shows an example of when the master station (standard station) communicates with local stations (safety stations).

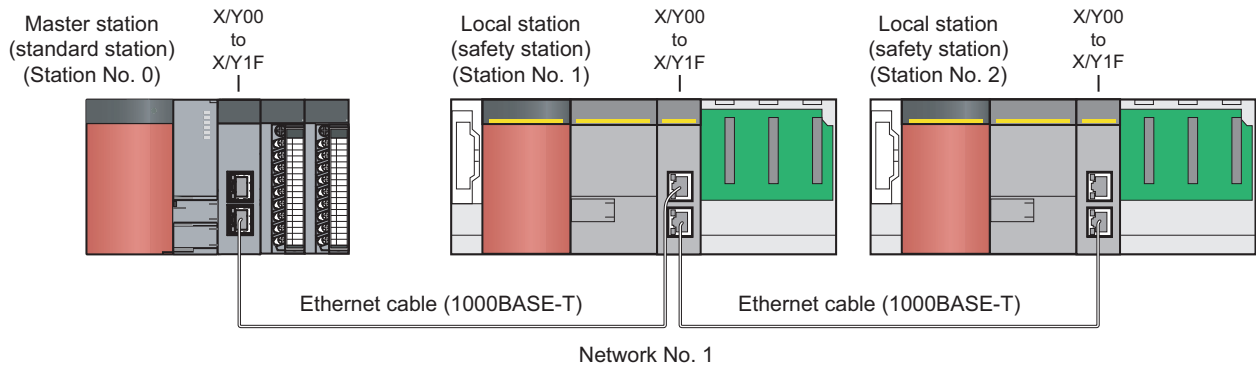
11.2.1 System configuration example

The following system configuration is used to explain communication between the master station (standard station) and local stations (safety stations).

(1) System configuration

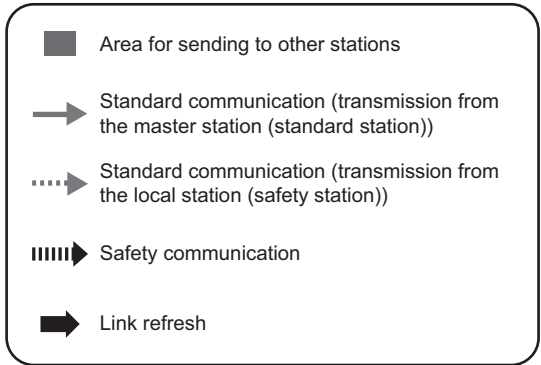
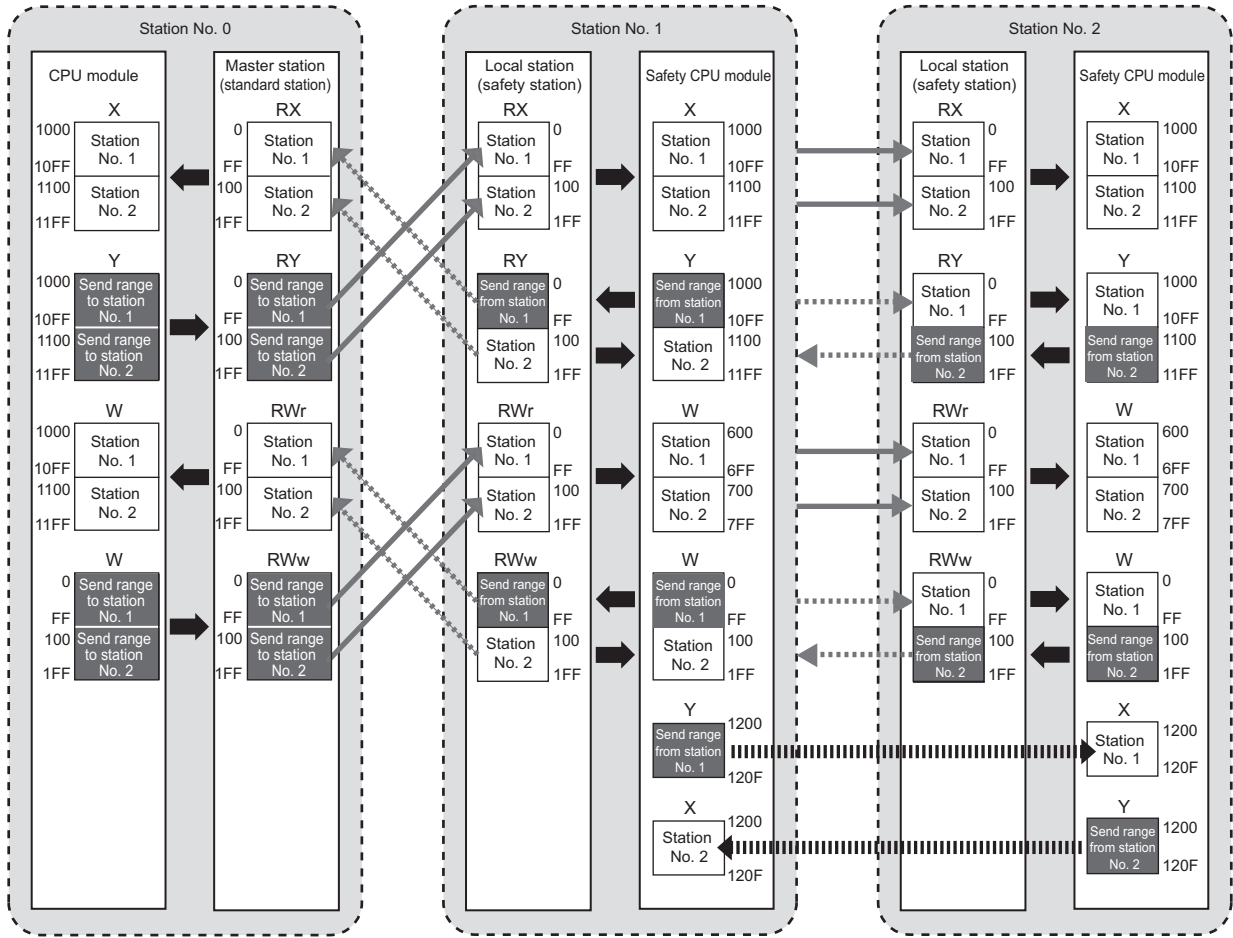
- Power supply module (Q62P)
- CPU module (Q10UDHCPU)
- Q series master/local module (QJ71GF11-T2)
- Input module (QX10)
- Output module (QY10)

- Safety power supply module (QS061P-A1)
- Safety CPU module (QS001CPU)
- Master/local module (QS0J71GF11-T2)



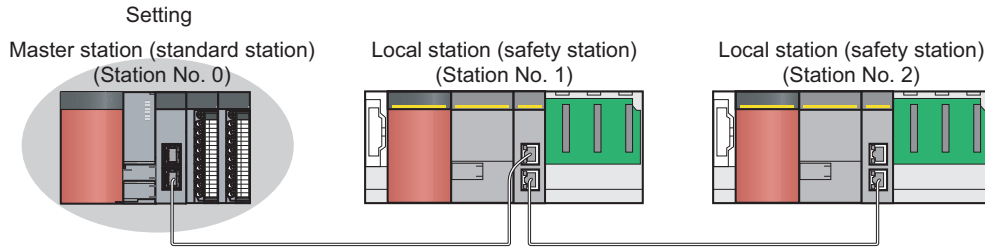
11.2 Communication Example of when Safety Stations and a Standard Station are Used
11.2.1 System configuration example

(2) Device assignment



11.2.2 Master station (standard station) settings

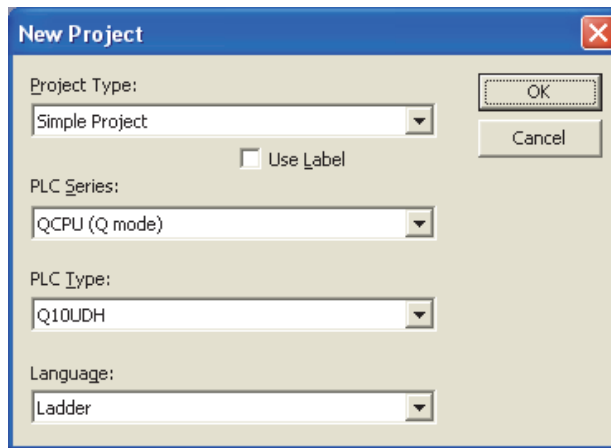
Connect GX Works2 to the master station (standard station) and set parameters.



1. Create a project using GX Works2.

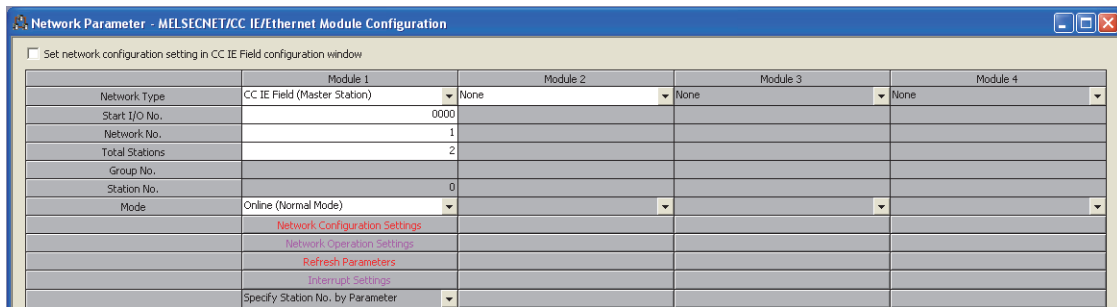
Select "QCPU (Q mode)" in "PLC Series" and "Q10UDH" in "PLC Type".

[Project] ⇒ [New]




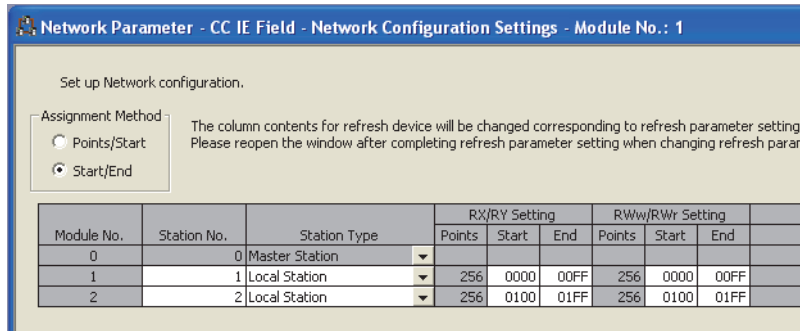
2. Display the network parameter window and set parameters as follows:

Project window ⇒ [Parameter] ⇒ [Network Parameter] ⇒ [Ethernet/CC IE/MELSECNET]




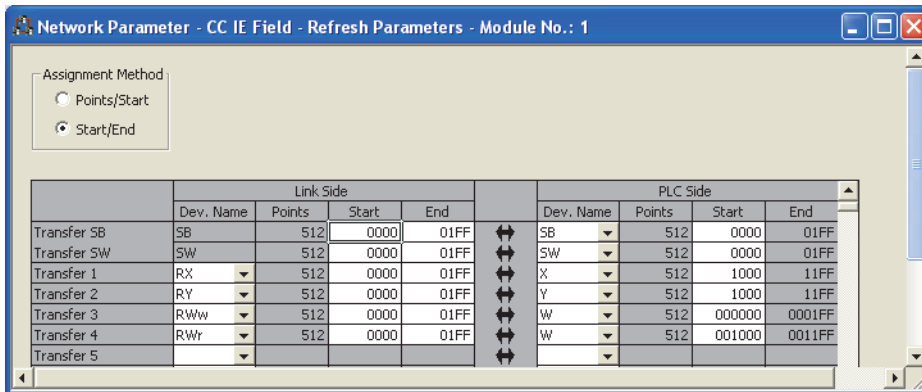
3. Display the network configuration setting window and set parameters as follows:

Project window ⇨ [Parameter] ⇨ [Network Parameter] ⇨ [Ethernet/CC IE/MELSECNET]
 ⇨  button



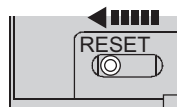
4. Display the refresh parameter window and set parameters as follows:

Project window ⇨ [Parameter] ⇨ [Network Parameter] ⇨ [Ethernet/CC IE/MELSECNET]
 ⇨  button



5. Write the parameters to the CPU module on the master station (standard station), and either reset or power it off and on.

 [Online] ⇨ [Write to PLC]



or powering off → on

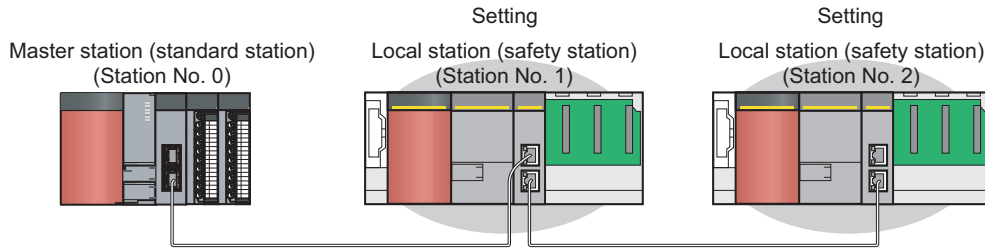
Point

In this example, default values were used for parameters that are not shown above. For parameter setting, refer to the parameter explanation chapter in the following.

 User's manual for the CC-Link IE Field Network master/local module used


11.2.3 Local station (safety station) settings

Connect GX Developer to a local station (safety station) and set parameters.



1. Create a project using GX Developer.

Select "QSCPU" in "PLC series" and "QS001" in "PLC Type".

 [Project] ⇒ [New project]

The 'New Project' dialog box shows the following settings:

- PLC series: QSCPU
- PLC Type: QS001
- Program type: Ladder (selected), SFC, MELSA/PL, ST
- Label setting: Do not use label (selected), Use label (Select when using FB and structures)
- Device memory data which is the same as program data's name is created:
- Setup project name: Setup project name
- Drive/Path: C:\MELSEC
- Project name: Sample1
- Title: Sample program

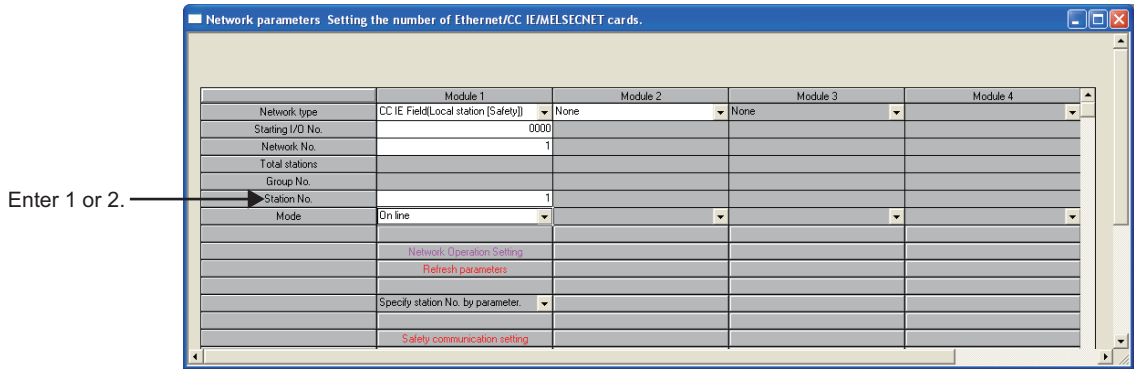
2. Enter a user name and password.

The 'Register new user' dialog box shows the following settings:

- User name: Sample
- Access level: Administrators
- New password: [masked]
- Confirm new password: [masked]
- Access level Administrators explanation: Access level with possible operation of all functions. Password must be set for this access level.

3. Display the network parameter window and set parameters as follows:

Project data list ⇨ [Parameter] ⇨ [Network param] ⇨ [Ethernet/CC IE/MELSECNET]

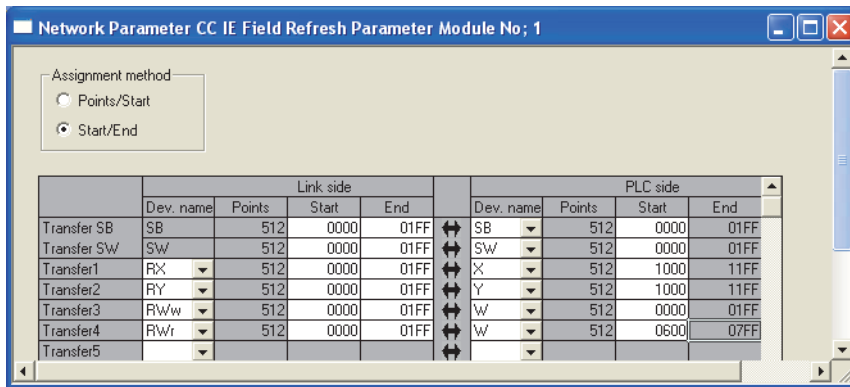


4. Display the refresh parameter window and set parameters as follows:

Set the same refresh parameters for local stations (safety stations) of station No. 1 and station No. 2.

Project data list ⇨ [Parameter] ⇨ [Network param] ⇨ [Ethernet/CC IE/MELSECNET] ⇨

 button



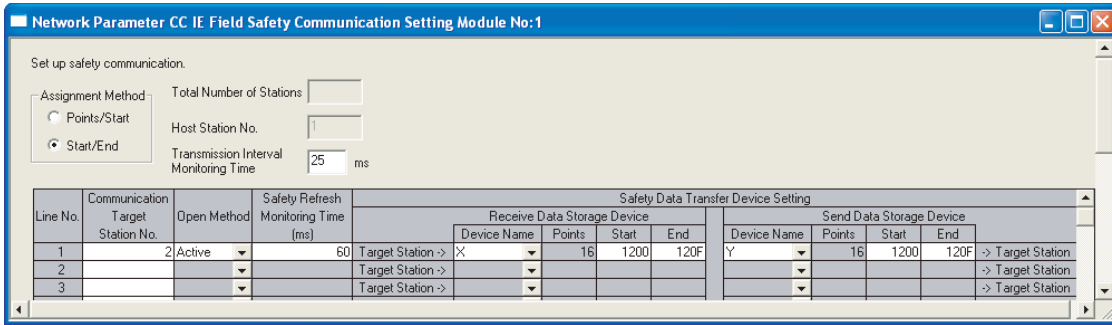
5. Configure safety communication setting.

Set devices for the local stations (safety stations) of station No.1 and station No.2 so that they do not overlap with ones set for refresh parameters.

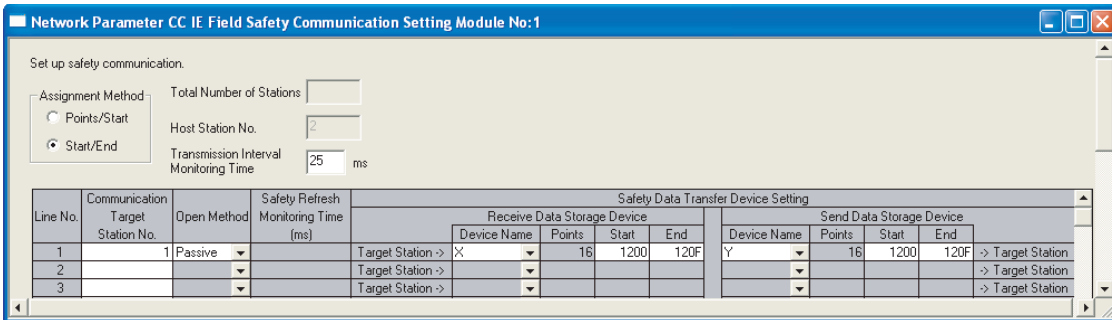
Project data list ⇨ [Parameter] ⇨ [Network param] ⇨ [Ethernet/CC IE/MELSECNET] ⇨

 button

Station No. 1



Station No. 2



6. Write the parameters to the safety CPU modules on the local stations (safety stations), and either reset or power them off and on.

 [Online] ⇨ [Write to PLC]



Point


In this example, default values were used for parameters that are not shown above. For parameter setting, refer to the parameter explanation chapter. (Page 77, CHAPTER 7)

11
11.2. Communication Example of when Safety Stations and a Standard Station are Used
11.2.3. Local station (safety station) settings

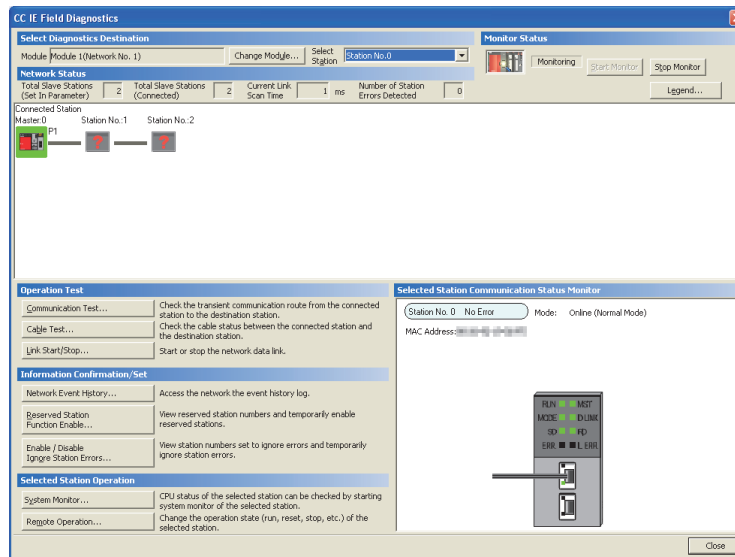
11.2.4 Checking the network status




Once parameters are set for the master station (standard station) and local stations (safety stations), the CC-Link IE Field Network diagnostics of GX Works2 can be used to check whether data link is normally operating.

1. Connect GX Works2 to the master station (standard station).
2. Start CC-Link IE Field Network diagnostics from the menu.

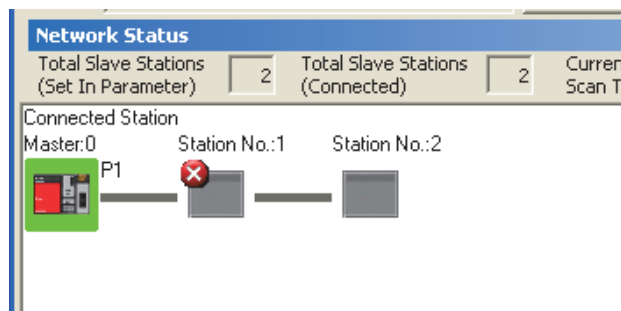
 [Diagnostics] ⇒ [CC IE Field diagnostics]

If the following display appears, data link is normal.



If , , or  is displayed in "Network Status", an error has occurred. Use CC-Link IE Field Network diagnostics to identify the cause of the error and take actions. (☞ Page 127, Section 9.2)

Ex. If an error occurs in a local station (safety station) (station No.1)



11.2.5 Program example

This section shows a program example.

(1) Safety communication among local stations (safety stations)

(a) Devices used in the program

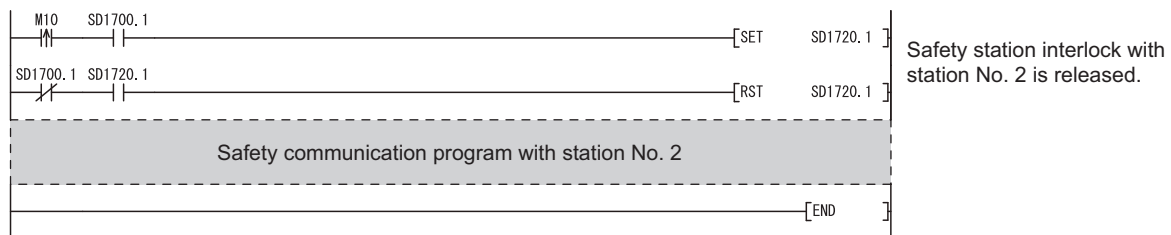
- Devices used by the user

Device	Description
M10	Safety station interlock cancel request signal
SD1700.0	Safety station interlock status of local station (safety station) (station No. 1)
SD1720.0	Safety station interlock cancel request of local station (safety station) (station No. 1)
SD1700.1	Safety station interlock status of local station (safety station) (station No. 2)
SD1720.1	Safety station interlock cancel request of local station (safety station) (station No. 2)

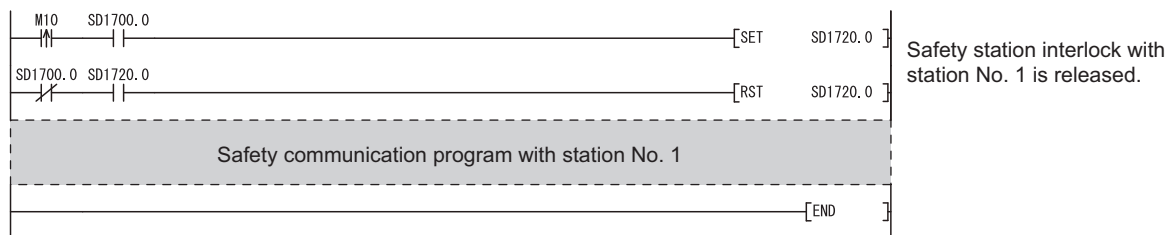
(b) Program example

1. Create the following program in the project for local stations (safety stations) of station No.1 and station No.2 using GX Developer.

Program for a local station (safety station) of station No. 1



Program for a local station (safety station) of station No. 2

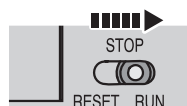


2. Write the program to the safety CPU modules on the local stations (safety stations) (station No.1 and station No.2), and either reset or power them off and on.

[Online] ⇔ [Write to PLC]



3. Set the safety CPU modules on the local stations (safety stations) to RUN.



(2) Standard communication among master station (standard station) and local stations (safety stations)

(a) Devices used in the program

- Link special relay (SB) and link special registers (SW)

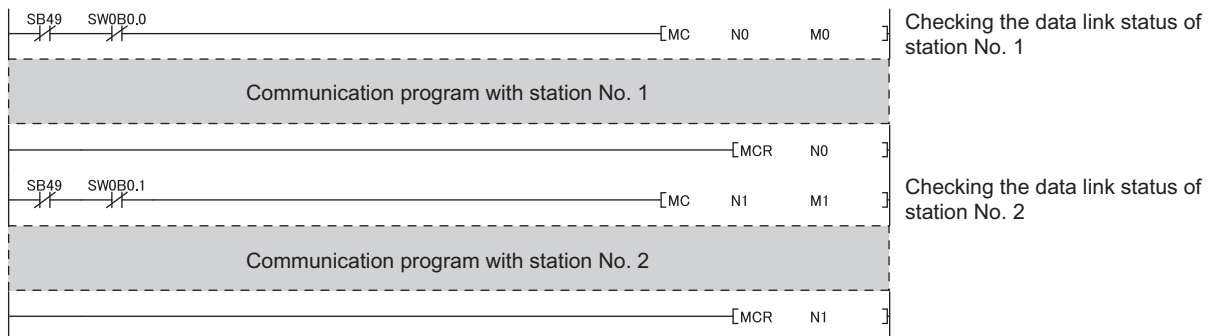
Device	Description	Device	Description
SB0049	Data link status (own station)	SW00B0.0	Data link status (each station) (station No. 1)
—	—	SW00B0.1	Data link status (each station) (station No. 2)

- Devices used by the user

Device	Description
M0	Communication condition establishment flag (station No. 1)
M1	Communication condition establishment flag (station No. 2)
N0	Nesting (station No. 1)
N1	Nesting (station No. 2)

(b) Program example

1. Create the following program in the project for the master station (standard station) using GX Works2.

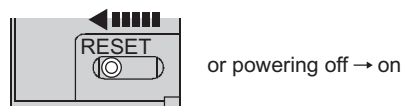


Point

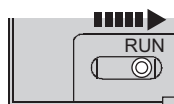
If a response is not received for several link scans, the station is determined as a cyclic transmission faulty station, and the status is stored in Data link status (each station) (SW00B0 to SW00B7).

2. Write the program to the CPU module on the master station (standard station), and either reset or power it off and on.

[Online] ⇔ [Write to PLC]



3. Set the CPU module on the master station (standard station) to RUN.



11.3 Using Link Special Relay (SB) and Link Special Register (SW)


This section describes how to use link special relay (SB) and link special register (SW).

Remark

For details on link special relay (SB) and link special register (SW), refer to the following:

- Page 273, Appendix 3
- Page 286, Appendix 4

(1) Stop and restart of cyclic transmission

Stop and restart of cyclic transmission are executed by CC-Link IE Field Network diagnostics, but can also be executed through link special relays (SB) and link special registers (SW). ( Page 138, Section 9.4)

(a) Stop and restart of cyclic transmission (other station)

(Cyclic transmission stop)

- 1. Specify the station to stop cyclic transmission in the following link special registers (SW).**
 - Specifying a target station
Link stop/start direction (SW0000)
 - Specifying a station number
Link stop/start direction (SW0001 to SW0008)
- 2. Turn on System link stop (SB0003).**
- 3. When the master/local module accepts the request, System link stop request accept status (SB0056) turns on.**
- 4. When cyclic transmission stop is completed, System link stop completion status (SB0057) turns on.**
- 5. Station number of the station that sent the cyclic transmission stop request is stored in Data link stop request station (SW004A). (It is stored in the station that received the stop request.)**
- 6. If cyclic transmission is stopped with error, an error code will be stored in Data link stop status (entire system) (SW0053).**
- 7. Turn off System link stop (SB0003).**

(Cyclic transmission restart)

8. Specify the station to restart cyclic transmission in the following link special registers (SW).

- Specifying a target station
Link stop/start direction (SW0000)
- Specifying a station number
Link stop/start direction (SW0001 to SW0008)

9. Turn on System link start (SB0002).

10. When the master/local module accepts the request, System link start request accept status (SB0054) turns on.

11. When cyclic transmission restart is completed, System link start completion status (SB0055) turns on.

12. If cyclic transmission is restarted with error, an error code will be stored in Data link start status (entire system) (SW0052).

13. Turn off System link start (SB0002).

Number	Description	Number	Description
SB0002	System link start	SW0000	Link stop/start direction
SB0003	System link stop	SW0001 to SW0008	Link stop/start direction
SB0054	System link start request accept status	SW004A	Data link stop request station
SB0055	System link start completion status	SW0052	Data link start status (entire system)
SB0056	System link stop request accept status	SW0053	Data link stop status (entire system)
SB0057	System link stop completion status		—

(b) Cyclic transmission stop/restart (own station)

(Cyclic transmission stop)


- 1.** Turn on Link stop (own station) (SB0001).
- 2.** When the master/local module accepts the request, Link stop request accept status (own station) (SB0052) turns on.
- 3.** When cyclic transmission stop is completed, Link stop completion status (own station) (SB0053) turns on.
- 4.** If cyclic transmission is stopped with error, an error code will be stored in Data link stop status (own station) (SW0051).
- 5.** Turn off Link stop (own station) (SB0001).

(Cyclic transmission restart)

- 6.** Turn on Link start (own station) (SB0000).
- 7.** When the master/local module accepts the request, Link start request accept status (own station) (SB0050) turns on.
- 8.** When cyclic transmission restart is completed, Link start completion status (own station) (SB0051) turns on.
- 9.** If the cyclic transmission is restarted with error, an error code will be stored in Data link start status (own station) (SW0050).
- 10.** Turn off Link start (own station) (SB0000).


Number	Description	Number	Description
SB0000	Link start (own station)	SW0050	Data link start status (own station)
SB0001	Link stop (own station)	SW0051	Data link stop status (own station)
SB0050	Link start request accept status (own station)		
SB0051	Link start completion status (own station)		
SB0052	Link stop request accept status (own station)		
SB0053	Link stop completion status (own station)		

(2) Checking data link status

Data link status is checked by CC-Link IE Field Network diagnostics, but can also be checked through link special relays (SB) and link special registers (SW). ( Page 124, CHAPTER 9)

(a) Checking the data link status (other stations)

1. Link scan time can be checked in SW005A to SW005B and SW0060 to SW0062.
2. If an error occurs in data link, any of the following link special relays (SB) will turn on.
 - Baton pass status (each station) (SB00A0)
 - Baton pass status (master station) (SB00A1)
 - Data link status (each station) (SB00B0)
 - Data link status (master station) (SB00B1)
3. When Baton pass status (each station) (SB00A0) turns on, the station number where an error has occurred is stored in Baton pass status (each station) (SW00A0 to SW00A7).
When Data link status (each station) (SB00B0) turns on, the station number where an error has occurred is stored in Data link status (each station) (SW00B0 to SW00B7).

Details on the causes of error can be checked by link special relay (SB) and link special register (SW) corresponding to the station number where the error has occurred. ( Page 225, Section 11.3 (2) (b))

Number	Description	Number	Description
	—	SW005A	Maximum baton pass station
	—	SW005B	Maximum cyclic transmission station
	—	SW0060	Maximum link scan time
	—	SW0061	Minimum link scan time
	—	SW0062	Current link scan time
SB00A0	Baton pass status (each station)	SW00A0 to SW00A7	Baton pass status (each station)
SB00A1	Baton pass status (master station)		—
SB00B0	Data link status (each station)	SW00B0 to SW00B7	Data link status (each station)
SB00B1	Data link status (master station)		—

Remark


If the master station is powered on before slave stations, data link may be reconfigured. During the reconfiguration (maximum 13 seconds), an error is detected using SB00B0.
Starting up the master station last can prevent data link from being reconfigured.

(b) Checking data link status (own station)

- 1. Link scan time can be checked in SW0060 to SW0062.**
- 2. If an error occurs in data link, either of the following link special relays (SB) will turn on.**
 - Baton pass status (own station) (SB0047)
 - Data link status (own station) (SB0049)
- 3. The cause of error will be stored in the following link special registers (SW).**
 - Baton pass status (own station) (SW0047)
 - Cause of baton pass interruption (SW0048)
 - Cause of data link stop (SW0049)


Number	Description	Number	Description
SB0047	Baton pass status (own station)	SW0047	Baton pass status (own station)
	—	SW0048	Cause of baton pass interruption
SB0049	Data link status (own station)	SW0049	Cause of data link stop
	—	SW0060	Maximum link scan time
		SW0061	Minimum link scan time
		SW0062	Current link scan time

(3) Detecting line errors

Line errors are detected by CC-Link IE Field Network diagnostics, but can also be detected through link special relays (SB) and link special registers (SW). ( Page 124, CHAPTER 9)

(a) Checking line errors on other stations

- 1. If other stations receive an error frame due to a line error, any of the following link special relays (SB) will turn on.**
 - PORT1 error frame reception status (each station) (SB0120)
 - PORT1 error frame reception status (master station) (SB0121)
 - PORT2 error frame reception status (each station) (SB0130)
 - PORT2 error frame reception status (master station) (SB0131)
 - PORT1 error frame detection (each station) (SB0140)
 - PORT1 error frame detection (master station) (SB0141)
 - PORT2 error frame detection (each station) (SB0150)
 - PORT2 error frame detection (master station) (SB0151)
- 2. When one of the link special relays (SB) shown above turns on, the station number that received an error frame can be checked by link special register (SW) of the same number (other than SB0121, SB0131, SB0141, and SB0151).**

Details on the causes of error can be checked by link special relay (SB) and link special register (SW) corresponding to the station number where the error has occurred. ( Page 227, Section 11.3 (3) (b))


Number	Description	Number	Description
SB0120	PORT1 error frame reception status (each station)	SW0120 to SW0127	PORT1 error frame reception status (each station)
SB0121	PORT1 error frame reception status (master station)		—
SB0130	PORT2 error frame reception status (each station)	SW0130 to SW0137	PORT2 error frame status (present)
SB0131	PORT2 error frame reception status (master station)		—
SB0140	PORT1 error frame detection (each station)	SW0140 to SW0147	PORT1 error frame detection (each station)
SB0141	PORT1 error frame detection (master station)		—
SB0150	PORT2 error frame detection (each station)	SW0150 to SW0157	PORT2 error frame detection (each station)
SB0151	PORT2 error frame detection (master station)		—

(b) Checking the line status (own station)

- 1.** If there is a line error in own station, one of SB006A to SB006F is turned on.
- 2.** Line status can be checked by SW0064, and SW0066 to SW006B.

Number	Description	Number	Description
SB006A	PORT1 linkup status (own station)	SW0064	Connection status (own station)
SB006B	PORT2 linkup status (own station)	SW0066	Actual link scan time (lower 1 word)
SB006C	PORT1 error frame reception status (own station)	SW0067	Actual link scan time (upper 1 word)
SB006D	PORT2 error frame reception status (own station)	SW0068	PORT1 line error occurrence rate (max.)
SB006E	PORT1 error frame detection (own station)	SW0069	PORT1 line error occurrence rate (present)
SB006F	PORT2 error frame detection (own station)	SW006A	PORT2 line error occurrence rate (max.)
	—	SW006B	PORT2 line error occurrence rate (present)

(4) Detecting cable disconnections

Cable disconnection is detected by CC-Link IE Field Network diagnostics, but can also be detected through link special relays (SB) and link special registers (SW). ( Page 124, CHAPTER 9)

- 1.** If a cable is disconnected, baton pass error causes **Baton pass status (own station) (SB0047)** to turn on.
- 2.** **30_H** is stored in **Cause of baton pass interruption (SW0048)**.

Details on the causes of error can be checked by link special relay (SB) and link special register (SW) corresponding to the station number where the error has occurred.

Number	Description	Number	Description
SB0047	Baton pass status (own station)	SW0048	Cause of baton pass interruption

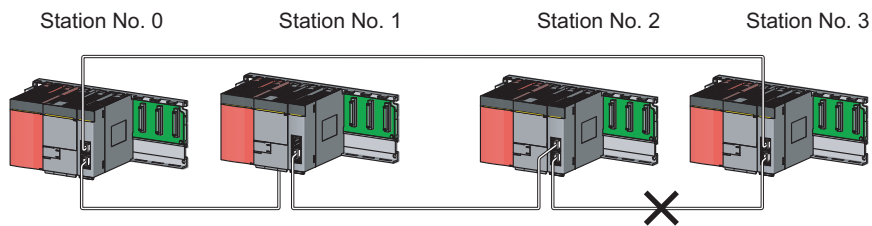
(5) Checking loopback execution status

Whether loopback is being performed or not can be checked through link special relay (SB) and link special registers (SW). (☞ Page 124, CHAPTER 9)

1. While loopback is performed, Loopback status (SB0065) is on.
2. Loopback station numbers are stored to Loopback station number (SW0070 and SW0071).

No.	Description	No.	Description
SB0065	Loopback status	SW0070	Loopback station number 1
	—	SW0071	Loopback station number 2

Ex. Loopback when a cable is disconnected between station No. 2 and stations No. 3



SW0070 and SW0071 store "2" and "3", respectively.

Remark

If the master station is powered on before slave stations, data link may be reconfigured. During the reconfiguration (maximum 13 seconds), an error is detected using SB00B0. Starting up the master station last can prevent data link from being reconfigured.

(6) Checking communication error and network event history

Communication errors and network events are detected by CC-Link IE Field Network diagnostics, but can also be detected through link special relays (SB) and link special registers (SW). (☞ Page 124, CHAPTER 9)

1. The number of communication errors is stored in SW0074 to SW0077, and SW007C to SW007F. The number can be cleared by Clear communication error count (SB0006).
2. When network event history occurs, Event history status (SB007A) is turned on. Number of network event history items is stored in Event history cumulative count (SW007A). The number can be cleared by Event history count clear (SB0009)

Number	Description	Number	Description
SB0006	Clear communication error count		—
SB0009	Event count clear		—
	—	SW0074	PORT1 cable disconnection detection count
	—	SW0075	PORT1 receive error detection count
	—	SW0076	PORT1 total no. of received data (lower 1 word)
	—	SW0077	PORT1 total no. of received data (upper 1 word)
SB007A	Event history status	SW007A	Event count
	—	SW007C	PORT2 cable disconnection detection count
	—	SW007D	PORT2 receive error detection count
	—	SW007E	PORT2 total no. of received data (lower 1 word)
	—	SW007F	PORT2 total no. of received data (upper 1 word)

(7) Checking test results before wiring

Test results are checked through the LED on the master/local module, but can also be checked through link special relays (SB). (☞ Page 60, Section 6.2)

(a) Checking hardware test results

1. When the hardware test is completed, Hardware test completion status (SB0090) is turned on.
2. When failed, Hardware test normal/abnormal end (SB0091) is turned on.

Number	Description	Number	Description
SB0090	Hardware test completion status		—
SB0091	Hardware test normal/abnormal end		

(b) Checking self-loopback test results

1. When the self-loopback test is completed, Self-loopback test completion status (SB0092) is turned on.
2. When failed, Self-loopback test normal/abnormal end (SB0093) is turned on.

Number	Description	Number	Description
SB0092	Self-loopback test completion status		—
SB0093	Self-loopback test normal/abnormal end		

(8) Checking test results after wiring

Test results are checked by CC-Link IE Field Network diagnostics, but can also be checked through link special relays (SB). (☞ Page 67, Section 6.4)

(a) Checking loop test results

1. When a loop test is started, Loop test request accept status (SB009A) is turned on.
2. When the loop test is completed, Loop test completion status (SB0094) is turned on.
3. When failed, Loop test normal/abnormal end (SB0095) is turned on.

Number	Description	Number	Description
SB0094	Loop test completion status		—
SB0095	Loop test normal/abnormal end		
SB009A	Loop test request accept status		

(9) Checking parameter status

The reflection status and setting contents of parameters can be checked by link special relay (SB) and link special register (SW).

(a) Checking the parameter status (other stations)

1. When a station on the network has a parameter error, **Parameter error status (each station) (SB0170)** is turned on.
2. The station number where the parameter error occurs is stored in **Parameter error status (each station) (SW0170 to SW0177)**.
3. Details on the parameters on each station can be checked by the link special relay (SB) and link special register (SW) on each station.

Number	Description	Number	Description
SB0170	Parameter error status (each station)	SW0170 to SW0177	Parameter error status (each station)

(b) Checking the parameter status (own station)

1. When reception of parameters is completed, **Parameter reception status (SB0077)** turns off.
2. When a parameter has an error, **Received parameter error (SB004D)** is turned on and the error code is stored in **Parameter setting status (SW004C)**.

Number	Description	Number	Description
SB004D	Received parameter error	SW004C	Parameter setting status
SB0077	Parameter reception status		—

3. When parameters are reflected in the master/local module, contents of the parameter is stored in the following link special relay (SB) and link special register (SW).

Number	Description	Number	Description
SB0040	Network type (own station)	SW0040	Network No.
	—	SW0042	Station No.
SB0043	Mode (own station)	SW0043	Mode status
SB0044	Station setting (own station) (1)	SW0046	Module type
SB0045	Station setting (own station) (2)	SW0058	Number of total slave stations (setting)
	—	SW0059	Number of total slave stations (current value)
SB0060	Constant scan status	SW0063	Constant link scan set value
SB0072	Scan mode setting information		—
SB0073	Operation status specified for CPU stop error		
SB0074	Reserved station specification status		
SB0075	Error invalid station setting status		
SB0078	Loopback function setting status		
SB007B	Input data status of data link faulty station		
SB007D	Hold/clear status setting for CPU STOP		
SB00C0	Reserved station setting status	SW00C0 to SW00C7	
SB00D0	Error invalid station setting	SW00D0 to SW00D7	Error invalid station setting

(10) Checking CPU module status

CPU module status is checked by CC-Link IE Field Network diagnostics, but can also be checked through link special relays (SB) and link special registers (SW). (☞ Page 124, CHAPTER 9)

(a) Checking the CPU module status (other stations)

- 1. Whether the CPU module is in RUN or STOP can be checked by the following link special relays (SB) and link special register (SW).**
 - CPU RUN status (master station) (SB00F1)
 - When CPU RUN status (each station) (SB00F0) is turned on, check the station number using CPU RUN status (each station) (SW00F0).
- 2. A continuation error of the CPU module can be checked by the following link special relays (SB) and link special register (SW).**
 - CPU operation status (master station) (2) (SB0111)
 - When CPU operation status (each station) (2) (SB0110) is turned on, check the station number using Operation status (each station) (2) (SW0110).
- 3. A stop error of the CPU module can be checked by the following link special relays (SB) and link special register (SW).**
 - CPU operation status (master station) (1) (SB0101)
 - When CPU operation status (each station) (1) (SB0100) is turned on, check the station number using Operation status (each station) (1) (SW0100).

Number	Description	Number	Description
SB00F0	CPU RUN status (each station)	SW00F0	CPU RUN status (each station)
SB00F1	CPU RUN status (master station)		—
SB0100	CPU operation status (each station) (1)	SW0100	Operation status (each station) (1)
SB0101	CPU operation status (master station) (1)		—
SB0110	CPU operation status (each station) (2)	SW0110	Operation status (each station) (2)
SB0111	CPU operation status (master station) (2)		—


(b) Checking safety CPU module status (own station)

- 1. Whether the safety CPU module is in RUN or STOP can be checked by CPU RUN status (own station) (SB004C).**
- 2. If a continuation error occurs in the safety CPU module, Own station's CPU status (1) (SB004A) turns on.
If a stop error occurs in the safety CPU module, Own station's CPU status (2) (SB004B) turns on.**
- 3. The safety CPU module status can be checked by Own station's CPU status (SW004B).**

Number	Description	Number	Description
SB004A	Own station's CPU status (1)		—
SB004B	Own station's CPU status (2)	SW004B	Own station's CPU status
SB004C	CPU RUN status (own station)		—

(11) Dedicated instructions

The following link special relays (SB) and link special registers (SW) are used for dedicated instructions.


( Page 152, CHAPTER 10)

(a) Common link dedicated instruction

Processing results of link dedicated instructions can be checked by Send/receive instruction (1) processing result (SW0030) for channel 1 and Send/receive instruction (2) processing result (SW0031) for channel 2.

Number	Description	Number	Description
	—	SW0030	Send/receive instruction (1) processing result
		SW0031	Send/receive instruction (2) processing result

(12) Canceling/restoring reserved station setting

Canceling/restoring reserved station setting is executed by CC-Link IE Field Network diagnostics, but can also be executed through link special relays (SB) and link special registers (SW). ( Page 142, Section 9.6)

(a) Canceling reserved station setting

1. Specify the station number to cancel reserved station setting in Reserved station function disable/temporary error invalid station setting (SW0010 to SW0017).
2. Turn on Reserved station function disable request (SB0012).
3. Reserved station function disable request accept status (SB005C) is turned on.
4. When reserved station setting is cancelled, Reserved station function disable completion status (SB005D) turns on.
5. Reserved station function disable status (SB0180) is turned on and the station number of the station in reserved station function disable status is stored in Reserved station function disable status (SW0180 to SW0187).
6. When the reserved station setting is cancelled with error, an error code will be stored in Result of reserved station function disable (SW0056).
7. Turn off Reserved station function disable request (SB0012).


Number	Description	Number	Description
SB0012	Reserved station function disable request	SW0010 to SW0017	Reserved station function disable/temporary error invalid station setting
SB005C	Reserved station function disable request accept status	SW0056	Result of reserved station function disable
SB005D	Reserved station function disable completion status		—
SB0180	Reserved station function disable status	SW0180 to SW0187	Reserved station function disable status

(b) Restoring reserved station setting

1. Specify the station number to restore reserved station setting in Reserved station function disable/temporary error invalid station setting (SW0010 to SW0017),
2. Turn on Reserved station specification enable request (SB0013).
3. Reserved station specification enable request accept status (SB005E) is turned on.
4. When cancellation of the reserved station specification is completed, Reserved station specification enabled status (SB005F) is turned on.
5. Use Reserved station function disable status (SW0180 to SW0187) to check whether the station returned to the reserved station. When the network no longer has a station for which reserved station function is disabled, Reserved station function disable status (SB0180) is turned off.
6. When the reserved station setting is restored with error, an error code will be stored in Result of reserved station function enable (SW0057).
7. Turn off Reserved station specification enable request (SB0013).

Number	Description	Number	Description
SB0013	Reserved station specification enable request	SW0010 to SW0017	Reserved station function disable/temporary error invalid station setting
SB005E	Reserved station specification enable request accept status	SW0057	Result of reserved station function enable
SB005F	Reserved station specification enabled status		—
SB0180	Reserved station function disable status	SW0180 to SW0187	Reserved station function disable status

(13) Setting/Canceling a temporary error invalid station

Setting/Canceling a temporary error invalid station is executed by CC-Link IE Field Network diagnostics, but can also be executed through link special relays (SB) and link special registers (SW). ( Page 146, Section 9.7)

(a) Setting a temporary error invalid station

1. Specify the station number to set a temporary error invalid station in Reserved station function disable/temporary error invalid station setting (SW0010 to SW0017),
2. Turn on Temporary error invalid request (SB0010).
3. Temporary error invalid request accept status (SB0058) is turned on.
4. When a temporary error invalid station is set, Temporary error invalid setting completion status (SB0059) turns on.
5. Temporary error invalid station status (SB00E0) turns on, and the station No. of the temporary error invalid station is stored in Temporary error invalid station status (SW00E0 to SW00E7).
6. When the temporary error invalid station is set with error, an error code will be stored in Temporary error invalid station setting result (SW0054).
7. Turn off Temporary error invalid request (SB0010).

Number	Description	Number	Description
SB0010	Temporary error invalid request	SW0010 to SW0017	Reserved station function disable/temporary error invalid station setting
SB0058	Temporary error invalid request accept status	SW0054	Temporary error invalid station setting result
SB0059	Temporary error invalid setting completion status		—
SB00E0	Temporary error invalid station status	SW00E0 to SW00E7	Temporary error invalid station setting

(b) Canceling a temporary error invalid station


1. Specify the station number to cancel a temporary error invalid station in Reserved station function disable/temporary error invalid station setting (SW0010 to SW0017).
2. Turn on Temporary error invalid setting cancel request (SB0011).
3. Temporary error invalid setting cancel request accept status (SB005A) is turned on.
4. When the cancellation is completed, Temporary error invalid setting cancel completion status (SB005B) turns on.
5. Use Temporary error invalid station setting (SW00E0 to SW00E7) to check whether the temporary error invalid station is cancelled. When the network no longer has a temporary error invalid station, Temporary error invalid station status (SB00E0) is turned off.
6. When the temporary error invalid station is cancelled with error, an error code will be stored in Temporary error invalid station setting cancel result (SW0055).
7. Turn off Temporary error invalid setting cancel request (SB0011).

Number	Description	Number	Description
SB0011	Temporary error invalid setting cancel request	SW0010 to SW0017	Reserved station function disable/temporary error invalid station setting
SB005A	Temporary error invalid setting cancel request accept status	SW0055	Temporary error invalid station setting cancel result
SB005B	Temporary error invalid setting cancel completion status		—
SB00E0	Temporary error invalid station status	SW00E0 to SW00E7	Temporary error invalid station setting

CHAPTER 12 TROUBLESHOOTING

This chapter describes errors that may occur on CC-Link IE Field Network, causes of the errors, and corrective actions.

12.1 Before Troubleshooting

Check that the POWER LED of the safety power supply module and the ALIVE LED of the safety CPU module are on. If either or both are off, troubleshoot the safety CPU module. ( QSCPU User's Manual (Hardware Design, Maintenance and Inspection))

12.2 Troubleshooting Procedure

The procedure for identifying the cause of the problem and taking action is explained below.

Use a programming tool supported by the programmable controller used: GX Developer for safety programmable controllers and GX Works2 for standard programmable controllers.

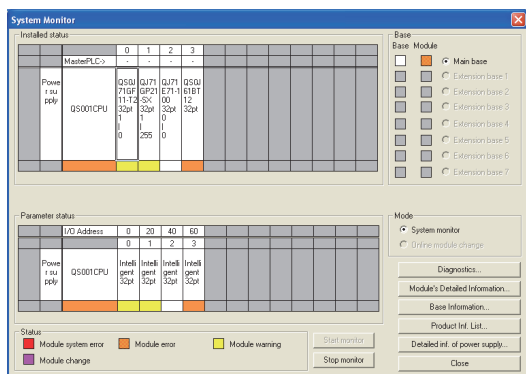
If a slave station cannot be monitored due to cable disconnection or any other error, directly connect the programming tool to the slave station.

(1) Procedure


The following describes a procedure for identifying the cause of an error and the action when the master station is a safety programmable controller.

When the master station is a standard programmable controller, refer to the following.

 User's manual for the CC-Link IE Field Network master/local module used




1. Connect GX Developer to the safety CPU module, and open the "System Monitor" window.


 [Diagnostics] ⇨ [System monitor]

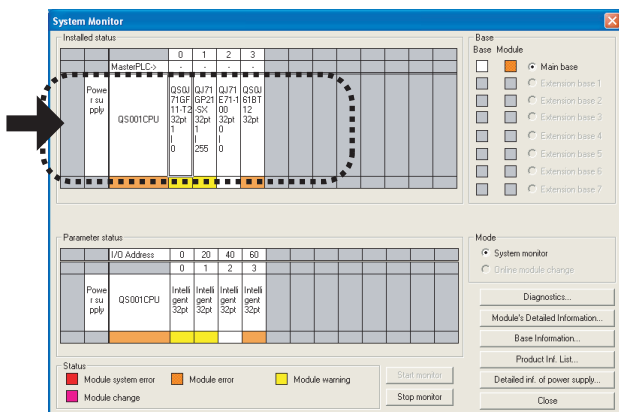
2. Select the module in which an error has occurred.

- When a module other than the master/local module is selected



 Page 237, Section 12.2 (1) (a)

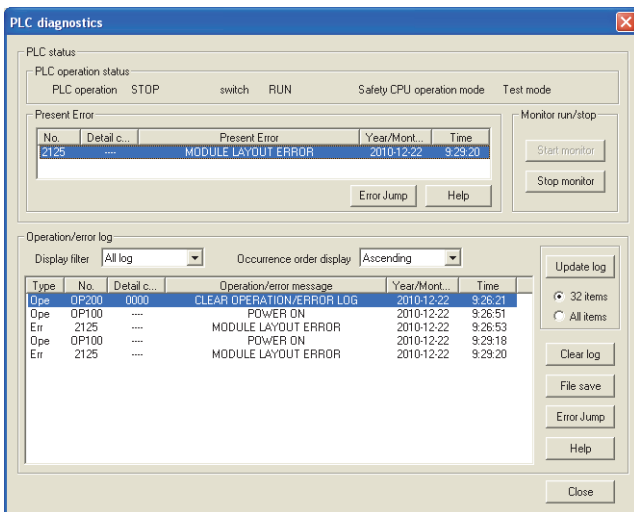
- When the selected module is the master/local module

 Page 238, Section 12.2 (1) (b)



Point

If data link cannot be performed even though no error is indicated in the "System Monitor" window, select the master/local module, and click the  button. ( Page 238, Section 12.2 (1) (b))

(a) Checking for error in modules other than the master/local module

1. Select a module other than the master/local module in the "System Monitor" window, and click the **Diagnostics...** button. The window corresponding to the module will open. (In the illustration on the left, the safety CPU module is selected.)

If the **Diagnostics...** button is not supported by the module, click the **Module's Detailed Information...** button.

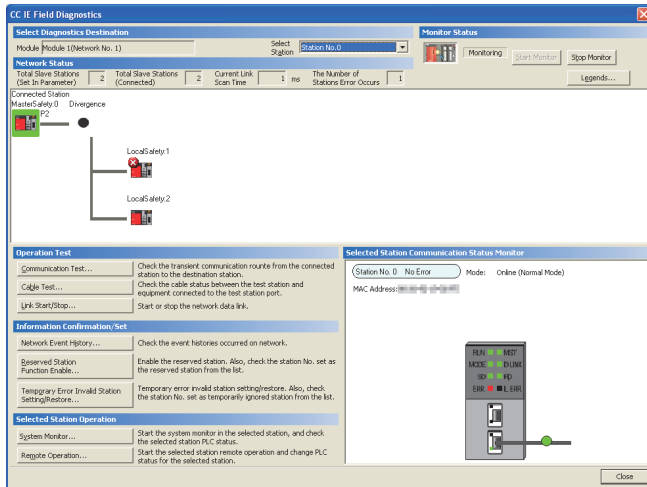
2. Identify the error location and take action.

(User's manual for the module used)

3. If data link cannot be performed even after the above operation is performed, perform the following:

- Checking for error using CC-Link IE Field Network diagnostics (Page 124, CHAPTER 9)
- Checking the LEDs (Page 239, Section 12.3)
- Troubleshooting by symptom (Page 242, Section 12.4)

(b) Checking for error in the master/local module



1. Select the master/local module in the "System Monitor" window, and click the **Diagnostics...** button. The "CC-Link IE Field Diagnostics" window will open. In the CC-Link IE Field Network diagnostics, identify the cause of the error and take action. (☞ Page 124, CHAPTER 9)

2. If data link cannot be performed even after the above operation is performed, perform the following:
 - Checking the LEDs (☞ Page 239, Section 12.3)
 - Troubleshooting by symptom (☞ Page 242, Section 12.4)

12.3 Checking the LEDs

The following explains how to troubleshoot the system by the LEDs.

(1) The RUN LED turns off

Check item	Action
Is the master/local module mounted correctly?	Securely mount the master/local module on the safety base unit.

If the above action does not solve the problem, perform the following tests on the master/local module to check for hardware error.

- Hardware test (☞ Page 60, Section 6.2.1)
- Self-loopback test (☞ Page 62, Section 6.2.2)

(2) The MODE LED turns off or is flashing

Check item	Action
Is the master/local module set to online mode?	Change the mode of the master/local module to Online. (☞ Page 79, Section 7.2)

If the above action does not solve the problem, perform the following tests on the master/local module to check for hardware error.

- Hardware test (☞ Page 60, Section 6.2.1)
- Self-loopback test (☞ Page 62, Section 6.2.2)

(3) The D LINK LED turns off or is flashing

Check item	Action
Is the master station connected to the network and operating normally?	<ul style="list-style-type: none"> • If an error has occurred in the CPU module of the master station, remove the cause of the CPU module error. (☞ Page 235, Section 12.2) • Connect a programming tool, which is supported by the programmable controller used, to the master station. Check if the master station is performing data link using CC-Link IE Field Network diagnostics, and take action. (☞ Page 124, CHAPTER 9) <p>When the master station is the module of the MELSEC-QS series, and there is a local station of the MELSEC iQ-R series module, refer to the following. (☞ Page 320, Appendix 8)</p>
Are 1000BASE-T-compliant Ethernet cables used?	Replace the cables with 1000BASE-T-compliant Ethernet cables. (☞ Page 56, Section 5.2.1)
Is the station-to-station distance 100m or less?	Change the station-to-station distance to 100m or less.
Does the cabling condition (bend radius) meet the specification?	Refer to the manual for the Ethernet cable, and correct the bend radius.
Is any Ethernet cable disconnected?	Replace the Ethernet cable.
Is the loopback function enabled for the master station?	Configure the network in ring topology without a switching hub.
Are other stations connected to the master/local modules operating normally?	Power on the other stations.
Is the switching hub operating normally?	<ul style="list-style-type: none"> • Check if a 1000BASE-T-compliant switching hub is used. (☞ Page 57, Section 5.2.2) • Power off and then on the switching hub.

Check item	Action
<p>Check that the cables are not connected as described below.</p> <ul style="list-style-type: none"> • Both PORT1 and PORT2 are connected to a switching hub. • Although the loopback function is disabled, the network is configured in ring topology. • Although the loopback function is enabled, the network is configured in star topology. • The network is incorrectly configured in ring topology. 	<ul style="list-style-type: none"> • Correct the wiring. (☞ Page 47, Section 5.1.1) • If the system does not contain a switching hub <ul style="list-style-type: none"> • When not using the loopback function <p>Disconnect an Ethernet cable connected to any station on the network (either PORT1 or PORT2).</p> <p>The network topology will become a line topology and data link will start.</p> • When using the loopback function <p>Enable the loopback function and rewrite the network parameter to the CPU module. (☞ Page 121, Section 8.6)</p> • If the system contains a switching hub <ol style="list-style-type: none"> 1. Check if the loopback function setting is correctly configured. (☞ Page 121, Section 8.6) <p>If incorrect, correct the network parameter and rewrite it to the CPU module. When data link starts across the entire network, this procedure is successful.</p> 2. Disconnect one Ethernet cable connected to the switching hub and power off and then on the hub. (Repeat this operation until data link starts over the network.) 3. When data link starts over the network, check the network configuration by CC-Link IE Field Network diagnostics. (☞ Page 124, CHAPTER 9)
<p>Is the station number of the master/local module duplicated with any of the other stations?</p>	<p>Change the duplicated station number.</p>

If the above actions do not solve the problem, perform the following tests on the master/local module to check for an error.

- Hardware test (☞ Page 60, Section 6.2.1)
- Self-loopback test (☞ Page 62, Section 6.2.2)
- Loop test (☞ Page 67, Section 6.4.1)
- Cable test (☞ Page 74, Section 6.4.2)

(4) The ERR. LED turns on

Connect GX Developer to the safety CPU module mounted with the master/local station whose ERR. LED is on, identify the cause of the error, and take action. (☞ Page 235, Section 12.2)

If the cause of the error cannot be identified using GX Developer, perform the following tests to the master/local module to check for hardware error.

- Hardware test (☞ Page 60, Section 6.2.1)
- Self-loopback test (☞ Page 62, Section 6.2.2)

(5) The ERR. LED is flashing

Check item	Action
<p>Is the disconnected station displayed in the network configuration diagram of CC-Link IE Field Network diagnostics?</p>	<p>Perform the troubleshooting shown in "When the D LINK LED turned off or is flashing". (☞ Page 239, Section 12.3 (3))</p>

If the above action does not solve the problem, "Total Stations" set in the Network Parameter window for the master station differs from the number of slave stations on the network. Correct the parameter.

(6) The L ERR. LED turns on

Check item	Action
Are the Ethernet cables operating normally?	<ul style="list-style-type: none"> • Check if 1000BASE-T-compliant Ethernet cables are used. (☞ Page 33, Section 3.2) • Check if the station-to-station distance is 100m or less. (☞ Page 66, Section 6.3 (2)) • Check if the Ethernet cables are not disconnected.
Is the switching hub operating normally?	<ul style="list-style-type: none"> • Check if a 1000BASE-T-compliant switching hub is used. (☞ Page 57, Section 5.2.2) • Check if the switching hub is on.
Are other stations connected to the master/local modules operating normally?	Check if the systems on other stations are on.
Is the master station set to online mode?	Change the mode of the module to Online. (☞ Page 79, Section 7.2)
Is there any noise affecting the system?	Check the wiring condition.
Is the loopback function enabled for the master station?	When the loopback function is enabled, check if the ring topology is correctly configured for the port where the L ERR. LED is on. (☞ Page 47, Section 5.1.1)

If the above actions do not solve the problem, follow the directions shown in "Communication is unstable".

(☞ Page 245, Section 12.4.6)

(7) The LINK LED turns off

Check item	Action
Are 1000BASE-T-compliant Ethernet cables used?	Replace the cables with 1000BASE-T-compliant Ethernet cables. (☞ Page 56, Section 5.2.1)
Is the station-to-station distance 100m or less?	Change the station-to-station distance to 100m or less.
Does the cabling condition (bend radius) meet the specification?	Refer to the manual for the Ethernet cable, and correct the bend radius.
Is any Ethernet cable disconnected?	Replace the Ethernet cable.
Are the switching hub and other stations connected to the master/local module normal?	Power on the switching hub and the other stations.

If the above actions do not solve the problem, perform the following tests on the master/local module to check for an error.


- Hardware test (☞ Page 60, Section 6.2.1)
- Self-loopback test (☞ Page 62, Section 6.2.2)
- Cable test (☞ Page 74, Section 6.4.2)

12.4 Troubleshooting by Symptom

Troubleshooting methods are described by symptom. Perform these troubleshooting if the following communications cannot be established even though no error is detected in the master/local module.










- Safety communication
- Cyclic transmission
- Transient transmission

If an error has occurred in the master/local module, identify the error cause using GX Developer.

( Page 235, Section 12.2)

12.4.1 Safety communication cannot be established

The following lists the actions to be taken if safety communication cannot be established.

Check item	Action
In Network Configuration Setting of the master station, is the safety station specified as a reserved station?	Cancel the reserved station setting. ( Page 81, Section 7.3)
Do the station numbers set in Network Configuration Setting of the master station match those set for corresponding safety stations?	Correct station number (s).
Is safety connection set among safety stations that perform safety communication?	Set safety connection among safety stations that perform safety communication in "Safety Communication Setting". ( Page 90, Section 7.6)
Is the same "Open Method" set to safety stations that perform safety communication?	Set one of the safety stations "Active" and the other "Passive". ( Page 90, Section 7.6)
Is the transmission interval monitoring time value valid?	Correct the transmission interval monitoring time value. ( Page 308, Appendix 5.4)
Is the safety refresh monitoring time value valid?	Correct the safety refresh monitoring time value. ( Page 309, Appendix 5.5)
Does safety station interlock status (SM1700, SD1700 to SD1707) indicate interlock status?	Release the interlock using safety station interlock release request (SM1720, SD1720 to SD1727). ( Page 100, Section 8.1.3)
Is a standard station set in "Communication Target Station No." in "Safety Communication Setting"?	Set a safety station for "Communication Target Station No.". ( Page 90, Section 7.6)
Is "Safety Data Transfer Device Setting" correctly set?	Correct "Safety Data Transfer Device Setting" set for the safety stations that perform safety communication. ( Page 90, Section 7.6)
Is any transfer target device in "Safety Data Transfer Device Setting" overlapped with any refresh target device of another network module?	Correct "Safety Data Transfer Device Setting" or the refresh parameters. Overlap of a transfer target device can be checked in the "Assignment Image" window through a programming tool supported by the programmable controller used. ( Page 88, Section 7.5 (2))

If the above actions do not solve the problem, perform the following tests on the master/local module to check for hardware error.

- Hardware test ( Page 60, Section 6.2.1)
- Self-loopback test ( Page 62, Section 6.2.2)

12.4.2 Cyclic transmission cannot be performed

The following lists the actions to be taken if cyclic data are not delivered to the master or a slave station.

Check item	Action
Is the D LINK LED of the master or slave station on?	If the D LINK LED is flashing or off, perform troubleshooting. (☞ Page 239, Section 12.3 (3))
In the network configuration settings of the master station, is a slave station specified as a reserved station?	Cancel the reserved station setting. (☞ Page 81, Section 7.3)
In the network configuration settings of the master station, is "RX/RX Setting" or "RWw/RWr Setting" for slave stations configured?	Set RX/RX or RWw/RWr data for each slave station within the allowable range. (☞ Page 81, Section 7.3)
Do the station numbers set in the network configuration settings of the master station match those set for corresponding slave stations?	Correct station number (s).
Do the station types set in the network configuration settings of the master station match those set for the connected slave stations?	Check the station types set in "Network Configuration Setting" of the master station.
Are the refresh parameters set within correct ranges?	Correct the refresh parameters. Link devices and link refresh assignment can be confirmed in either of the following. <ul style="list-style-type: none"> • Network Configuration Settings (☞ Page 81, Section 7.3) • "Assignment Image" window (☞ Page 88, Section 7.5 (2))
Is any refresh target device in the refresh parameter window overlapped with that of another network module?	Correct the refresh parameters. Overlap of a refresh target device can be checked in the "Assignment Image" window through a programming tool supported by the programmable controller used. (☞ Page 88, Section 7.5 (2))
Is the station number of the master/local module duplicated with any of the other stations?	Change the duplicated station number.

If the above actions do not solve the problem, perform the following tests on the master/local module to check for hardware error.

- Hardware test (☞ Page 60, Section 6.2.1)
- Self-loopback test (☞ Page 62, Section 6.2.2)

12.4.3 Transient transmission cannot be performed

The following lists the actions to be taken if transient transmission cannot be performed with the target station, and a programming tool supported by the programmable controller used cannot perform monitoring.

Check item	Action
Is the D LINK LED of the master or slave station on or flashing?	If the D LINK LED is off, perform troubleshooting. (☞ Page 239, Section 12.3 (3))
Is the baton passing status of the target station normal?	In the CC-Link IE Field Network diagnostics, identify the cause of the error and take action. (☞ Page 124, CHAPTER 9)
Are the following control data of the dedicated instruction correct? <ul style="list-style-type: none">• Target station's CPU type• Target station's network number• Target station number	Correct the control data of the dedicated instruction.
Is the station number of the master/local module duplicated with any of the other stations?	Change the duplicated station number.

If the above actions do not solve the problem, perform the following tests on the master/local module to check for an error.

- Hardware test (☞ Page 60, Section 6.2.1)
- Self-loopback test (☞ Page 62, Section 6.2.2)
- Communication test (☞ Page 75, Section 6.4.3)

12.4.4 Station is disconnected from the network

The following is the troubleshooting action to be taken when a station in data link is disconnected.

Check item	Action
Is the ambient temperature for the module within the specified range?	Keep the ambient temperature within the specified range by taking action such as removing heat source.

If the above action does not solve the problem, perform the following tests on the master/local module to check for an error.

- Hardware test (☞ Page 60, Section 6.2.1)
- Self-loopback test (☞ Page 62, Section 6.2.2)
- Cable test (☞ Page 74, Section 6.4.2)

12.4.5 Station is repeatedly disconnected and reconnected

The following lists the troubleshooting actions to be taken when a station in data link is repeatedly disconnected and reconnected.

Check item	Action
Are 1000BASE-T-compliant Ethernet cables used?	Replace the cables with 1000BASE-T-compliant Ethernet cables. (☞ Page 56, Section 5.2.1)
Is the station-to-station distance 100m or less?	Change the station-to-station distance to 100m or less.
Does the cabling condition (bend radius) meet the specification?	Refer to the manual for the Ethernet cable, and correct the bend radius.
Is any Ethernet cable disconnected?	Replace the Ethernet cable.
Is the switching hub normal?	Power on the switching hub.

If the above actions do not solve the problem, perform the following tests on the master/local module to check for an error.

- Hardware test (☞ Page 60, Section 6.2.1)
- Self-loopback test (☞ Page 62, Section 6.2.2)
- Cable test (☞ Page 74, Section 6.4.2)

12.4.6 Communication is unstable

The following lists the troubleshooting actions to be taken when link scan time or transmission delay time is long or when a transient transmission timeout occurred.

Check item	Action
Is the L ERR. LED of the master or slave station off?	If the L ERR. LED is on or flashing, perform troubleshooting. (☞ Page 241, Section 12.3 (6))
Is the ambient temperature for the module within the specified range?	Keep the ambient temperature within the specified range by taking action such as removing heat source.
Is any error shown in "Selected Station Communication Status Monitor" of CC-Link IE Field Network diagnostics?	If an error is identified at PORT1 or PORT2, perform a cable test and a self-loopback test.
Is there any noise affecting the system?	Check the wiring condition.

If the above actions do not solve the problem, perform the following tests on the master/local module to check for an error.

- Hardware test (☞ Page 60, Section 6.2.1)
- Self-loopback test (☞ Page 62, Section 6.2.2)
- Cable test (☞ Page 74, Section 6.4.2)

12.5 Error Code List

Error codes of the master/local module are listed below.

Error code	Error	Action
D000 _H to D007 _H	Network module failure	<ul style="list-style-type: none"> • A malfunction may have occurred due to noise. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
D00F _H	Network module failure	<ul style="list-style-type: none"> • A malfunction may have occurred due to noise. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
D010 _H	Parameter error (RX size over)	Correct the points assigned to the RX devices.
D011 _H	Parameter error (RY size over)	Correct the points assigned to the RY devices.
D012 _H	Parameter error (RWw size over)	Correct the points assigned to the RWw devices.
D013 _H	Parameter error (RW _r size over)	Correct the points assigned to the RW _r devices.
D014 _H to D016 _H	Network module failure	<ul style="list-style-type: none"> • A malfunction may have occurred due to noise. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
D018 _H	Parameter error (constant link scan time error)	Correct the constant link scan time.
D019 _H to D01C _H	Network module failure	<ul style="list-style-type: none"> • A malfunction may have occurred due to noise. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
D020 _H	Network module failure	<ul style="list-style-type: none"> • A malfunction may have occurred due to noise. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
D030 _H to D033 _H	Connection failure	Correct the wiring.
D035 _H	Connection failure	Correct the wiring.
D036 _H	Network module failure	<ul style="list-style-type: none"> • A malfunction may have occurred due to noise. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
D037 _H	Incorrect number of stations	<ul style="list-style-type: none"> • Check the network status using the CC-Link IE Field Network diagnostics of the programming tool. • If the number of slave stations per network is more than 120, reduce it to 120 or less.

Error code	Error	Action
D040 _H	Network module failure	<ul style="list-style-type: none"> • A malfunction may have occurred due to noise. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
D041 _H	Incorrect number of stations	<ul style="list-style-type: none"> • Check the network status using the CC-Link IE Field Network diagnostics of the programming tool. • If the number of slave stations per network is more than 120, reduce it to 120 or less.
D080 _H to D084 _H	Network module failure	<ul style="list-style-type: none"> • A malfunction may have occurred due to noise. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
D0A0 _H	Transient data transmission response wait timeout	<ul style="list-style-type: none"> • If the own station, target station, or relay station is disconnected from the network, identify the cause of the disconnection and take action. • When the mode of the master station is "Online (High Speed Mode)", change it to "Online (Normal Mode)" and retry the operation. • When the target station or the relay station is overloaded and cannot receive transient data, reduce the frequency of transient transmission and retry the operation.
D0A1 _H	Transient data transmission completion wait timeout	<ul style="list-style-type: none"> • Check if the cables and the switching hub are connected properly. • Exchange the cable connected to PORT1 with that connected to PORT2, and retry the operation. • Reduce the frequency of transient transmission, and retry the operation. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
D0A2 _H	Transient data transmission processing wait timeout	<ul style="list-style-type: none"> • Reduce the frequency of transient transmission, and retry the operation. • Check if the switching hub and the cables at the request source are connected properly.
D0A3 _H	Transient data transmission error	<ul style="list-style-type: none"> • If the own station, target station, or relay station is disconnected from the network, identify the cause of the disconnection and take action. • Correct the number of the station for which transient data is to be sent, and retry the operation. • If the station for which transient data is to be sent is on another network, check if the routing parameters for each station are correctly set.
D0A4 _H to D0A6 _H	Transient transmission failed	<ul style="list-style-type: none"> • Check if the cables and the switching hub are connected properly. • Exchange the cable connected to PORT1 with that connected to PORT2, and retry the operation. • Reduce the frequency of transient transmission, and retry the operation. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
D0A7 _H	Transient reception failed	<ul style="list-style-type: none"> • Check if the cables and the switching hub are connected properly. • Exchange the cable connected to PORT1 with that connected to PORT2, and retry the operation. • Reduce the frequency of transient transmission, and retry the operation. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
D0C0 _H	Reserved station specification failed (another process in progress)	Wait for a while, and reserve the station again.

Error code	Error	Action
D0C1 _H	Reserved station cancellation failed (another process in progress)	Wait for a while, and cancel the reserved station setting again.
D0C2 _H	Data link stop failed (another process in progress)	Wait for a while, and instruct the data link stop again.
D0C3 _H	Data link start failed (another process in progress)	Wait for a while, and instruct the data link start again.
D0C4 _H	Temporary error invalid station setting failed (another process in progress)	Wait for a while, and set the temporary error invalid station again.
D0C5 _H	Temporary error invalid station cancellation failed (another process in progress)	Wait for a while, and cancel the temporary error invalid station setting again.
D0C6 _H	Another station number change failed (another process in progress)	Wait for a while, and set the station number of another station.
D0D0 _H	Another station number setting failed (another process in progress)	Wait for a while, and set the station number of another station.
D0E0 _H	Station type mismatch	In "Network Configuration Setting" for the master station, change the station type to that of the own station.
D0E1 _H	Own station reserved	<ul style="list-style-type: none"> • In "Network Configuration Setting" for the master station, cancel the reserved station setting. • Change the station number of the own station to a station number that is not reserved.
D0E2 _H	Station No. duplication (own station)	<ul style="list-style-type: none"> • Set a unique station number. • After taking the above action, power off and on all the stations that detected the station number duplication error, or reset them.
D0E3 _H	Own station No. out of range	Add information of the own station to "Network Configuration Setting" of the master station.
D0E4 _H	Multiple master stations (including own station)	<ul style="list-style-type: none"> • Check the network status using the CC-Link IE Field Network diagnostics of the programming tool. • Check if the cables and the switching hub are connected properly. • After taking the above action, power off and on all the stations that detected this error, or reset them.
D0F0 _H	Network module failure	<ul style="list-style-type: none"> • A malfunction may have occurred due to noise. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
D100 _H to D101 _H	Network module failure	<ul style="list-style-type: none"> • A malfunction may have occurred due to noise. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
D110 _H to D113 _H	Network module failure	<ul style="list-style-type: none"> • A malfunction may have occurred due to noise. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
D200 _H	Transient data received twice	<ul style="list-style-type: none"> • Check the network status using the CC-Link IE Field Network diagnostics of the programming tool. • Check if the cables and the switching hub are connected properly. • If the request source is on another network, check if the routing parameters are correctly set.

Error code	Error	Action
D201 _H	Header information error in transient transmission	Correct the header information at the request source, and retry the operation.
D202 _H	Send buffer full	<ul style="list-style-type: none"> • Reduce the frequency of transient transmission, and retry the operation. • When the mode of the master station is "Online (High Speed Mode)", change it to "Online (Normal Mode)" and retry the operation. • Check if the cables and the switching hub are connected properly.
D203 _H	Read/write address error in transient transmission	Correct the read/write address at the request source, and retry the operation.
D204 _H	Network No. error in transient transmission	<ul style="list-style-type: none"> • Correct the network number at the request source, and retry the operation. • If the request source is on another network, check if the routing parameters are correctly set.
D205 _H	Target station No. error in transient transmission	Correct the target station number at the request source, and retry the operation.
D206 _H	Network No. error in transient transmission	<ul style="list-style-type: none"> • Correct the network number at the request source, and retry the operation. • If the request source is on another network, check if the routing parameters are correctly set.
D207 _H	Invalid number of relays in transient transmission	<ul style="list-style-type: none"> • Change the system configuration so that the number of relay stations may be seven or less. • Check if the routing parameters are correctly set.
D208 _H	Network No. error in transient transmission	<ul style="list-style-type: none"> • Correct the network number at the request source, and retry the operation. • If the request source is on another network, check if the routing parameters are correctly set.
D209 _H to D20A _H	Target station No. error in transient transmission	Correct the target station number at the request source, and retry the operation.
D20B _H	Specified master station No. error in transient transmission	Correct the target station number at the request source, and retry the operation.
D20C _H	Current master station No. error in transient transmission	Correct the target station number at the request source, and retry the operation.
D20D _H	Transient data transmission completion wait timeout	<ul style="list-style-type: none"> • Check the network status using the CC-Link IE Field Network diagnostics of the programming tool. • When the own station, target station, or relay station detected an error, identify the cause of the error and take action. • Reduce the frequency of transient transmission, and retry the operation. • When the mode of the master station is "Online (High Speed Mode)", change it to "Online (Normal Mode)" and retry the operation. • Check if the switching hub and the cables at the request source are connected properly.
D20E _H	Header information error in transient transmission	Correct the header information at the request source, and retry the operation.
D20F _H	Target station No. error in transient transmission	Check that the command can be requested to all or a group of stations at the request source, and retry the operation.
D210 _H	Target station No. error in transient transmission	Correct the header information at the request source, and retry the operation.
D211 _H	Own station No. not set (dedicated instruction)	Set the station number in the parameter setting, and retry the operation.
D212 _H	Transient transmission failed	<ul style="list-style-type: none"> • Check if the switching hub and the cables at the request source are connected properly. • Exchange the cable connected to PORT1 with that connected to PORT2 at the request source, and retry the operation. • Reduce the frequency of transient transmission, and retry the operation.
D213 _H	Transient data command error	Correct the request command at the request source, and retry the operation.
D214 _H	Transient data length error	Correct the data length at the request source, and retry the operation.
D215 _H	Transient data request error	Change the mode to Online, and retry the operation.

Error code	Error	Action
D216 _H to D217 _H	Transient data command error	Correct the request command at the request source, and retry the operation.
D218 _H	Incorrect number of read/write transient data	Correct the number of read/write device data at the request source, and retry the operation.
D219 _H	Transient data attribute code error	Correct the attribute code at the request source, and retry the operation.
D21A _H	Transient data access code error	Correct the access code at the request source, and retry the operation.
D21B _H to D21C _H	Transient data request error	<ul style="list-style-type: none"> Abnormal transient data were issued from the CPU module. Replace the CPU module and retry the operation. If this error persists, please consult your local Mitsubishi representative.
D21D _H	Network No. error in transient transmission	<ul style="list-style-type: none"> A cable test cannot be executed for a different network. Correct "Testing Station Setting", and execute the cable test again. Transient data that cannot be sent to a different network were received. Correct the network number or the target station number at the request source, and retry the operation.
D21E _H	Target station No. error in transient transmission	<ul style="list-style-type: none"> A communication test cannot be executed on a sending (relay) station. Correct the "Target Station" setting, and execute the communication test again. Transient data of the application type that cannot be executed on the own station were received. Correct the application type or the target station number at the request source, and retry the operation.
D21F _H	Network module failure	<ul style="list-style-type: none"> A malfunction may have occurred due to noise. Check the wire and cable distances and grounding condition of each device, and take measures against noise. Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
D220 _H	No master station	Add a master station to the network.
D222 _H	Transient data command error	Correct the request command at the request source, and retry the operation.
D223 _H	Transient error	<ul style="list-style-type: none"> Check the network status using the CC-Link IE Field Network diagnostics of the programming tool. Check if the cables and the switching hub are connected properly. If the request source is on another network, check if the routing parameters are correctly set. If this error persists, please consult your local Mitsubishi representative.
D22E _H	Station No. setting not available for the target station	<ul style="list-style-type: none"> Although change of the target station number was attempted online from the master station, the target station does not have the online station number setting function. Check the manual for the target station if the station number setting function is available. If the function is supported by the model, please consult your local Mitsubishi representative.
D22F _H	No baton pass executed in the target station	Check the communication status of the station whose station number is to be changed.
D230 _H	Invalid station No. setting	<ul style="list-style-type: none"> The station number change was attempted for the own station (master station). Check that no station number is set for the target station.
D231 _H	Station No. already set in the target station	<ul style="list-style-type: none"> The station number has been already set for the target station. Check that no station number is set for the target station.
D232 _H	Station No. setting target not exist	<ul style="list-style-type: none"> The station where the station number change was attempted does not exist. Check that no station number is set for the target station.
D233 _H	Station No. setting out of range	Set the station number within 1 to 120, and retry the operation.

Error code	Error	Action
D240 _H	Target network No. error (dedicated instruction)	<ul style="list-style-type: none"> • Correct the network number at the request source of the dedicated instruction, and retry the operation. • If the request source is on another network, check if the routing parameters are correctly set.
D241 _H	Target station No. error (dedicated instruction)	<ul style="list-style-type: none"> • Correct the target station number at the request source of the dedicated instruction, and retry the operation. • If the request source is on another network, check if the routing parameters are correctly set.
D242 _H	Command code error (dedicated instruction)	<ul style="list-style-type: none"> • Correct the command code at the request source of the dedicated instruction, and retry the operation. • If the request source is on another network, check if the routing parameters are correctly set.
D243 _H	Used channel error (dedicated instruction)	<ul style="list-style-type: none"> • Set the used channel within the allowable range at the request source of the dedicated instruction, and retry the operation. • If the request source is on another network, check if the routing parameters are correctly set.
D244 _H	Incorrect transient data	<ul style="list-style-type: none"> • Correct the transient data at the request source, and retry the operation. • If this error persists, please consult your local Mitsubishi representative.
D245 _H	Target station No. error (dedicated instruction)	<ul style="list-style-type: none"> • Correct the target station number at the request source of the dedicated instruction, and retry the operation. • If the request source is on another network, check if the routing parameters are correctly set.
D246 _H	Incorrect transient data	<ul style="list-style-type: none"> • Correct the transient data at the request source, and retry the operation. • If this error persists, please consult your local Mitsubishi representative.
D247 _H	Dedicated instruction received twice	<ul style="list-style-type: none"> • Check the network status using the CC-Link IE Field Network diagnostics of the programming tool. • Check if the switching hub and the cables at the request source are connected properly. • If the request source is on another network, check if the routing parameters are correctly set.
D248 _H	Incorrect transient data	<ul style="list-style-type: none"> • Correct the transient data at the request source, and retry the operation. • If this error persists, please consult your local Mitsubishi representative.
D249 _H	Target station's CPU type error (dedicated instruction)	<ul style="list-style-type: none"> • Correct the target station's CPU type at the request source of the dedicated instruction, and retry the operation. • If the request source is on another network, check if the routing parameters are correctly set.
D24A _H	Arrival monitoring time error (dedicated instruction)	<ul style="list-style-type: none"> • Correct the arrival monitoring time at the request source of the dedicated instruction, and retry the operation. • When the own station, target station, or relay station detected an error, identify the cause of the error and take action. • Reduce the frequency of transient transmission, and retry the operation. • When the mode of the master station is "Online (High Speed Mode)", change it to "Online (Normal Mode)" and retry the operation. • Check if the switching hub and the cables at the request source are connected properly.
D24B _H	Number of resends error (dedicated instruction)	<ul style="list-style-type: none"> • Correct the number of resends at the request source of the dedicated instruction, and retry the operation. • When the own station, target station, or relay station detected an error, identify the cause of the error and take action. • Reduce the frequency of transient transmission, and retry the operation. • When the mode of the master station is "Online (High Speed Mode)", change it to "Online (Normal Mode)" and retry the operation. • Check if the switching hub and the cables at the request source are connected properly.

Error code	Error	Action
D24C _H	Target network No. error (dedicated instruction)	<ul style="list-style-type: none"> • Correct the network number at the request source of the dedicated instruction, and retry the operation. • If the request source is on another network, check if the routing parameters are correctly set.
D24D _H	Network module failure	<ul style="list-style-type: none"> • A malfunction may have occurred due to noise. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
D24E _H	Target station setting error (dedicated instruction)	<ul style="list-style-type: none"> • A value set for the control block of the dedicated instruction is out of range. Correct the value, and retry the operation. • If this error persists, please consult your local Mitsubishi representative.
D24F _H	Own station No. not set (dedicated instruction)	<ul style="list-style-type: none"> • Set the station number in the network parameter dialog box, and retry the operation. • If this error persists, please consult your local Mitsubishi representative.
D250 _H	Flash ROM failure	<ul style="list-style-type: none"> • The flash ROM may be faulty. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
D251 _H	Arrival check error (dedicated instruction)	<ul style="list-style-type: none"> • Increase the number of resends at the request source of the dedicated instruction, and retry the operation. • When the own station, target station, or relay station detected an error, identify the cause of the error and take action. • Reduce the frequency of transient transmission, and retry the operation. • When the mode of the master station is "Online (High Speed Mode)", change it to "Online (Normal Mode)" and retry the operation. • Check if the switching hub and the cables at the request source are connected properly.
D252 _H	Transmission completion wait timeout (dedicated instruction)	<ul style="list-style-type: none"> • Check the network status using the CC-Link IE Field Network diagnostics of the programming tool. • Increase the number of resends at the request source of the dedicated instruction, and retry the operation. • Reduce the frequency of transient transmission, and retry the operation. • When the mode of the master station is "Online (High Speed Mode)", change it to "Online (Normal Mode)" and retry the operation. • Correct the number of link dedicated instructions that is simultaneously executed within the range. (☞ Page 155, Section 10.2.1 (3)) • If this error persists, please consult your local Mitsubishi representative.
D253 _H	Response timer timeout (dedicated instruction)	<ul style="list-style-type: none"> • Check the network status using the CC-Link IE Field Network diagnostics of the programming tool. • Increase the number of resends at the request source of the dedicated instruction, and retry the operation. • Reduce the frequency of transient transmission, and retry the operation. • Correct the number of link dedicated instructions that is simultaneously executed within the range. (☞ Page 155, Section 10.2.1 (3)) • If this error persists, please consult your local Mitsubishi representative.
D254 _H	Network module failure	<ul style="list-style-type: none"> • A malfunction may have occurred due to noise. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.

Error code	Error	Action
D255 _H	Target station No. error (dedicated instruction)	<ul style="list-style-type: none"> • Correct the value in Target station number (control data), and retry the operation. • If this error persists, please consult your local Mitsubishi representative.
D256 _H	Execution/abnormal end type error (dedicated instruction)	<ul style="list-style-type: none"> • Correct the value in Execution/abnormal end type (control data), and retry the operation. • If this error persists, please consult your local Mitsubishi representative.
D257 _H	Request type error (REQ)	<ul style="list-style-type: none"> • Correct the value in Request type (request data), and retry the operation. • If this error persists, please consult your local Mitsubishi representative.
D258 _H	Specified/current control station not exist (dedicated instruction)	<ul style="list-style-type: none"> • Correct the value in Target station number (control data), and retry the operation. • If this error persists, please consult your local Mitsubishi representative.
D259 _H	Mode error during dedicated instruction execution	<ul style="list-style-type: none"> • Change the mode of the master station from loop test to online, and retry the operation. • If this error persists, please consult your local Mitsubishi representative.
D25A _H	Channel in use (dedicated instruction)	<ul style="list-style-type: none"> • Retry the operation after a while. • Change the value in Channels used by own station or Target station's channel (control data).
D25B _H	Channel in use (dedicated instruction)	Change the value in Channels used by own station or Target station's channel (control data).
D25C _H	Invalid function version (dedicated instruction)	<ul style="list-style-type: none"> • A value set for the control block of the dedicated instruction is out of range. Correct the value, and retry the operation. • If this error persists, please consult your local Mitsubishi representative.
D25D _H	Incorrect transient data	<ul style="list-style-type: none"> • Correct the transient data at the request source, and retry the operation. • If this error persists, please consult your local Mitsubishi representative.
D25E _H to D260 _H	Network module failure	<ul style="list-style-type: none"> • A malfunction may have occurred due to noise. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
D262 _H to D26D _H	Network module failure	<ul style="list-style-type: none"> • A malfunction may have occurred due to noise. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
D280 _H	Transient data request error	Correct the request command at the request source, and retry the operation.
D281 _H	Transient reception failed	<ul style="list-style-type: none"> • Check the network status using the CC-Link IE Field Network diagnostics of the programming tool. • When the target station or the relay station is overloaded and cannot receive transient data, send the data to the target/relay station after the load on the station is reduced.
D282 _H	Receive queue full	<ul style="list-style-type: none"> • Once pausing the transient transmission, and retry the operation. • Reduce the frequency of transient transmission, and retry the operation. • If this error persists, please consult your local Mitsubishi representative.
D283 _H	Transient transmission failed	<ul style="list-style-type: none"> • Check the network status using the CC-Link IE Field Network diagnostics of the programming tool. • Exchange the cable connected to PORT1 with that connected to PORT2 at the request source, and retry the operation. • Reduce the frequency of transient transmission, and retry the operation.

Error code	Error	Action
D2A0 _H to D2B0 _H	Network module failure	<ul style="list-style-type: none"> • A malfunction may have occurred due to noise. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
D602 _H to D609 _H	Parameter error	<ul style="list-style-type: none"> • Write the network parameters to the CPU module again. • If this error persists, please consult your local Mitsubishi representative.
D60A _H	Parameter error (link scan mode/constant link scan time setting error)	<ul style="list-style-type: none"> • Write the network parameters to the CPU module again. • Set "Asynchronous" to the link scan mode, or do not set the constant link scan time. • If this error persists, please consult your local Mitsubishi representative.
D60D _H to D610 _H	Network module failure	<ul style="list-style-type: none"> • A malfunction may have occurred due to noise. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
D611 _H	Parameter error (device range assignment error (RWw))	<ul style="list-style-type: none"> • Write the network parameters to the CPU module again. • Correct the value in the size of the link device in the slave station(s) (setting data), and retry the operation. • If this error persists, please consult your local Mitsubishi representative.
D612 _H	Parameter error (device range assignment error (RWw))	<ul style="list-style-type: none"> • Write the network parameters to the CPU module again. • Correct the value in the offset of the link device in the slave station(s) (setting data), and retry the operation. • If this error persists, please consult your local Mitsubishi representative.
D613 _H	Parameter error (device range assignment error (RWr))	<ul style="list-style-type: none"> • Write the network parameters to the CPU module again. • Correct the value in the size of the link device in the slave station(s) (setting data), and retry the operation. • If this error persists, please consult your local Mitsubishi representative.
D614 _H	Parameter error (device range assignment error (RWr))	<ul style="list-style-type: none"> • Write the network parameters to the CPU module again. • Correct the value in the offset of the link device in the slave station(s) (setting data), and retry the operation. • If this error persists, please consult your local Mitsubishi representative.
D615 _H	Parameter error (device range assignment error (RY))	<ul style="list-style-type: none"> • Write the network parameters to the CPU module again. • Correct the value in the size of the link device in the slave station(s) (setting data), and retry the operation. • If this error persists, please consult your local Mitsubishi representative.
D616 _H	Parameter error (device range assignment error (RY))	<ul style="list-style-type: none"> • Write the network parameters to the CPU module again. • Correct the value in the offset of the link device in the slave station(s) (setting data), and retry the operation. • If this error persists, please consult your local Mitsubishi representative.
D617 _H	Parameter error (device range assignment error (RX))	<ul style="list-style-type: none"> • Write the network parameters to the CPU module again. • Correct the value in the size of the link device in the slave station(s) (setting data), and retry the operation. • If this error persists, please consult your local Mitsubishi representative.
D618 _H	Parameter error (device range assignment error (RX))	<ul style="list-style-type: none"> • Write the network parameters to the CPU module again. • Correct the value in the offset of the link device in the slave station(s) (setting data), and retry the operation. • If this error persists, please consult your local Mitsubishi representative.
D619 _H to D61A _H	Parameter error	<ul style="list-style-type: none"> • Write the network parameters to the CPU module again. • If this error persists, please consult your local Mitsubishi representative.

Error code	Error	Action
D61B _H	Parameter error (device duplication (RWw))	<ul style="list-style-type: none"> • Write the network parameters to the CPU module again. • Correct the value in the offset or the size of the link device in the slave station(s) (setting data), and retry the operation. • If this error persists, please consult your local Mitsubishi representative.
D61C _H	Parameter error (device duplication (RW _r))	
D61D _H	Parameter error (device duplication (RY))	
D61E _H	Parameter error (device duplication (RX))	
D61F _H	Network module failure	<ul style="list-style-type: none"> • A malfunction may have occurred due to noise. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
D620 _H	Incorrect transient data	<ul style="list-style-type: none"> • Check the transient data at the request source, and retry the operation. • If this error persists, please consult your local Mitsubishi representative.
D621 _H	Parameter error	<ul style="list-style-type: none"> • Write the network parameters to the CPU module again. • If this error persists, please consult your local Mitsubishi representative.
D622 _H	Parameter error (total number of slave stations error)	<ul style="list-style-type: none"> • Write the network parameters to the CPU module again. • Correct the total number of slave stations, and retry the operation. • If this error persists, please consult your local Mitsubishi representative.
D623 _H	Parameter error (link scan mode error)	<ul style="list-style-type: none"> • Write the network parameters to the CPU module again. • Correct the link scan mode, and retry the operation. • If this error persists, please consult your local Mitsubishi representative.
D624 _H	Parameter error (constant link scan time setting error)	<ul style="list-style-type: none"> • Write the network parameters to the CPU module again. • Correct the constant link scan time, and retry the operation. • If this error persists, please consult your local Mitsubishi representative.
D625 _H	Parameter error (block data assurance per station setting error)	<ul style="list-style-type: none"> • Write the network parameters to the CPU module again. • Correct the setting in "Block Data Assurance per Station", and retry the operation. • If this error persists, please consult your local Mitsubishi representative.
D626 _H	Parameter error (loopback setting error)	<ul style="list-style-type: none"> • Write the network parameters to the CPU module again. • Correct the loopback function setting, and retry the operation. • If this error persists, please consult your local Mitsubishi representative.
D627 _H	Parameter error (slave station setting information error)	<ul style="list-style-type: none"> • Write the network parameters to the CPU module again. • Correct the value in the slave station setting information (setting data), and retry the operation. • If this error persists, please consult your local Mitsubishi representative.
D628 _H	Parameter error (station type error)	<ul style="list-style-type: none"> • Write the network parameters to the CPU module again. • Correct the value in the station type (setting data), and retry the operation. • If this error persists, please consult your local Mitsubishi representative.
D629 _H	Parameter error (station No. range error)	<ul style="list-style-type: none"> • Write the network parameters to the CPU module again. • Correct the value in the station No. (setting data) within 1 to 120, and retry the operation. • If this error persists, please consult your local Mitsubishi representative.
D62A _H	Parameter error (data link faulty station setting error)	<ul style="list-style-type: none"> • Write the network parameters to the CPU module again. • Correct the data link faulty station setting, and retry the operation. • If this error persists, please consult your local Mitsubishi representative.
D62B _H	Parameter error (output status setting for CPU STOP error)	<ul style="list-style-type: none"> • Write the network parameters to the CPU module again. • Correct the output status setting for CPU STOP, and retry the operation. • If this error persists, please consult your local Mitsubishi representative.
D62C _H	Parameter error (interrupt setting error)	<ul style="list-style-type: none"> • Write the network parameters to the CPU module again. • Correct the interrupt setting, and retry the operation. • If this error persists, please consult your local Mitsubishi representative.

Error code	Error	Action
D62D _H	Data link start failed	Data link start failed due to any of the following causes. Remove the error cause, and retry the operation. <ul style="list-style-type: none"> • Station No. not set • CPU module error on the own station • Master station duplication • Station type mismatch • Master station lost • Own station No. out of range • Station No. duplication (own station) • Own station reserved • Parameter error • Parameter communication in progress • Parameters not received (master station only and no slave station exists) • Link stop command
D630 _H	Network module failure	<ul style="list-style-type: none"> • A malfunction may have occurred due to noise. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
D701 _H	Temporary reserved station cancel/temporary error invalid station setting not set	Set the target station(s) in Reserved station function disable/temporary error invalid station setting (SW0010 to SW0017), and retry the operation.
D706 _H	Request error of temporary error invalid station setting/cancel or reserved station cancel/restoration (when the own station is a local station)	Temporary error invalid station setting/cancel or reserved station cancel/restoration cannot be executed from a local station. Retry the operation from the master station.
D70B _H	Request error of temporary error invalid station setting/cancel or reserved station cancel/restoration (when different settings are simultaneously performed)	<ul style="list-style-type: none"> • Temporary error invalid station setting/cancel using SB0010 and SB0011 or reserved station cancel/restoration using SB0012 and SB0013 cannot be simultaneously executed. • Retry the operation so that only one bit in SB0010 to SB0013 may turn on after all bits in them are turned off.
D720 _H	Data link start/stop instruction out of range	Check the setting, and stop or start data link.
D721 _H	Data link start/stop retry error (another station)	Retry the operation after the stop or restart of data link is completed.
D722 _H	Data link start/stop retry error (own station)	
D723 _H	Data link start/stop retry error (entire system)	
D724 _H	Data link start/stop station error	Check the setting, and stop or start data link.
D725 _H	Station type error (station that starts/stops data link throughout the entire system)	A local station cannot start or stop data link of all or multiple stations. Perform these operations from the master station.
D726 _H	Transient data command error	Correct the request command at the request station, and retry the operation.
D727 _H	Data link start/stop command-instructing stations different	<ul style="list-style-type: none"> • Data link start was instructed from a station different from the one that had instructed the data link stop. Instruct data link start and data link stop from the same station. • The method of the data link start differs from that of the data link stop. Instruct the data link start using the same method as the data link stop (Ex. Data link is stopped using the CC-Link IE Field Network diagnostics, and the data link is started using a program). • Data link start failed. Forcibly restart the data link.

Error code	Error	Action
D728 _H	Data link start/stop command-instructing stations different	Data link start was instructed during execution of data link. Instruct data link stop then data link start.
D72B _H to D72C _H	Illegal access to network module error	Data were written to a use-prohibited SB/SW or buffer memory. Correct the destination address.
D730 _H	Illegal access to network module error	Data were written to a use-prohibited SB/SW or buffer memory. Correct the destination address.
D780 _H	History acquisition setting data full	The area for writing history acquisition setting data for network event history is insufficient. Reset or power off and on the CPU module.
D781 _H	Network module failure	<ul style="list-style-type: none"> • A malfunction may have occurred due to noise. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
D782 _H	History acquisition setting data error	The previous history acquisition setting data for network event history were not written successfully. Reset or power off and on the CPU module.
D783 _H to D784 _H	Transient data request error	<ul style="list-style-type: none"> • The read request by the CC-Link IE Field Network diagnostics of the programming tool is incorrect. Close the "CC IE Field Diagnostics" window, and request it again. • Check the read request data at the request station, and retry the operation.
D785 _H	Flash ROM failure	The maximum number of writes to the flash ROM is exceeded. Replace the master/local module.
D786 _H	Flash ROM failure	The flash ROM may be faulty. Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
D800 _H	Network module failure	<ul style="list-style-type: none"> • A malfunction may have occurred due to noise. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
D803 _H to D805 _H	Network module failure	<ul style="list-style-type: none"> • A malfunction may have occurred due to noise. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
D806 _H	Receive queue full	<ul style="list-style-type: none"> • Reduce the frequency of transient transmission, and retry the operation. • Check if the cables and the switching hub are connected properly.
D807 _H	Network module failure	<ul style="list-style-type: none"> • A malfunction may have occurred due to noise. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
D80A _H to D80F _H	Parameter error	<ul style="list-style-type: none"> • Write the network parameters to the CPU module again. • If this error persists, please consult your local Mitsubishi representative
D812 _H to D813 _H	Parameter error	<ul style="list-style-type: none"> • Write the network parameters to the CPU module again. • If this error persists, please consult your local Mitsubishi representative.

Error code	Error	Action
D814 _H	Network module failure	<ul style="list-style-type: none"> • A malfunction may have occurred due to noise. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
D816 _H	Network module failure	<ul style="list-style-type: none"> • A malfunction may have occurred due to noise. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
D819 _H	CPU module failure	<ul style="list-style-type: none"> • Replace the CPU module. • If this error persists, please consult your local Mitsubishi representative.
D81A _H	CPU module stop error	Check the error in the "PLC Diagnostics" window of the programming tool.
D81B _H	Programmable controller power failure	The power is off. Turn it on.
D81D _H	Network module failure	<ul style="list-style-type: none"> • A malfunction may have occurred due to noise. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
D81F _H to D825 _H	Network module failure	<ul style="list-style-type: none"> • A malfunction may have occurred due to noise. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
D826 _H	Flash ROM failure	<ul style="list-style-type: none"> • The maximum number of writes to the flash ROM is exceeded. • Reset the CPU module. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
D827 _H	Communication RAM failure	<ul style="list-style-type: none"> • A malfunction may have occurred due to noise. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
D902 _H	Incorrect online test data	<ul style="list-style-type: none"> • Correct the data at the station that started the online test, and retry the operation. • If this error persists, please consult your local Mitsubishi representative.
D903 _H	Communication test retry error	After completion of the communication test, retry the operation.
D905 _H	Communication monitoring timeout in communication test	<ul style="list-style-type: none"> • Check the network status using the CC-Link IE Field Network diagnostics of the programming tool, take action, and retry the operation. • Check if the routing parameters are correctly set.
D906 _H	Communication test transmission completion wait timeout	<ul style="list-style-type: none"> • Check the network status using the CC-Link IE Field Network diagnostics of the programming tool, take action, and retry the operation. • Reduce the frequency of transient transmission, and retry the operation. • When the mode of the master station is "Online (High Speed Mode)", change it to "Online (Normal Mode)" and retry the operation. • Check if the routing parameters are correctly set.
D909 _H	Header information error in transient transmission	Correct the header information at the request source, and retry the operation.


Error code	Error	Action
D90A _H	Communication test data received twice	Check the network status using the CC-Link IE Field Network diagnostics of the programming tool, take action, and retry the operation.
D90B _H	Incorrect number of stations	<ul style="list-style-type: none"> • Check the network status using the CC-Link IE Field Network diagnostics of the programming tool. • If the number of slave stations per network is more than 120, reduce it to 120 or less.
D90C _H	Invalid communication test target station	<ul style="list-style-type: none"> • Correct the "Target Station" setting in the "Communication Test" window, and retry the operation. • Under "Target Station", set a station including a different CPU module from the station set in "Connected Station (Own)".
D90D _H	Cable test retry error	After completion of the cable test, retry the operation.
DA00 _H to DA01 _H	Network module failure	<ul style="list-style-type: none"> • A malfunction may have occurred due to noise. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
DA10 _H to DA18 _H	Network module failure	<ul style="list-style-type: none"> • A malfunction may have occurred due to noise. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
DAD0 _H to DAD4 _H	Network module failure	<ul style="list-style-type: none"> • A malfunction may have occurred due to noise. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
DAE0 _H to DAE3 _H	Network module failure	<ul style="list-style-type: none"> • A malfunction may have occurred due to noise. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
DAE4 _H	CPU module failure	<ul style="list-style-type: none"> • Execute hardware and self-loopback tests. • If this error persists, please consult your local Mitsubishi representative.
DAE5 _H	Network module failure	<ul style="list-style-type: none"> • A malfunction may have occurred due to noise. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
DAE6 _H	CC-Link IE Field not supported by the CPU	<ul style="list-style-type: none"> • Use a CPU module compatible with the master/local module. • If this error persists, please consult your local Mitsubishi representative.
DAE7 _H	Network module failure	<ul style="list-style-type: none"> • A malfunction may have occurred due to noise. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
DAE8 _H	Switch setting information error	<ul style="list-style-type: none"> • Clear the intelligent function module switch setting, and write the setting data to the CPU module again. • If this error persists, please consult your local Mitsubishi representative.

Error code	Error	Action
DAF1 _H	Network module failure	<ul style="list-style-type: none"> • A malfunction may have occurred due to noise. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
DAF2 _H	Flash ROM failure	<ul style="list-style-type: none"> • The flash ROM may be faulty. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
DAF3 _H	Flash ROM failure	<ul style="list-style-type: none"> • The flash ROM may be faulty. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
DAF5 _H to DAF7 _H	Network module failure	<ul style="list-style-type: none"> • A malfunction may have occurred due to noise. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.
DAF8 _H to DAF9 _H	Flash ROM failure	The flash ROM may be faulty. Execute hardware and self-loopback tests. If a failure occurs again, the hardware of the master/local module may be faulty. Please consult your local Mitsubishi representative.

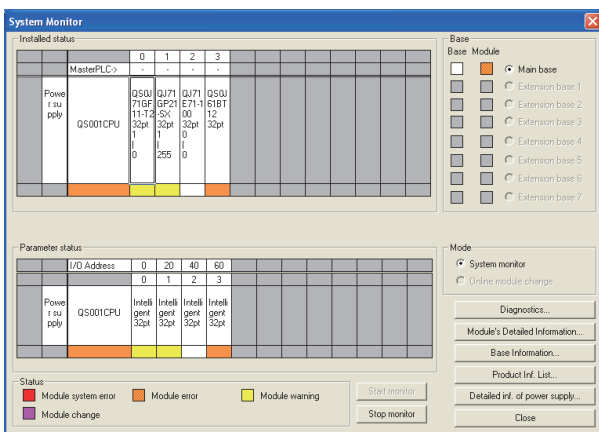
12.6 Checking the Master/Local Module Status by System Monitor

In the "System Monitor" window of GX Developer, the network No. and LED status of the master/local module can be checked.

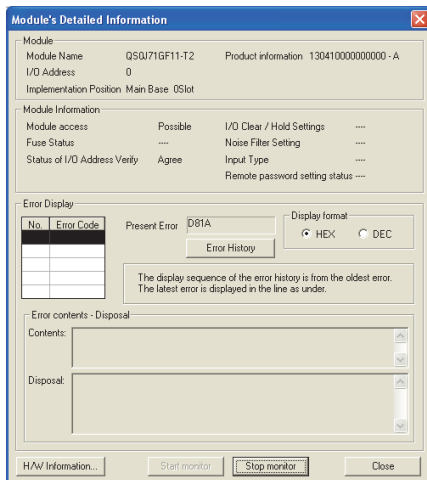
1. Open the "System Monitor" window.

 [Diagnostics] ⇒ [System monitor]

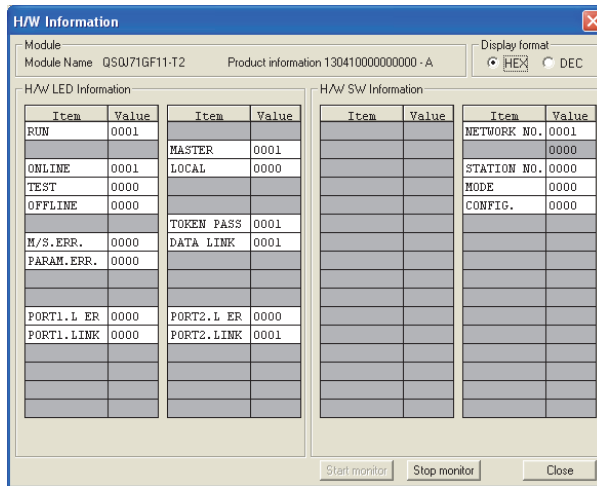
2. Select a module to be checked under "Installed status", and click the Module's Detailed Information... button.



3. Click the H/W Information... button in the "Module's Detailed Information" window.



4. The "H/W Information" window opens.



Item		Description
Display format		Switches the display format of "H/W LED Information" and "H/W SW Information".
H/W LED Information	RUN	Shows the condition of the RUN LED. 0000: OFF 0001: ON
	ONLINE	Shows whether the master/local module is in online mode. 0000: Other than online 0001: Online
	TEST	Shows whether the master/local module is in test mode. 0000: Other than test mode 0001: Test mode
	OFFLINE	Shows whether the master/local module is in offline mode. 0000: Other than offline mode 0001: Offline mode

Item	Description
H/W LED Information	M/S. ERR. Shows whether master station or station number is duplicated 0000: No duplication of master station or station number 0001: Master station or station number duplicated
	PARAM.ERR. Shows the parameter error status. 0000: No error 0001: Error
	PORT1.L ER Shows the L ER LED status of PORT1. 0000: OFF 0001: ON
	PORT1.LINK Shows the LINK LED status of PORT1. 0000: OFF 0001: ON
	MASTER Shows the station type (master station) of the master/local module. 0000: Local station or no parameter 0001: Master station
	LOCAL Shows the station type (local station) of the master/local module. 0000: Master station or no parameter 0001: Local station
	TOKEN PASS Shows the baton pass status of the master/local module. 0000: No baton (token) passing 0001: Baton (token) passing
	DATA LINK Shows the data link status of the master/local module. 0000: No data link 0001: Data link in execution
	PORT2.L ER Shows the L ER LED status of PORT2. 0000: OFF 0001: ON
	PORT2.LINK Shows the LINK LED status of PORT2. 0000: OFF 0001: ON
H/W SW Information	NETWORK NO. Displays the network number.
	STATION NO. Displays the station number. When no station number is set, 0 is displayed.
	MODE Shows the mode of the master/local module. 0000: Online (Normal Mode) 0001: Online (High Speed Mode) 0002: Offline 0006: Loop test 0007: Self-loopback test 0009: Hardware test
	CONFIG. Shows the station type of the master/local module. 0000: Master station 0003: Local station

APPENDICES

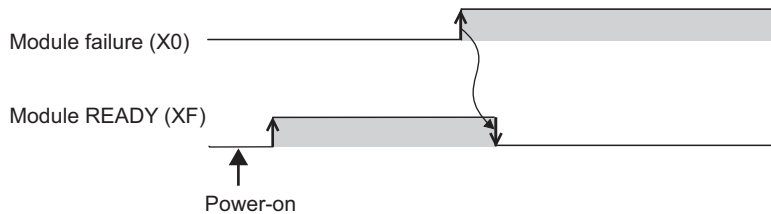
Appendix 1 Details of I/O Signals

The following describes I/O signals for the safety CPU module of the master/local module in detail. The I/O numbers in Appendix 1 are shown based on a start I/O number setting of 0 for the master/local module.

Appendix 1.1 Module failure (X0)

This is a signal that confirms the status of the master/local module.

- OFF: Module normal
- ON: Module failure



Appendix 1.2 Own station data link status (X1)

This is a signal that confirms the own station's data link status.

- OFF: Data link stop
- ON: Data link in progress

Data link status (own station) (SB0049) has the same signal, but when using it in a program, use either X1 or SB0049 only. Also note that the on/off conditions for X1 and SB0049 are reversed.

When an error occurs, the cause of the fault can be checked by CC-Link IE Field Network diagnostics or Cause of data link stop (SW0049).

Appendix 1.3 Other stations data link status (X3)

This is a signal that confirms the other station's data link status.

- OFF: All stations normal
- ON: Faulty station found

Data link status (each station) (SB00B0) has the same signal, but when using it in a program, use either X3 or SB00B0 only.

When an error occurs, the faulty station can be checked by CC-Link IE Field Network diagnostics or Data link status (each station) (SW00B0 to SW00B7).

Appendix 1.4 Module ready (XF)

This is a signal that confirms the status of module operation preparation.

- OFF: N/A for module operation
- ON: Available for module operation

For the module ready timing chart, refer to Module failure (X0). (☞ Page 264, Appendix 1.1)

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Appendix 2 Details of Buffer Memory Addresses

This section describes the buffer memory of the master/local module.

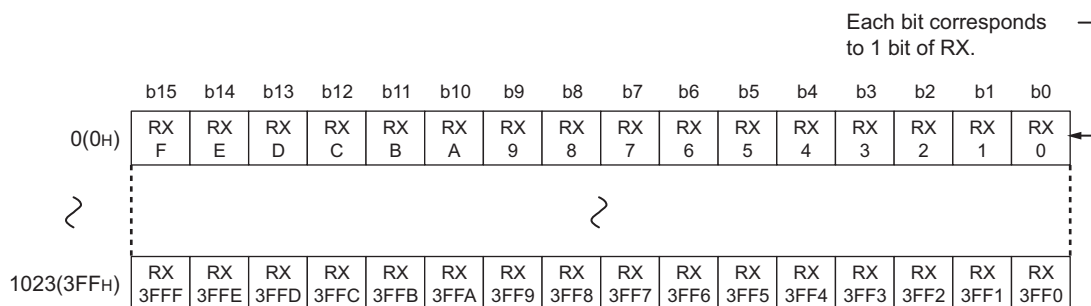
Appendix 2.1 Link device area (buffer memory address: 0 to 18975 (0_H to 4A1F_H))

This buffer memory stores the RX, RY, RWw, and RWr values.

(1) Remote input (buffer memory address: 0 to 1023 (0_H to 3EF_H))

This buffer memory stores the RX value. The RX start number and number of points for each station No. can be checked by the RX offset/size information (buffer memory address: 19456 to 19695 (4C00_H to 4CEF_H).

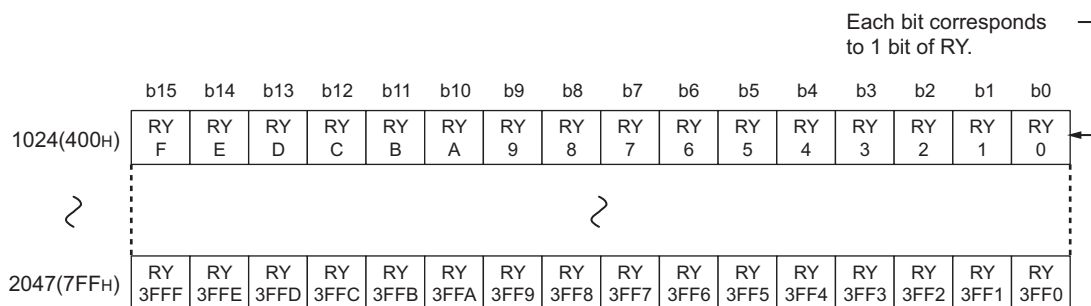
(☞ Page 269, Appendix 2.2)



(2) Remote output (RY) (buffer memory address: 1024 to 2047 (400_H to 7FF_H))

This buffer memory stores the RY value. The RY start number and number of points for each station No. can be checked by the RY offset/size information (buffer memory address: 19712 to 19951 (4D00_H to 4DEF_H)).

(☞ Page 269, Appendix 2.3)



(3) Remote register (RWw) (buffer memory address: 2048 to 10239 (800_H to 27FF_H))

This buffer memory stores the RWw value. The RWw start number and number of points for each station No. can be checked by the RWw/offset size information (buffer memory address: 19968 to 20207 (4E00_H to 4EEF_H)).

(Page 270, Appendix 2.4)



(4) Remote register (RWr) (buffer memory address: 10240 to 18431 (2800_H to 47FF_H))

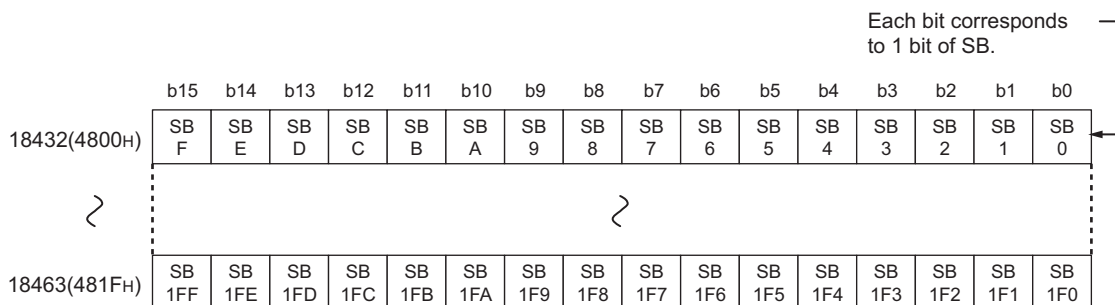
This buffer memory stores the RWr value. The RWr start number and number of points for each station No. can be checked by the RWr offset/size information (buffer memory address: 20224 to 20463 (4F00_H to 4FEF_H)).

(Page 270, Appendix 2.5)



(5) Link special relay (SB) (buffer memory address: 18432 to 18463 (4800_H to 481F_H))

This buffer memory stores the SB value.



Appendix 2 Details of Buffer Memory Addresses
Appendix 2.1 Link device area (buffer memory address: 0 to 18975 (0_H to 4A1F_H))

(6) Link special register (SW) (buffer memory address: 18464 to 18975 (4820_H to 4A1F_H))

This buffer memory stores the SW value.



Appendix 2.2 RX offset/size information (buffer memory address: 19456 to 19695 (4C00_H to 4CEF_H))

This buffer memory stores the start number and the number of points of RX for each station.

19456(4C00H)	Station No. 1	Offset
19457(4C01H)	Station No. 1	Size (in units of words)
19458(4C02H)	Station No. 2	Offset
19459(4C03H)	Station No. 2	Size (in units of words)
⋮	⋮	⋮
19694(4CEEH)	Station No. 120	Offset
19695(4CEF _H)	Station No. 120	Size (in units of words)

The offset and size buffer memory address for each station No. can be calculated using the following formula:

- Offset buffer memory address = $19456 + (\text{station No.} - 1) \times 2$
- Size buffer memory address = $19457 + (\text{station No.} - 1) \times 2$

Appendix 2.3 RY offset/size information (buffer memory address: 19712 to 19951 (4D00_H to 4DEF_H))

This buffer memory stores the start number and the number of points of RY for each station.

19712(4D00H)	Station No. 1	Offset
19713(4D01H)	Station No. 1	Size (in units of words)
19714(4D02H)	Station No. 2	Offset
19715(4D03H)	Station No. 2	Size (in units of words)
⋮	⋮	⋮
19950(4DEEH)	Station No. 120	Offset
19951(4DEF _H)	Station No. 120	Size (in units of words)

The offset and size buffer memory address for each station No. can be calculated using the following formula:

- Offset buffer memory address = $19712 + (\text{station No.} - 1) \times 2$
- Size buffer memory address = $19713 + (\text{station No.} - 1) \times 2$

Appendix 2.4 RWw offset/size information (buffer memory address: 19968 to 20207 (4E00_H to 4EEF_H))

This buffer memory stores the start number and the number of points of RWw for each station.

19968(4E00H)	Station No. 1	Offset
19969(4E01H)	Station No. 1	Size (in units of words)
19970(4E02H)	Station No. 2	Offset
19971(4E03H)	Station No. 2	Size (in units of words)
⋮		⋮
20206(4EEEH)	Station No. 120	Offset
20207(4EEFH)	Station No. 120	Size (in units of words)

The offset and size buffer memory address for each station No. can be calculated using the following formula:

- Offset buffer memory address = $19968 + (\text{station No.} - 1) \times 2$
- Size buffer memory address = $19969 + (\text{station No.} - 1) \times 2$

Appendix 2.5 RWr offset/size information (buffer memory address: 20224 to 20463 (4F00_H to 4FEF_H))

This buffer memory stores the start number and the number of points of RWr for each station.

20224(4F00H)	Station No. 1	Offset
20225(4F01H)	Station No. 1	Size (in units of words)
20226(4F02H)	Station No. 2	Offset
20227(4F03H)	Station No. 2	Size (in units of words)
⋮		⋮
20462(4FEEH)	Station No. 120	Offset
20463(4FEFH)	Station No. 120	Size (in units of words)

The offset and size buffer memory address for each station No. can be calculated using the following formula:

- Offset buffer memory address = $20224 + (\text{station No.} - 1) \times 2$
- Size buffer memory address = $20225 + (\text{station No.} - 1) \times 2$

Appendix 2.6 Own station information (buffer memory address: 20512 to 20536 (5020_H to 5038_H))

This buffer memory stores the own station's information on the network.

(1) Own station (network card) information (buffer memory address: 20512 to 20515 (5020_H to 5023_H))

Address	Name	Description
20512 (5020 _H)	Manufacturer code	This buffer memory stores the own station's master/local module information. The following values are stored in the model code: 6: When the standard station is set as the station type 7: When the safety station is set as the station type
20513 (5021 _H)	Model type	
20514 (5022 _H)	Model code	
20515 (5023 _H)	Version	

(2) Own station (controller) information (buffer memory address: 20520 to 20536 (5028_H to 5038_H))

Address	Name	Description
20520 (5028 _H)	Controller information valid/invalid flag	This buffer memory stores whether the value stored in the own station (controller) information is valid or invalid. 0: Invalid 1: Valid
20521 (5029 _H)	Manufacturer code	This buffer memory stores the own station's master/local module information.
20522 (502A _H)	Model type	
20523 (502B _H)	Model code	
20524 (502C _H)	Version	
20525 to 20534 (502D _H to 5036 _H)	Model name string	
20535 to 20536 (5037 _H to 5038 _H)	Vendor-specific device information	

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Appendix 2.7 Other station information (buffer memory address: 20544 to 24383 (5040_H to 5F3F_H))

This buffer memory stores other stations' information on the network.

(1) Other station (network card) information (station No. 1) (buffer memory address: 20544 to 20551 (5040_H to 5047_H))

Address	Name	Description
20544 (5040 _H)	Manufacturer code	This buffer memory stores another station's (station No. 1) information.
20545 (5041 _H)	Model type	
20546 (5042 _H)	Model code	
20547 (5043 _H)	Version	
20548 to 20551 (5044 _H to 5047 _H)	System area	—

(2) Other station (controller) information (station No. 1) (buffer memory address: 20552 to 20575 (5048_H to 505F_H))

Address	Name	Description
20552 (5048 _H)	Controller information valid/invalid flag	This buffer memory stores whether the value stored in another station (controller) information (station No. 1) is valid or invalid. 0: Invalid 1: Valid
20553 (5049 _H)	Manufacturer code	This buffer memory stores another station's (station No. 1) master/local module information.
20554 (504A _H)	Model type	
20555 (504B _H)	Model code	
20556 (504C _H)	Version	
20557 to 20566 (504D _H to 5056 _H)	Model name string	
20567 to 20568 (5057 _H to 5058 _H)	Vendor-specific device information	
20569 to 20575 (5059 _H to 505F _H)	System area	—

(3) Other station information (station No. 2 to No. 120) (buffer memory address: 20576 to 24383 (5060_H to 5F3F_H))

The information for station No. 2 to No. 120 is stored in the same order as the information for other station (network card) information (station No. 1) and other station (controller) information (station No. 1).

Appendix 3 Link Special Relay (SB) List

The link special relay (SB) is turned on/off depending on various factors at data link. Any error status of the data link can be confirmed by using and monitoring it in the program.

(1) Application of the link special relay (SB)

By using link special relays (SB), the status of CC-Link IE Field Network can be checked from HMI (Human Machine Interface) as well as GX Developer.

(2) Refresh of the link special relay (SB)

The link special relay (SB) uses "Transfer SB" of the refresh parameters to refresh the device of the safety CPU module. (☞ Page 86, Section 7.5)

(3) Ranges that is turned on/off by users and by the system

The following ranges correspond to when the link special relays (SB) are assigned from SB0000 to SB01FF.

- Turned on/off by users: SB0000 to SB001F
- Turned on/off by the system: SB0020 to SB01FF

(4) Link special relay (SB) list

The following table shows the link special relays (SB) when they are assigned from SB0000 to SB01FF.

Point

- Available link special relays are the same for all safety CPU operation modes.
- Do not turn on or off areas whose numbers are not on the link special relay (SB) list. Doing so may cause malfunction of the programmable controller system.
- For the usage of the link special relay (SB), refer to the following.

☞ Page 221, Section 11.3

Number	Name	Description	Availability	
			Master station (safety station)	Local station
SB0000	Link start (own station)	<p>The own station's cyclic transmission is restarted.</p> <p>OFF: No start direction ON: Start direction (enabled during start-up)</p> <p>(Conditions)</p> <ul style="list-style-type: none"> This is enabled when Baton pass status (own station) (SB0047) is off. For SB0000 to SB0003, this is enabled when only one of them is turned on. 	○	○
SB0001	Link stop (own station)	<p>The own station's cyclic transmission is stopped.</p> <p>OFF: No stop direction ON: Stop direction (enabled during start-up)</p> <p>(Conditions)</p> <ul style="list-style-type: none"> This is enabled when Baton pass status (own station) (SB0047) is off. For SB0000 to SB0003, this is enabled when only one of them is turned on. 	○	○
SB0002	System link start	<p>Cyclic transmission of the entire system is restarted.</p> <p>The station where cyclic transmission is restarted is specified by the Link stop/start direction (SW0000 to SW0008).</p> <p>OFF: No start direction ON: Start direction (enabled during start-up)</p> <p>(Conditions)</p> <ul style="list-style-type: none"> This is enabled when Baton pass status (own station) (SB0047) is off. For SB0000 to SB0003, this is enabled when only one of them is turned on. 	○	×
SB0003	System link stop	<p>Cyclic transmission of the entire system is stopped.</p> <p>The station where cyclic transmission is stopped is specified by the Link stop/start direction (SW0000 to SW0008).</p> <p>OFF: No stop direction ON: Stop direction (enabled during start-up)</p> <p>(Conditions)</p> <ul style="list-style-type: none"> This is enabled when Baton pass status (own station) (SB0047) is off. For SB0000 to SB0003, this is enabled when only one of them is turned on. 	○	×
SB0006	Clear communication error count	<p>Clears the link special registers for the communication error (SW0068 to SW006B, SW0074 to SW0077, SW007C to SW007F, SW0120 to SW0127, SW0130 to SW0137, SW0140 to SW0147, and SW0150 to SW0157).</p> <p>OFF: No clear direction ON: Clear direction (valid while this relay is on)</p>	○	○
SB0009	Event count clear	<p>This clears the Event history status (SB007A) and Event count (SW007A).</p> <p>OFF: No clear direction ON: Clear direction (Errors are not counted while this is ON.)</p>	○	○
SB0010	Temporary error invalid request	<p>Stations specified in Reserved station function disable/temporary error invalid station setting (SW0010 to SW0017) are set as temporary error invalid stations.</p> <p>OFF: No request ON: Request issued</p>	○	×

Number	Name	Description	Availability	
			Master station (safety station)	Local station
SB0011	Temporary error invalid setting cancel request	Stations specified in Reserved station function disable/temporary error invalid station setting (SW0010 to SW0017) are canceled from temporary error invalid stations. OFF: No request ON: Request issued	○	×
SB0012	Reserved station function disable request	Stations specified in Reserved station function disable/temporary error invalid station setting (SW0010 to SW0017) are temporarily canceled from reserved stations. OFF: No request ON: Request issued	○	×
SB0013	Reserved station specification enable request	Stations specified in Reserved station function disable/temporary error invalid station setting (SW0010 to SW0017) are returned to reserved stations. Only stations that were temporarily canceled can be returned to reserved stations. OFF: No request ON: Request issued	○	×
SB0040	Network type (own station)	Stores the network type of own station. ON: Field network	○	○
SB0043	Mode (own station)	Stores the mode of own station. OFF: Online ON: Not online	○	○
SB0044	Station setting (own station) (1)	This stores if the own station is a master station or not. OFF: Not master station ON: Master station	○	○
SB0045	Station setting (own station) (2)	This stores if the own station is a local station or not. OFF: Not local station ON: Local station (Condition) • This is enabled when Station setting (own station) (1) (SB0044) is off.	×	○
SB0047	Baton pass status (own station)	Stores the baton pass status for the own station (transient transmission possible). OFF: Normal ON: Error If an error occurs, the cause of the error can be checked by the Baton pass status (own station) (SW0047) and Cause of baton pass interruption (SW0048). Depending on the timing of the link refresh, the update of Baton pass status (own station) (SW0047) and Cause of baton pass interruption (SW0048) may be offset by one sequence scan.	○	○
SB0049	Data link status (own station)	Stores the own station's data link status. OFF: Normal ON: Error If an error occurs, the cause of the error can be checked by Cause of data link stop (SW0049). Depending on the timing of the link refresh, the update of Cause of data link stop (SW0049) may be offset by one sequence scan. (Condition) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○

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Number	Name	Description	Availability	
			Master station (safety station)	Local station
SB004A	Own station's CPU status (1)	Stores the continuation error status of the own station's safety CPU module. OFF: Normal ON: Continuation error	○	○
SB004B	Own station's CPU status (2)	Stores the stop error status of the own station's safety CPU module. OFF: Normal ON: Stop error	○	○
SB004C	CPU RUN status (own station)	Stores the RUN status of the own station's safety CPU module. OFF: RUN ON: STOP or safety CPU module stop due to an error	○	○
SB004D	Received parameter error	Stores the status of the received parameter. (own parameter status during master station) OFF: Parameter normal ON: Parameter error	○	○
SB0050	Link start request accept status (own station)	Turns on when a cyclic transmission start request by Link start (own station) (SB0000) is accepted. OFF: Not accepted (SB0000 is off) ON: Start accepted (SB0000 is on) (Condition) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SB0051	Link start completion status (own station)	Turns on when Link start request accept status (own station) (SB0050) turns on, and cyclic transmission start is completed. OFF: Start not completed (SB0000 is off) ON: Start completed (SB0000 is on) (Condition) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SB0052	Link stop request accept status (own station)	Turns on when a cyclic transmission stop request by Link stop (own station) (SB0001) is accepted. OFF: Not accepted (SB0001 is off) ON: Stop accepted (SB0001 is on) (Condition) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SB0053	Link stop completion status (own station)	Turns on when Link stop request accept status (own station) (SB0052) turns on, and cyclic transmission stop is completed. OFF: Stop not completed (SB0001 is off) ON: Stop completed (SB0001 is on) (Condition) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SB0054	System link start request accept status	Turns on when a cyclic transmission start request by System link start (SB0002) is accepted. OFF: Not accepted (SB0002 is off) ON: Start accepted (SB0002 is on) (Condition) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	×

Number	Name	Description	Availability	
			Master station (safety station)	Local station
SB0055	System link start completion status	Turns on when System link start request accept status (SB0054) turns on, and cyclic transmission start is completed. OFF: Start not completed (SB0002 is off) ON: Start completed (SB0002 is on) (Condition) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	×
SB0056	System link stop request accept status	Turns on when a cyclic transmission stop request by System link stop (SB0003) is accepted. OFF: Not accepted (SB0003 is off) ON: Stop accepted (SB0003 is on) (Condition) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	×
SB0057	System link stop completion status	Turns on when System link stop accept status (SB0056) turns on, and cyclic transmission stop is completed. OFF: Stop not completed (SB0003 is off) ON: Stop completed (SB0003 is on) (Condition) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	×
SB0058	Temporary error invalid request accept status	Turns on when Temporary error invalid request (SB0010) is accepted. OFF: Not accepted (SB0010 is off) ON: Invalid accepted (SB0010 is on)	○	○
SB0059	Temporary error invalid setting completion status	Turns on when Temporary error invalid request accept status (SB0058) is turned on and the temporary error invalid processing is completed. OFF: Not completed ON: Completed or error completion	○	○
SB005A	Temporary error invalid setting cancel request accept status	Turns on when Temporary error invalid setting cancel request (SB0011) is accepted. OFF: Not accepted ON: Cancel accepted	○	○
SB005B	Temporary error invalid setting cancel completion status	Turns on when Temporary error invalid setting cancel request accept status (SB005A) is turned on and the temporary error invalid setting cancel process is completed. OFF: Not completed ON: Completed or error completion	○	○
SB005C	Reserved station function disable request accept status	Turns on when Reserved station function disable request (SB0012) is accepted. OFF: Not accepted ON: Cancel accepted	○	○
SB005D	Reserved station function disable completion status	Turns on when Reserved station function disable request accept status (SB005C) is turned on and disabling the reserved station function is completed. OFF: Not completed ON: Completed or error completion	○	○
SB005E	Reserved station specification enable request accept status	Turns on when Reserved station specification enable request (SB0013) is accepted. OFF: Not accepted ON: Enable accepted	○	○

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Appendix 3 Link Special Relay (SB) List

Number	Name	Description	Availability	
			Master station (safety station)	Local station
SB005F	Reserved station specification enabled status	Turns on when Reserved station specification enable request accept status (SB005E) is turned on and the reserved station specification enable processing is completed. OFF: Not completed ON: Completed or error completion	○	○
SB0060	Constant link scan status	Stores the constant link scan status. OFF: Constant link scan is disabled ON: Constant link scan is enabled (Condition) • This is enabled when Data link status (own station) (SB0049) is off.	○	○
SB0065	Loopback status	Stores loopback execution status. The loopback station numbers can be checked by Loopback station number 1 (SW0070) and Loopback station number 2 (SW0071). OFF: Normal (no loopback stations) ON: Error (loopback being performed) (Loopback stations exist.) (Condition) • This is enabled when Baton pass status (own station) (SB0047) is off and Loopback function setting status (SB0078) is on.	○	×
SB006A	PORT1 linkup status (own station)	Stores the linkup status of PORT1 (own station). OFF: Linkup in progress ON: Linkdown in progress The time that the linkup starts after power-on or Ethernet cable connection may vary. Normally, it takes a few seconds. Depending on device status on the line, a linkup process is repeated, resulting in the increase in the time.	○	○
SB006B	PORT2 linkup status (own station)	Stores the linkup status of PORT2 (own station). OFF: Linkup in progress ON: Linkdown in progress The time that the linkup starts after power-on or Ethernet cable connection may vary. Normally, it takes a few seconds. Depending on device status on the line, a linkup process is repeated, resulting in the increase in the time.	○	○
SB006C	PORT1 error frame reception status (own station)	Stores if an error frame is received at the own station's PORT1. OFF: An error frame has not yet been received ON: An error frame has been received	○	○
SB006D	PORT2 error frame reception status (own station)	Stores if an error frame is received at the own station's PORT2. OFF: An error frame has not yet been received ON: An error frame has been received	○	○
SB006E	PORT1 error frame detection (own station)	Stores if an error frame was received from power-on until the present at the own station's PORT1. OFF: An error frame has not yet been received ON: An error frame has been received	○	○
SB006F	PORT2 error frame detection (own station)	Stores if an error frame was received from power-on until the present at the own station's PORT2. OFF: An error frame has not yet been received ON: An error frame has been received	○	○

Number	Name	Description	Availability	
			Master station (safety station)	Local station
SB0072	Scan mode setting information	Stores the scan mode setting status. OFF: Asynchronous mode ON: Synchronous mode	○	○
SB0073	Operation status specified for CPU stop error	Stores the operating status during a CPU stop error due to parameters. OFF: Stop ON: Continue	○	○
SB0074	Reserved station specification status	Stores the reserved station specification status due to parameters. The reserved station number can be checked using Reserved station setting status (SW00C0 to SW00C7). OFF: Not specified ON: Specified	○	○
SB0075	Error invalid station setting status	Stores the Error invalid station setting status due to parameters. The station No. set for the error invalid station can be checked by Error invalid station setting (SW00D0 to SW00D7). OFF: Not specified ON: Specified	○	○
SB0077	Parameter reception status	Stores the parameter reception status from the master station. OFF: Reception completed ON: Reception not completed	×	○
SB0078	Loopback function setting status	Stores the setting status of the loopback function configured by the parameter. OFF: Not used ON: Used	○	×
SB007A	Event history status	Stores the network event history occurrence. OFF: No event history ON: Event history found If the event history is found, the cumulative number of network event history can be checked by the Event count (SW007A). Depending on the timing of the link refresh, the update of Event count (SW007A) may be offset by one sequence scan. This area is cleared when Event count clear (SB0009) is turned on.	○	○
SB007B	Input data status of data link faulty station	Stores the own station's setting status for "Data Link Disorder Station Setting". OFF: OFF or cleared to 0 ON: Hold	○	○
SB007D	Hold/clear status setting for CPU STOP	Stores the own station's setting status for "Output Setting during CPU STOP". OFF: Hold ON: Clear (ALL OFF)	○	○
SB0090	Hardware test completion status	Stores the hardware test completion status. OFF: Not executed or execution in progress ON: Completed If completed, the completion status can be checked by Hardware test normal/abnormal end (SB0091).	○	○

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Number	Name	Description	Availability	
			Master station (safety station)	Local station
SB0091	Hardware test normal/abnormal end	Stores the hardware test normal completion or abnormal completion status. OFF: Normal completion ON: Abnormal completion (Condition) • This is enabled when Hardware test completion status (SB0090) is on.	○	○
SB0092	Self-loopback test completion status	Stores the self-loopback test completion status. OFF: Not executed or execution in progress ON: Completed If completed, the completion status can be checked by Self-loopback test normal/abnormal end (SB0093).	○	○
SB0093	Self-loopback test normal/abnormal end	Stores the self-loopback test normal completion or abnormal completion status. OFF: Normal completion ON: Abnormal completion (Condition) • This is enabled when Self-loopback test completion status (SB0092) is on.	○	○
SB0094	Loop test completion status	Stores the loop test completion status. OFF: Not executed or execution in progress ON: Completed If completed, the completion status can be checked by Loop test normal/abnormal end (SB0095).	○	×
SB0095	Loop test normal/abnormal end	Stores the loop test normal completion or abnormal completion status. OFF: Normal completion ON: Abnormal completion (Condition) • This is enabled when Loop test completion status (SB0094) is on.	○	×
SB009A	Loop test request accept status	Stores the loop test request accept status. OFF: Loop test not accepted ON: Loop test accepted The master station is turned on during loop test mode. The slave stations are turned on during the loop test and turned off when the loop test is completed.	○	○
SB00A0	Baton pass status (each station)	Stores the baton pass status for each station. OFF: All stations normal ON: Faulty station found If a faulty station is found, the status of each station can be checked by Baton pass status (each station) (SW00A0 to SW00A7). Depending on the timing of the link refresh, the update of Baton pass status (each station) (SW00A0 to SW00A7) may be offset by one sequence scan. (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off. • Reserved stations and stations higher than the maximum station No. are ignored.	○	○

Number	Name	Description	Availability	
			Master station (safety station)	Local station
SB00A1	Baton pass status (master station)	Stores the baton pass status for master station. OFF: Normal ON: Error (Condition) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SB00B0	Data link status (each station)	Stores the cyclic transmission status for each station. OFF: Cyclic transmission for all stations in progress ON: Cyclic transmission not executed for some stations If cyclic transmission are not executed for some stations, the status of each station can be checked by Data link status (each station) (SW00B0 to SW00B7). Depending on the timing of the link refresh, the update of Data link status (each station) (SW00B0 to SW00B7) may be offset by one sequence scan. (Conditions) • This is enabled when Baton pass status (own station) (SB0047) is off. • Reserved stations and stations higher than the maximum station No. are ignored.	○	○
SB00B1	Data link status (master station)	Stores the cyclic transmission status for the master station. OFF: Normal ON: Error (Condition) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SB00C0	Reserved station setting status	Stores if there are any reserved stations. OFF: No reserved stations ON: Reserved stations found When a reserved station has been set, each station status can be checked using Reserved station setting status (SW00C0 to SW00C7). Depending on the timing of the link refresh, the update of Reserved station setting status (SW00C0 to SW00C7) may be offset by one sequence scan. (Condition) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SB00D0	Error invalid station setting	Stores if there are any error invalid stations. OFF: No error invalid stations ON: Error invalid station found If an error invalid station is found, the status of each station can be checked by Error invalid station setting (SW00D0 to SW00D7). Depending on the timing of the link refresh, the update of Error invalid station setting (SW00D0 to SW00D7) may be offset by one sequence scan. (Condition) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○

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Number	Name	Description	Availability	
			Master station (safety station)	Local station
SB00E0	Temporary error invalid station status	<p>Stores if there are any temporary error invalid stations.</p> <p>OFF: No temporary error invalid stations ON: Temporary error invalid station found</p> <p>If a temporary error invalid station is found, the status of each station can be checked by Temporary error invalid station setting (SW00E0 to SW00E7).</p> <p>Depending on the timing of the link refresh, the update of Temporary error invalid station setting (SW00E0 to SW00E7) may be offset by one sequence scan.</p> <p>(Condition)</p> <ul style="list-style-type: none"> This is enabled when Baton pass status (own station) (SB0047) is off. 	○	○
SB00F0	CPU RUN status (each station)	<p>Stores the RUN status of each station's CPU module.</p> <p>OFF: All stations are in RUN or STEP-RUN status ON: Station in STOP or PAUSE status found</p> <p>If a station in STOP or PAUSE status is found, the status of each station can be checked by the CPU RUN status (each station) (SW00F0 to SW00F7).</p> <p>Depending on the timing of the link refresh, the update of CPU RUN status (each station) (SW00F0 to SW00F7) may be offset by one sequence scan.</p> <p>(Condition)</p> <ul style="list-style-type: none"> This is enabled when Baton pass status (own station) (SB0047) is off. 	○	○
SB00F1	CPU RUN status (master station)	<p>Stores the RUN status of the master station's CPU module.</p> <p>OFF: RUN or STEP-RUN status ON: STOP or PAUSE status</p> <p>(Condition)</p> <ul style="list-style-type: none"> This is enabled when Baton pass status (own station) (SB0047) is off. 	○	○
SB0100	CPU operation status (each station) (1)	<p>Stores the stop error status for each station.</p> <p>OFF: All stations normal ON: Station with stop error found</p> <p>If a station with a stop error is found, the status of each station can be checked by Operation status (each station) (1) (SW0100 to SW0107).</p> <p>Depending on the timing of the link refresh, the update of Operation status (each station) (1) (SW0100 to SW0107) may be offset by one sequence scan.</p> <p>(Condition)</p> <ul style="list-style-type: none"> This is enabled when Baton pass status (own station) (SB0047) is off. 	○	○
SB0101	CPU operation status (master station) (1)	<p>Stores the stop error status of the master station's CPU module.</p> <p>OFF: Normal ON: Stop error occurred</p> <p>(Condition)</p> <ul style="list-style-type: none"> This is enabled when Baton pass status (own station) (SB0047) is off. 	○	○

Number	Name	Description	Availability	
			Master station (safety station)	Local station
SB0110	CPU operation status (each station) (2)	<p>Stores the continuation error status for each station.</p> <p>OFF: All stations normal ON: Station with continuation error found</p> <p>If a station with a continuation error is found, the status of each station can be checked by Operation status (each station) (2) (SW0110 to SW0117).</p> <p>Depending on the timing of the link refresh, the update of Operation status (each station) (2) (SW0110 to SW0117) may be offset by one sequence scan.</p> <p>(Condition)</p> <ul style="list-style-type: none"> This is enabled when Baton pass status (own station) (SB0047) is off. 	○	○
SB0111	CPU operation status (master station) (2)	<p>Stores the continuation error status of the master station's CPU module.</p> <p>OFF: Normal ON: Continuation error occurred</p> <p>(Condition)</p> <ul style="list-style-type: none"> This is enabled when Baton pass status (own station) (SB0047) is off. 	○	○
SB0120	PORT1 error frame reception status (each station)	<p>Stores if an error frame is received at each station's PORT1.</p> <p>OFF: An error frame has not yet been received at any stations. ON: An error frame has been received at one or more stations.</p> <p>If an error frame has been received, the status of each station can be checked by the PORT1 error frame reception status (each station) (SW0120 to SW0127).</p> <p>Depending on the timing of the link refresh, the update of PORT1 error frame reception status (each station) (SW0120 to SW0127) may be offset by one sequence scan.</p> <p>(Condition)</p> <ul style="list-style-type: none"> This is enabled when Baton pass status (own station) (SB0047) is off. 	○	○
SB0121	PORT1 error frame reception status (master station)	<p>Stores if an error frame is received at the master station's PORT1.</p> <p>OFF: An error frame has not yet been received ON: An error frame has been received</p> <p>(Condition)</p> <ul style="list-style-type: none"> This is enabled when Baton pass status (own station) (SB0047) is off. 	○	○
SB0130	PORT2 error frame reception status (each station)	<p>Stores if an error frame is received at each station's PORT2.</p> <p>OFF: An error frame has not yet been received at any stations. ON: An error frame has been received at one or more stations.</p> <p>If an error frame has been received, the status of each station can be checked by the PORT2 error frame reception status (each station) (SW0130 to SW0137).</p> <p>Depending on the timing of the link refresh, the update of PORT2 error frame reception status (each station) (SW0130 to SW0137) may be offset by one sequence scan.</p> <p>(Condition)</p> <ul style="list-style-type: none"> This is enabled when Baton pass status (own station) (SB0047) is off. 	○	○

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Number	Name	Description	Availability	
			Master station (safety station)	Local station
SB0131	PORT2 error frame reception status (master station)	Stores if an error frame is received at the master station's PORT2. OFF: An error frame has not yet been received ON: An error frame has been received (Condition) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SB0140	PORT1 error frame detection (each station)	Stores if an error frame was received from power-on until the present at each station's PORT1. OFF: An error frame has not been received at any stations ON: An error frame has been received at one or more stations If an error frame has been received, the status of each station can be checked by the PORT1 error frame detection (each station) (SW0140 to SW0147). Depending on the timing of the link refresh, the update of PORT1 error frame detection (each station) (SW0140 to SW0147) may be offset by one sequence scan. (Condition) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SB0141	PORT1 error frame detection (master station)	Stores if an error frame was received from power-on until the present at the master station's PORT1. OFF: An error frame has not yet been received ON: An error frame has been received at least once (Condition) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SB0150	PORT2 error frame detection (each station)	Stores if an error frame was received from power-on until the present at each station's PORT2. OFF: An error frame has not been received at any stations ON: An error frame has been received at one or more stations If an error frame has been received, the status of each station can be checked by the PORT2 error frame detection (each station) (SW0150 to SW0157). Depending on the timing of the link refresh, the update of PORT2 error frame detection (each station) (SW0150 to SW0157) may be offset by one sequence scan. (Condition) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SB0151	PORT2 error frame detection (master station)	Stores if an error frame was received from power-on until the present at the master station's PORT2. OFF: An error frame has not yet been received ON: An error frame has been received at least once (Condition) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○

Number	Name	Description	Availability	
			Master station (safety station)	Local station
SB0170	Parameter error status (each station)	<p>Stores the parameter status for each station. OFF: No parameter errors for any stations ON: Parameter error detected at one or more stations</p> <p>If a parameter error occurs, the status of each station can be checked by the Parameter error status (each station) (SW0170 to SW0177). Depending on the timing of the link refresh, the update of Parameter error status (each station) (SW0170 to SW0177) may be offset by one sequence scan.</p> <p>(Conditions)</p> <ul style="list-style-type: none"> • This is enabled when Baton pass status (own station) (SB0047) is off. • Reserved stations and stations higher than the maximum station No. are ignored. 	○	○
SB0180	Reserved station function disable status	<p>This stores if a reserved station function is disabled. OFF: No disabled reserved station function ON: Disabled reserved station function found</p> <p>If a reserved station function is disabled, the status of each station can be checked by the Reserved station function disable status (SW0180 to SW0187). Depending on the timing of the link refresh, the update of Reserved station function disable status (SW0180 to SW0187) may be offset by one sequence scan.</p> <p>(Condition)</p> <ul style="list-style-type: none"> • This is enabled when Baton pass status (own station) (SB0047) is off. 	○	○

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Appendix 4 Link Special Register (SW) List

The link special register (SW) stores the information during data link as a numerical value. Error locations and causes can be checked by the using and monitoring the link special register (SW) in programs.

(1) Application of link special registers (SW)

By using link special registers (SW), the status of CC-Link IE Field Network can be checked from HMI (Human Machine Interfaces) as well as GX Developer.

(2) Link special register (SW) refresh

The link special register (SW) uses "Transfer SW" of the refresh parameters to refresh the device of the safety CPU module. (☞ Page 86, Section 7.5)

(3) Ranges to which data are stored by users and by the system


The following ranges correspond to when the link special registers (SW) are assigned from SW0000 to SW01FF.



- Stored by users: SW0000 to SW001F
- Stored by the system: SW0020 to SW01FF

(4) Link special register (SW) list

The following table shows the link special registers (SW) when they are assigned from SW0000 to SW01FF.

Point




- Available link special registers are the same for all safety CPU operation modes.
 - Do not write any data to an area whose number is not on the link special register (SW) list. Doing so may cause malfunction of the programmable controller system.
 - For the usage of the link special register (SW), refer to  Page 221, Section 11.3.
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Number	Name	Description	Availability																																																																																																																																																										
			Master station (safety station)	Local station																																																																																																																																																									
SW0000		Sets the station where cyclic transmission is stopped or started. 00 _H : Own station 01 _H : All stations 02 _H : Specified station 80 _H : Own station (Forced link start) 81 _H : All stations (Forced link start) 82 _H : Specified station (Forced link start) Stopping/starting of cyclic transmission is performed by System link start (SB0002) or System link stop (SB0003).	○	×																																																																																																																																																									
SW0001 to SW0008	Link stop/start direction	When setting 02 _H or 82 _H by the Link stop/start direction (SW0000), this sets the station No. that stops or starts cyclic transmission. 0: No direction issued for stop or start 1: Direction issued for stop or start <table border="1"> <thead> <tr> <th></th> <th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>b7</th><th>b6</th><th>b5</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th> </tr> </thead> <tbody> <tr> <td>SW0001</td> <td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td> </tr> <tr> <td>SW0002</td> <td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td> </tr> <tr> <td>SW0003</td> <td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td> </tr> <tr> <td>SW0004</td> <td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td> </tr> <tr> <td>SW0005</td> <td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td> </tr> <tr> <td>SW0006</td> <td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td> </tr> <tr> <td>SW0007</td> <td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td> </tr> <tr> <td>SW0008</td> <td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td> </tr> </tbody> </table> Each number in the table represents station No.		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW0001	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW0002	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW0003	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW0004	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW0005	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW0006	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW0007	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW0008	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113	○	×
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																																																																																																													
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SW0002	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17																																																																																																																																													
SW0003	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33																																																																																																																																													
SW0004	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49																																																																																																																																													
SW0005	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65																																																																																																																																													
SW0006	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81																																																																																																																																													
SW0007	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97																																																																																																																																													
SW0008	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113																																																																																																																																													
SW0010 to SW0017	Reserved station function disable/temporary error invalid station setting	Specify the slave station for which the reserved station setting is to be temporary cancelled/restored, or the temporary error invalid station setting is to be set/cancelled. 0: Not specified 1: Specified <table border="1"> <thead> <tr> <th></th> <th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>b7</th><th>b6</th><th>b5</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th> </tr> </thead> <tbody> <tr> <td>SW0010</td> <td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td> </tr> <tr> <td>SW0011</td> <td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td> </tr> <tr> <td>SW0012</td> <td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td> </tr> <tr> <td>SW0013</td> <td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td> </tr> <tr> <td>SW0014</td> <td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td> </tr> <tr> <td>SW0015</td> <td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td> </tr> <tr> <td>SW0016</td> <td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td> </tr> <tr> <td>SW0017</td> <td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td> </tr> </tbody> </table> Each number in the table represents station No. (Conditions) • For some stations, reserved station setting cannot be temporarily cancelled/restored and temporary error invalid station setting cannot be configured/cancelled. ( Page 142, Section 9.6, Page 146, Section 9.7) • Stations higher than the maximum station No. are ignored.		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW0010	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW0011	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW0012	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW0013	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW0014	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW0015	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW0016	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW0017	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113	○	×
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SW0017	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113																																																																																																																																													
SW0030	Send/receive instruction (1) processing result	Stores the processing results of the link dedicated instruction that used the own station's channel 1. 0: Normal completion 1 or higher: Abnormal completion ( Page 246, Section 12.5)	○	○																																																																																																																																																									







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Appendix 4 Link Special Register (SW) List

Number	Name	Description	Availability	
			Master station (safety station)	Local station
SW0031	Send/receive instruction (2) processing result	Stores the processing results of the link dedicated instruction that used the own station's channel 2. 0: Normal completion 1 or higher: Abnormal completion ( Page 246, Section 12.5)	○	○
SW0040	Network No.	Stores the network number of own station. Range: 1 to 239	○	○
SW0042	Station No.	Stores the station number of own station. Range: 125 (master station), 1 to 120 (slave station), 0 (station No. not set)	○	○
SW0043	Mode status	Stores the mode of own station. 0: Online (Normal Mode) (Local station: Online) 1: Online (High Speed Mode) 2: Offline 6: Loop test 7: Self-loopback test 9: Hardware test	○	○
SW0047	Baton pass status (own station)	Stores the baton pass status for the own station (transient transmission possible). 0: Data link in progress 2: Baton pass in progress 3: Baton pass stopped 4: Test in progress 5: Offline	○	○
SW0048	Cause of baton pass interruption	Stores the cause of interruption in the communication (baton pass) of own station. 00 _H : At normal communication or power-on 30 _H : Cable disconnection 33 _H : Disconnection or reconnection in progress 40 _H : Offline mode 41 _H : Hardware test 42 _H : Self-loopback test	○	○
SW0049	Cause of data link stop	Stores the cause which stopped the data link of own station. 00 _H : At normal communication or power-on 01 _H : Stop command issued 02 _H : Monitoring timeout 05 _H : No slave stations (master station only) 10 _H : Parameter not received (local stations only) 11 _H : Own station No. out of range 12 _H : Own station specified as reserved 13 _H : Station No. duplication (own station) 14 _H : Master station duplication 16 _H : Station No. not set 18 _H : Parameter error 19 _H : Parameter communication in progress 1A _H : Station type mismatch 20 _H : Safety CPU module stop error 60 _H : Incorrect ring topology configuration (master station only)	○	○

Number	Name	Description	Availability	
			Master station (safety station)	Local station
SW004A	Data link stop request station	Stores the station No. of the station that performed the cyclic transmission stop request for the own station. Range: 1 to 120, 125 (master station) The cyclic transmission stop request is performed by System link stop (SB0003). (Condition) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SW004B	Own station's CPU status	Stores the own station's status. 00 _H : No module mounted 01 _H : STOP (Normal) 02 _H : STOP (Stop error occurring) 03 _H : STOP (Continuation error occurring) 04 _H : RUN (Normal) 05 _H : RUN (Continuation error occurring) 0E _H : Reset in progress 0F _H : Initial processing	○	○
SW004C	Parameter setting status	Stores the parameter status. 0: Normal 1 or higher: Abnormal ( Page 246, Section 12.5) (Condition) • This is enabled when the Received parameter error (SB004D) is on.	○	○
SW0050	Data link start status (own station)	Stores the results when cyclic transmission is started by Link start (own station) (SB0000). 0: Normal 1 or higher: Abnormal ( Page 246, Section 12.5) When Link start (own station) (SB0000) is turned off, the stored error definition is cleared. (Condition) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SW0051	Data link stop status (own station)	Stores the results when cyclic transmission is stopped by Link stop (own station) (SB0001). 0: Normal 1 or higher: Abnormal ( Page 246, Section 12.5) When Link stop (own station) (SB0001) is turned off, the stored error definition is cleared. (Condition) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○

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Number	Name	Description	Availability	
			Master station (safety station)	Local station
SW0052	Data link start status (entire system)	Stores the results when cyclic transmission is started by System link start (SB0002). 0: Normal 1 or higher: Error definition in own station ( Page 246, Section 12.5) When System link start (SB0002) is turned off, the stored error definition is cleared. (Condition) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	×
SW0053	Data link stop status (entire system)	Stores the results when cyclic transmission is stopped by System link stop (SB0003). 0: Normal 1 or higher: Error definition in own station ( Page 246, Section 12.5) When System link stop (SB0003) is turned off, the stored error definition is cleared. (Condition) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	×
SW0054	Temporary error invalid station setting result	Stores the results when executing the temporary error invalid station setting. 0: Normal 1 or higher: Abnormal ( Page 246, Section 12.5) When Temporary error invalid request (SB0010) is turned off, the stored error definition is cleared.	○	×
SW0055	Temporary error invalid station setting cancel result	Stores the results when canceling the temporary error invalid station setting. 0: Normal 1 or higher: Abnormal ( Page 246, Section 12.5) When Temporary error invalid setting cancel request (SB0011) is turned off, the stored error definition is cleared.	○	×
SW0056	Result of reserved station function disable	Stores the result when disabling reserved station function. 0: Normal 1 or higher: Abnormal ( Page 246, Section 12.5) When Reserved station function disable request (SB0012) is turned off, the stored error definition is cleared.	○	×
SW0057	Result of reserved station function enable	Stores the result when reserved station function disable is undone 0: Normal 1 or higher: Abnormal ( Page 246, Section 12.5) When Reserved station specification enable request (SB0013) is turned off, the stored error definition is cleared.	○	×
SW0058	Number of total slave stations (setting)	Stores the number of total slave stations that are set by the parameters. Range: 1 to 120	○	○

Number	Name	Description	Availability	
			Master station (safety station)	Local station
SW0059	Number of total slave stations (current value)	Stores the number of total slave stations that are actually connected by data link in CC-Link IE Field Network. Range: 1 to 120 (0 when own station is disconnected)	○	○
SW005A	Maximum baton pass station	Stores the maximum station No. of the stations where the baton pass is performed. Range: 1 to 120 (0 when own station is disconnected) (Condition) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SW005B	Maximum cyclic transmission station	Stores the maximum station No. of the station where the cyclic transmission is performed. Range: 1 to 120 (0 when own station is disconnected) (Condition) • This is enabled when Data link status (own station) (SB0049) is off.	○	○
SW0060	Maximum link scan time	Stores the maximum value of the link scan time during cyclic transmission. (Unit: ms) (Condition) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SW0061	Minimum link scan time	Stores the minimum value of the link scan time during cyclic transmission. (Unit: ms) (Condition) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SW0062	Current link scan time	Stores the current value of the link scan time during cyclic transmission. The stored value contains a maximum error of 1 ms. (Unit: ms) (Condition) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	○
SW0063	Constant link scan set value	Stores the setting value of the contact link scan that is set in the supplementary setting. 0: No setting 1 to 200: Setting value of contact link scan time (Unit: ms) (Condition) • This is enabled when Data link status (own station) (SB0049) is off.	○	○

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Number	Name	Description	Availability	
			Master station (safety station)	Local station
SW0064	Connection status (own station)	<p>Stores the connection status of own station.</p> <p>00_H: Normal (communication in progress on PORT1 and PORT2)</p> <p>01_H: Normal (communication in progress on PORT1, cable disconnected on PORT2)</p> <p>04_H: Normal (loopback communication in progress on PORT1, cable disconnected on PORT2)</p> <p>10_H: Normal (cable disconnected on PORT1, communication in progress on PORT2)</p> <p>11_H: Disconnecting (cable disconnected on PORT1 and PORT2)</p> <p>12_H: Disconnecting (cable disconnected on PORT1, establishing line on PORT2)</p> <p>21_H: Disconnecting (establishing line on PORT1, cable disconnected on PORT2)</p> <p>22_H: Disconnecting (establishing line on PORT1 and PORT2)</p> <p>40_H: Normal (cable disconnected on PORT1, loopback communication in progress on PORT2)</p>	○	○
SW0066	Actual link scan time (lower 1 word)	Stores the link scan time during cyclic transmission. (Unit: μs)	○	○
SW0067	Actual link scan time (upper 1 word)			
SW0068	PORT1 line error occurrence rate (max.)	<p>Stores the occurrence rate (maximum value) of received error frames at the own station's PORT1. (Unit: %)</p> <p>When Clear communication error count (SB0006) is turned on, the stored occurrence rate is cleared.</p>	○	○
SW0069	PORT1 line error occurrence rate (present)	<p>Stores the occurrence rate (current value) of received error frames at the own station's PORT1. (Unit: %)</p> <p>When Clear communication error count (SB0006) is turned on, the stored occurrence rate is cleared.</p>	○	○
SW006A	PORT2 line error occurrence rate (max.)	<p>Stores the occurrence rate (maximum value) of received error frames at the own station's PORT2. (Unit: %)</p> <p>When Clear communication error count (SB0006) is turned on, the stored occurrence rate is cleared.</p>	○	○
SW006B	PORT2 line error occurrence rate (present)	<p>Stores the occurrence rate (current value) of received error frames at the own station's PORT2. (Unit: %)</p> <p>When Clear communication error count (SB0006) is turned on, the stored occurrence rate is cleared.</p>	○	○
SW0070	Loopback station number 1	<p>Stores the number of the station where loopback is being performed. The other loopback station number can be checked by Loopback station number 2 (SW0071).</p> <p>0: No loopback stations</p> <p>1 to 120: Slave station</p> <p>125: Master station</p> <p>255: Station number not set</p> <p>If loopback occurs at a station whose station number is duplicated, the station number is stored in this register.</p> <p>(Condition)</p> <ul style="list-style-type: none"> This is enabled when Baton pass status (own station) (SB0047) is off. 	○	×

Number	Name	Description	Availability	
			Master station (safety station)	Local station
SW0071	Loopback station number 2	Stores the number of the station where loopback is being performed. The other loopback station number can be checked by Loopback station number 1 (SW0070). 0: No loopback stations 1 to 120: Slave station 125: Master station 255: Station number not set If loopback occurs at a station whose station number is duplicated, the station number is stored in this register. (Condition) • This is enabled when Baton pass status (own station) (SB0047) is off.	○	×
SW0074	PORT1 cable disconnection detection count	Stores the (cumulative) count that was detected for cable disconnections at the PORT1. When Clear communication error count (SB0006) is turned on, the stored occurrence rate is cleared. When FFFF _H is counted, the value returns to 0 and the module continues to count.	○	○
SW0075	PORT1 receive error detection count	Stores the (cumulative) count that data was received at the PORT1. The count stores only error data that is not transmitted to all stations. When Clear communication error count (SB0006) is turned on, the stored occurrence rate is cleared. When FFFF _H is counted, counting stops.	○	○
SW0076	PORT1 total no. of received data (lower 1 word)	Stores the (cumulative) count that data was received at the PORT1. When Clear communication error count (SB0006) is turned on, the stored occurrence rate is cleared. When FFFFFFFF _H is counted, counting stops.	○	○
SW0077	PORT1 total no. of received data (upper 1 word)			
SW007A	Event count	Stores the count of the network event history. This stored count is cleared when Event count clear (SB0009) is turned on. When FFFF _H is counted, counting stops.	○	○
SW007C	PORT2 cable disconnection detection count	Stores the (cumulative) count that was detected for cable disconnections at the PORT2. When Clear communication error count (SB0006) is turned on, the stored occurrence rate is cleared. When FFFF _H is counted, the value returns to 0 and the module continues to count.	○	○
SW007D	PORT2 receive error detection count	Stores the (cumulative) count that error data was received at the PORT2. The count stores only error data that is not transmitted to all stations. When Clear communication error count (SB0006) is turned on, the stored occurrence rate is cleared. When FFFF _H is counted, counting stops.	○	○

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Number	Name	Description	Availability																																																																																																																																																										
			Master station (safety station)	Local station																																																																																																																																																									
SW007E	PORT2 total no. of received data (lower 1 word)	Stores the (cumulative) count that data was received at the PORT2. When Clear communication error count (SB0006) is turned on, the stored occurrence rate is cleared. When FFFFFFFFH is counted, counting stops.	○	○																																																																																																																																																									
SW007F	PORT2 total no. of received data (upper 1 word)																																																																																																																																																												
SW00A0 to SW00A7	Baton pass status (each station)	<p>Stores the baton pass status for each station.</p> <p>0: Baton pass normal station 1: Baton pass faulty station</p> <ul style="list-style-type: none"> If multiple stations change from faulty to normal, because they are reconnected to the network one by one per link scan, the time until the status changes to "0: Baton pass normal station" may vary by several seconds. If no response is received for one link scan, the station is determined to be a baton pass faulty station. <table border="1"> <thead> <tr> <th></th> <th>b15</th> <th>b14</th> <th>b13</th> <th>b12</th> <th>b11</th> <th>b10</th> <th>b9</th> <th>b8</th> <th>b7</th> <th>b6</th> <th>b5</th> <th>b4</th> <th>b3</th> <th>b2</th> <th>b1</th> <th>b0</th> </tr> </thead> <tbody> <tr> <td>SW00A0</td> <td>16</td> <td>15</td> <td>14</td> <td>13</td> <td>12</td> <td>11</td> <td>10</td> <td>9</td> <td>8</td> <td>7</td> <td>6</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>1</td> </tr> <tr> <td>SW00A1</td> <td>32</td> <td>31</td> <td>30</td> <td>29</td> <td>28</td> <td>27</td> <td>26</td> <td>25</td> <td>24</td> <td>23</td> <td>22</td> <td>21</td> <td>20</td> <td>19</td> <td>18</td> <td>17</td> </tr> <tr> <td>SW00A2</td> <td>48</td> <td>47</td> <td>46</td> <td>45</td> <td>44</td> <td>43</td> <td>42</td> <td>41</td> <td>40</td> <td>39</td> <td>38</td> <td>37</td> <td>36</td> <td>35</td> <td>34</td> <td>33</td> </tr> <tr> <td>SW00A3</td> <td>64</td> <td>63</td> <td>62</td> <td>61</td> <td>60</td> <td>59</td> <td>58</td> <td>57</td> <td>56</td> <td>55</td> <td>54</td> <td>53</td> <td>52</td> <td>51</td> <td>50</td> <td>49</td> </tr> <tr> <td>SW00A4</td> <td>80</td> <td>79</td> <td>78</td> <td>77</td> <td>76</td> <td>75</td> <td>74</td> <td>73</td> <td>72</td> <td>71</td> <td>70</td> <td>69</td> <td>68</td> <td>67</td> <td>66</td> <td>65</td> </tr> <tr> <td>SW00A5</td> <td>96</td> <td>95</td> <td>94</td> <td>93</td> <td>92</td> <td>91</td> <td>90</td> <td>89</td> <td>88</td> <td>87</td> <td>86</td> <td>85</td> <td>84</td> <td>83</td> <td>82</td> <td>81</td> </tr> <tr> <td>SW00A6</td> <td>112</td> <td>111</td> <td>110</td> <td>109</td> <td>108</td> <td>107</td> <td>106</td> <td>105</td> <td>104</td> <td>103</td> <td>102</td> <td>101</td> <td>100</td> <td>99</td> <td>98</td> <td>97</td> </tr> <tr> <td>SW00A7</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>120</td> <td>119</td> <td>118</td> <td>117</td> <td>116</td> <td>115</td> <td>114</td> <td>113</td> </tr> </tbody> </table> <p>Each number in the table represents a station No. — is fixed to 0.</p> <p>(Conditions)</p> <ul style="list-style-type: none"> This is enabled when Baton pass status (own station) (SB0047) is off. Reserved stations and stations higher than the maximum station No. are ignored. 		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW00A0	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW00A1	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW00A2	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW00A3	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW00A4	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW00A5	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW00A6	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW00A7	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113	○	○
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SW00B0 to SW00B7	Data link status (each station)	<p>Stores the cyclic transmission status for each station.</p> <p>0: Cyclic transmission normal station 1: Cyclic transmission faulty station</p> <ul style="list-style-type: none"> If multiple stations change from faulty to normal, because they are reconnected to the network one by one per link scan, the time until the status changes to "0: Cyclic transmission normal station" may vary by several seconds. If no response is received for several link scans, the station is determined to be a cyclic transmission faulty station. <table border="1"> <thead> <tr> <th></th> <th>b15</th> <th>b14</th> <th>b13</th> <th>b12</th> <th>b11</th> <th>b10</th> <th>b9</th> <th>b8</th> <th>b7</th> <th>b6</th> <th>b5</th> <th>b4</th> <th>b3</th> <th>b2</th> <th>b1</th> <th>b0</th> </tr> </thead> <tbody> <tr> <td>SW00B0</td> <td>16</td> <td>15</td> <td>14</td> <td>13</td> <td>12</td> <td>11</td> <td>10</td> <td>9</td> <td>8</td> <td>7</td> <td>6</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>1</td> </tr> <tr> <td>SW00B1</td> <td>32</td> <td>31</td> <td>30</td> <td>29</td> <td>28</td> <td>27</td> <td>26</td> <td>25</td> <td>24</td> <td>23</td> <td>22</td> <td>21</td> <td>20</td> <td>19</td> <td>18</td> <td>17</td> </tr> <tr> <td>SW00B2</td> <td>48</td> <td>47</td> <td>46</td> <td>45</td> <td>44</td> <td>43</td> <td>42</td> <td>41</td> <td>40</td> <td>39</td> <td>38</td> <td>37</td> <td>36</td> <td>35</td> <td>34</td> <td>33</td> </tr> <tr> <td>SW00B3</td> <td>64</td> <td>63</td> <td>62</td> <td>61</td> <td>60</td> <td>59</td> <td>58</td> <td>57</td> <td>56</td> <td>55</td> <td>54</td> <td>53</td> <td>52</td> <td>51</td> <td>50</td> <td>49</td> </tr> <tr> <td>SW00B4</td> <td>80</td> <td>79</td> <td>78</td> <td>77</td> <td>76</td> <td>75</td> <td>74</td> <td>73</td> <td>72</td> <td>71</td> <td>70</td> <td>69</td> <td>68</td> <td>67</td> <td>66</td> <td>65</td> </tr> <tr> <td>SW00B5</td> <td>96</td> <td>95</td> <td>94</td> <td>93</td> <td>92</td> <td>91</td> <td>90</td> <td>89</td> <td>88</td> <td>87</td> <td>86</td> <td>85</td> <td>84</td> <td>83</td> <td>82</td> <td>81</td> </tr> <tr> <td>SW00B6</td> <td>112</td> <td>111</td> <td>110</td> <td>109</td> <td>108</td> <td>107</td> <td>106</td> <td>105</td> <td>104</td> <td>103</td> <td>102</td> <td>101</td> <td>100</td> <td>99</td> <td>98</td> <td>97</td> </tr> <tr> <td>SW00B7</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>120</td> <td>119</td> <td>118</td> <td>117</td> <td>116</td> <td>115</td> <td>114</td> </tr> </tbody> </table> <p>Each number in the table represents a station No. — is fixed to 0.</p> <p>(Conditions)</p> <ul style="list-style-type: none"> This is enabled when Baton pass status (own station) (SB0047) is off. Stations higher than the maximum station No. are ignored. 		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW00B0	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW00B1	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW00B2	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW00B3	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW00B4	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW00B5	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW00B6	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW00B7	—	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	○	○
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SW00C0 to SW00C7	Reserved station setting status	<p>Stores the setting status of the reserved station.</p> <p>0: Other than reserved station (also includes stations specified as reserved station disable status) 1: Reserved station</p> <table border="1"> <thead> <tr> <th></th> <th>b15</th> <th>b14</th> <th>b13</th> <th>b12</th> <th>b11</th> <th>b10</th> <th>b9</th> <th>b8</th> <th>b7</th> <th>b6</th> <th>b5</th> <th>b4</th> <th>b3</th> <th>b2</th> <th>b1</th> <th>b0</th> </tr> </thead> <tbody> <tr> <td>SW00C0</td> <td>16</td> <td>15</td> <td>14</td> <td>13</td> <td>12</td> <td>11</td> <td>10</td> <td>9</td> <td>8</td> <td>7</td> <td>6</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>1</td> </tr> <tr> <td>SW00C1</td> <td>32</td> <td>31</td> <td>30</td> <td>29</td> <td>28</td> <td>27</td> <td>26</td> <td>25</td> <td>24</td> <td>23</td> <td>22</td> <td>21</td> <td>20</td> <td>19</td> <td>18</td> <td>17</td> </tr> <tr> <td>SW00C2</td> <td>48</td> <td>47</td> <td>46</td> <td>45</td> <td>44</td> <td>43</td> <td>42</td> <td>41</td> <td>40</td> <td>39</td> <td>38</td> <td>37</td> <td>36</td> <td>35</td> <td>34</td> <td>33</td> </tr> <tr> <td>SW00C3</td> <td>64</td> <td>63</td> <td>62</td> <td>61</td> <td>60</td> <td>59</td> <td>58</td> <td>57</td> <td>56</td> <td>55</td> <td>54</td> <td>53</td> <td>52</td> <td>51</td> <td>50</td> <td>49</td> </tr> <tr> <td>SW00C4</td> <td>80</td> <td>79</td> <td>78</td> <td>77</td> <td>76</td> <td>75</td> <td>74</td> <td>73</td> <td>72</td> <td>71</td> <td>70</td> <td>69</td> <td>68</td> <td>67</td> <td>66</td> <td>65</td> </tr> <tr> <td>SW00C5</td> <td>96</td> <td>95</td> <td>94</td> <td>93</td> <td>92</td> <td>91</td> <td>90</td> <td>89</td> <td>88</td> <td>87</td> <td>86</td> <td>85</td> <td>84</td> <td>83</td> <td>82</td> <td>81</td> </tr> <tr> <td>SW00C6</td> <td>112</td> <td>111</td> <td>110</td> <td>109</td> <td>108</td> <td>107</td> <td>106</td> <td>105</td> <td>104</td> <td>103</td> <td>102</td> <td>101</td> <td>100</td> <td>99</td> <td>98</td> <td>97</td> </tr> <tr> <td>SW00C7</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>120</td> <td>119</td> <td>118</td> <td>117</td> <td>116</td> <td>115</td> <td>114</td> </tr> </tbody> </table> <p>Each number in the table represents a station No. — is fixed to 0.</p> <p>(Conditions)</p> <ul style="list-style-type: none"> This is enabled when Baton pass status (own station) (SB0047) is off. Holds the data immediately before the error. This is enabled only for normal stations in Baton pass status (each station) (SW00A0 to SW00A7). Stations higher than the maximum station No. are ignored. 		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW00C0	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW00C1	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW00C2	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW00C3	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW00C4	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW00C5	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW00C6	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW00C7	—	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	○	○
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Appendix 4 Link Special Register (SW) List

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SW00D0 to SW00D7	Error invalid station setting status	<p>Stores the setting status of error invalid stations.</p> <p>0: Other than error invalid station 1: Error invalid station</p> <table border="1"> <thead> <tr> <th></th> <th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>b7</th><th>b6</th><th>b5</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th> </tr> </thead> <tbody> <tr> <td>SW00D0</td> <td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td> </tr> <tr> <td>SW00D1</td> <td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td> </tr> <tr> <td>SW00D2</td> <td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td> </tr> <tr> <td>SW00D3</td> <td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td> </tr> <tr> <td>SW00D4</td> <td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td> </tr> <tr> <td>SW00D5</td> <td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td> </tr> <tr> <td>SW00D6</td> <td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td> </tr> <tr> <td>SW00D7</td> <td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td> </tr> </tbody> </table> <p>Each number in the table represents a station No. — is fixed to 0.</p> <p>(Conditions)</p> <ul style="list-style-type: none"> • This is enabled when Baton pass status (own station) (SB0047) is off. • Stations higher than the maximum station No. are ignored. 		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW00D0	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW00D1	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW00D2	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW00D3	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW00D4	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW00D5	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW00D6	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW00D7	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113	○	○
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SW0100 to SW0107	Operation status (each station) (1)	<p>Stores the stop error status for each station. 0: Normal 1: Stop error</p> <table border="1"> <thead> <tr> <th></th> <th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>b7</th><th>b6</th><th>b5</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th> </tr> </thead> <tbody> <tr> <td>SW0100</td> <td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td> </tr> <tr> <td>SW0101</td> <td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td> </tr> <tr> <td>SW0102</td> <td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td> </tr> <tr> <td>SW0103</td> <td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td> </tr> <tr> <td>SW0104</td> <td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td> </tr> <tr> <td>SW0105</td> <td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td> </tr> <tr> <td>SW0106</td> <td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td> </tr> <tr> <td>SW0107</td> <td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td> </tr> </tbody> </table> <p>Each number in the table represents a station No. — is fixed to 0.</p> <p>(Conditions)</p> <ul style="list-style-type: none"> • This is enabled when Baton pass status (own station) (SB0047) is off. • Holds the data immediately before the error. • This is enabled only for normal stations in Baton pass status (each station) (SW00A0 to SW00A7). • Reserved stations and stations higher than the maximum station No. are ignored. 		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW0100	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW0101	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW0102	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW0103	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW0104	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW0105	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW0106	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW0107	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113	○	○
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SW0102	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33																																																																																																																																													
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SW0107	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113																																																																																																																																													



Number	Name	Description	Availability																																																																																																																																																										
			Master station (safety station)	Local station																																																																																																																																																									
SW0110 to SW0117	Operation status (each station) (2)	<p>Stores the continuation error status for each station.</p> <p>0: Normal 1: Continuation error</p> <table border="1"> <thead> <tr> <th></th> <th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>b7</th><th>b6</th><th>b5</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th> </tr> </thead> <tbody> <tr> <td>SW0110</td> <td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td> </tr> <tr> <td>SW0111</td> <td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td> </tr> <tr> <td>SW0112</td> <td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td> </tr> <tr> <td>SW0113</td> <td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td> </tr> <tr> <td>SW0114</td> <td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td> </tr> <tr> <td>SW0115</td> <td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td> </tr> <tr> <td>SW0116</td> <td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td> </tr> <tr> <td>SW0117</td> <td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td> </tr> </tbody> </table> <p>Each number in the table represents a station No. — is fixed to 0.</p> <p>(Conditions)</p> <ul style="list-style-type: none"> • This is enabled when Baton pass status (own station) (SB0047) is off. • Holds the data immediately before the error. • This is enabled only for normal stations in Baton pass status (each station) (SW00A0 to SW00A7). • Reserved stations and stations higher than the maximum station No. are ignored. 		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW0110	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW0111	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW0112	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW0113	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW0114	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW0115	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW0116	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW0117	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113	○	○
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																																																																																																													
SW0110	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1																																																																																																																																													
SW0111	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17																																																																																																																																													
SW0112	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33																																																																																																																																													
SW0113	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49																																																																																																																																													
SW0114	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65																																																																																																																																													
SW0115	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81																																																																																																																																													
SW0116	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97																																																																																																																																													
SW0117	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113																																																																																																																																													
SW0120 to SW0127	PORT1 error frame reception status (each station)	<p>Stores the station number receiving an error frame on the transmission path at each station's PORT1.</p> <p>0: A line error is not occurring on the transmission path of each station's PORT1. 1: A line error is occurring on the transmission path of each station's PORT1.</p> <p>When Clear communication error count (SB0006) is turned on, the stored status is cleared.</p> <table border="1"> <thead> <tr> <th></th> <th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>b7</th><th>b6</th><th>b5</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th> </tr> </thead> <tbody> <tr> <td>SW0120</td> <td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td> </tr> <tr> <td>SW0121</td> <td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td> </tr> <tr> <td>SW0122</td> <td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td> </tr> <tr> <td>SW0123</td> <td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td> </tr> <tr> <td>SW0124</td> <td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td> </tr> <tr> <td>SW0125</td> <td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td> </tr> <tr> <td>SW0126</td> <td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td> </tr> <tr> <td>SW0127</td> <td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td> </tr> </tbody> </table> <p>Each number in the table represents a station No. — is fixed to 0.</p> <p>(Conditions)</p> <ul style="list-style-type: none"> • This is enabled when Baton pass status (own station) (SB0047) is off. • Holds the data immediately before the error. • This is enabled only for normal stations in Baton pass status (each station) (SW00A0 to SW00A7). 		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW0120	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW0121	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW0122	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW0123	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW0124	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW0125	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW0126	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW0127	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113	○	○
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																																																																																																													
SW0120	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1																																																																																																																																													
SW0121	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17																																																																																																																																													
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SW0123	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49																																																																																																																																													
SW0124	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65																																																																																																																																													
SW0125	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81																																																																																																																																													
SW0126	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97																																																																																																																																													
SW0127	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113																																																																																																																																													

Number	Name	Description	Availability																																																																																																																																																											
			Master station (safety station)	Local station																																																																																																																																																										
SW0130 to SW0137	PORT2 error frame reception status (each station)	<p>Stores the station number receiving an error frame on the transmission path at each station's PORT2.</p> <p>0: A line error has not yet occurred on the transmission path of the own station's PORT2.</p> <p>1: A line error has occurred on the transmission path of the own station's PORT2.</p> <p>When Clear communication error count (SB0006) is turned on, the stored status is cleared.</p> <table border="1"> <thead> <tr> <th></th> <th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>b7</th><th>b6</th><th>b5</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th> </tr> </thead> <tbody> <tr> <td>SW0130</td> <td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td> </tr> <tr> <td>SW0131</td> <td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td> </tr> <tr> <td>SW0132</td> <td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td> </tr> <tr> <td>SW0133</td> <td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td> </tr> <tr> <td>SW0134</td> <td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td> </tr> <tr> <td>SW0135</td> <td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td> </tr> <tr> <td>SW0136</td> <td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td> </tr> <tr> <td>SW0137</td> <td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td> </tr> </tbody> </table> <p>Each number in the table represents a station No. — is fixed to 0.</p> <p>(Conditions)</p> <ul style="list-style-type: none"> • This is enabled when Baton pass status (own station) (SB0047) is off. • Holds the data immediately before the error. • This is enabled only for normal stations in Baton pass status (each station) (SW00A0 to SW00A7). 		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW0130	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW0131	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW0132	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW0133	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW0134	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW0135	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW0136	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW0137	—	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113	○	○
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																																																																																																														
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SW0136	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97																																																																																																																																														
SW0137	—	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113																																																																																																																																													
SW0140 to SW0147	PORT1 error frame detection (each station)	<p>Stores the station number receiving an error frame on the transmission path at each station's PORT1.</p> <p>0: A line error is not currently occurred on the transmission path of the own station's PORT1.</p> <p>1: A line error is currently occurred on the transmission path of the own station's PORT1.</p> <p>When Clear communication error count (SB0006) is turned on, the stored status is cleared.</p> <table border="1"> <thead> <tr> <th></th> <th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>b7</th><th>b6</th><th>b5</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th> </tr> </thead> <tbody> <tr> <td>SW0140</td> <td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td> </tr> <tr> <td>SW0141</td> <td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td> </tr> <tr> <td>SW0142</td> <td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td> </tr> <tr> <td>SW0143</td> <td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td> </tr> <tr> <td>SW0144</td> <td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td> </tr> <tr> <td>SW0145</td> <td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td> </tr> <tr> <td>SW0146</td> <td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td> </tr> <tr> <td>SW0147</td> <td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td> </tr> </tbody> </table> <p>Each number in the table represents a station No. — is fixed to 0.</p> <p>(Conditions)</p> <ul style="list-style-type: none"> • This is enabled when Baton pass status (own station) (SB0047) is off. • Holds the data immediately before the error. • This is enabled only for normal stations in Baton pass status (each station) (SW00A0 to SW00A7). 		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW0140	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW0141	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW0142	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW0143	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW0144	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW0145	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW0146	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW0147	—	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113	○	○
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																																																																																																														
SW0140	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1																																																																																																																																														
SW0141	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17																																																																																																																																														
SW0142	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33																																																																																																																																														
SW0143	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49																																																																																																																																														
SW0144	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65																																																																																																																																														
SW0145	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81																																																																																																																																														
SW0146	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97																																																																																																																																														
SW0147	—	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113																																																																																																																																													

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Appendix 4 Link Special Register (SW) List

Number	Name	Description	Availability																																																																																																																																																										
			Master station (safety station)	Local station																																																																																																																																																									
SW0150 to SW0157	PORT2 error frame detection (each station)	<p>Stores the station number that has received an error frame from power-on until the present on the transmission path at each station's PORT2.</p> <p>0: A line error is not currently occurred on the transmission path of the own station's PORT2.</p> <p>1: A line error is currently occurred on the transmission path of the own station's PORT2.</p> <p>When Clear communication error count (SB0006) is turned on, the stored status is cleared.</p> <table border="1"> <thead> <tr> <th></th> <th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>b7</th><th>b6</th><th>b5</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th> </tr> </thead> <tbody> <tr> <td>SW0150</td> <td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td> </tr> <tr> <td>SW0151</td> <td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td> </tr> <tr> <td>SW0152</td> <td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td> </tr> <tr> <td>SW0153</td> <td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td> </tr> <tr> <td>SW0154</td> <td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td> </tr> <tr> <td>SW0155</td> <td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td> </tr> <tr> <td>SW0156</td> <td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td> </tr> <tr> <td>SW0157</td> <td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td> </tr> </tbody> </table> <p>Each number in the table represents a station No. — is fixed to 0.</p> <p>(Conditions)</p> <ul style="list-style-type: none"> • This is enabled when Baton pass status (own station) (SB0047) is off. • Holds the data immediately before the error. • This is enabled only for normal stations in Baton pass status (each station) (SW00A0 to SW00A7). 		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW0150	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW0151	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW0152	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW0153	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW0154	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW0155	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW0156	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW0157	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113	○	○
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																																																																																																													
SW0150	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1																																																																																																																																													
SW0151	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17																																																																																																																																													
SW0152	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33																																																																																																																																													
SW0153	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49																																																																																																																																													
SW0154	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65																																																																																																																																													
SW0155	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81																																																																																																																																													
SW0156	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97																																																																																																																																													
SW0157	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113																																																																																																																																													
SW0170 to SW0177	Parameter error status (each station)	<p>Stores the parameter status for each station.</p> <p>0: No parameter error</p> <p>1: Parameter error found</p> <table border="1"> <thead> <tr> <th></th> <th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>b7</th><th>b6</th><th>b5</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th> </tr> </thead> <tbody> <tr> <td>SW0170</td> <td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td> </tr> <tr> <td>SW0171</td> <td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td> </tr> <tr> <td>SW0172</td> <td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td> </tr> <tr> <td>SW0173</td> <td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td> </tr> <tr> <td>SW0174</td> <td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td> </tr> <tr> <td>SW0175</td> <td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td> </tr> <tr> <td>SW0176</td> <td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td> </tr> <tr> <td>SW0177</td> <td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td> </tr> </tbody> </table> <p>Each number in the table represents a station No. — is fixed to 0.</p> <p>(Conditions)</p> <ul style="list-style-type: none"> • This is enabled when Baton pass status (own station) (SB0047) is off. • Holds the data immediately before the error. • This is enabled only for normal stations in Baton pass status (each station) (SW00A0 to SW00A7). • Reserved stations and stations higher than the maximum station No. are ignored. 		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW0170	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW0171	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW0172	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW0173	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW0174	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW0175	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW0176	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW0177	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113	○	○
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																																																																																																													
SW0170	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1																																																																																																																																													
SW0171	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17																																																																																																																																													
SW0172	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33																																																																																																																																													
SW0173	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49																																																																																																																																													
SW0174	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65																																																																																																																																													
SW0175	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81																																																																																																																																													
SW0176	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97																																																																																																																																													
SW0177	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113																																																																																																																																													

Number	Name	Description	Availability																																																																																																																																																										
			Master station (safety station)	Local station																																																																																																																																																									
SW0180 to SW0187	Reserved station function disable status	<p>Stores the station that is currently in reserved station function disable status.</p> <p>0: No reserved station function disable is specified 1: Reserved station function disable in progress</p> <table border="1"> <thead> <tr> <th></th> <th>b15</th> <th>b14</th> <th>b13</th> <th>b12</th> <th>b11</th> <th>b10</th> <th>b9</th> <th>b8</th> <th>b7</th> <th>b6</th> <th>b5</th> <th>b4</th> <th>b3</th> <th>b2</th> <th>b1</th> <th>b0</th> </tr> </thead> <tbody> <tr> <td>SW0180</td> <td>16</td> <td>15</td> <td>14</td> <td>13</td> <td>12</td> <td>11</td> <td>10</td> <td>9</td> <td>8</td> <td>7</td> <td>6</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>1</td> </tr> <tr> <td>SW0181</td> <td>32</td> <td>31</td> <td>30</td> <td>29</td> <td>28</td> <td>27</td> <td>26</td> <td>25</td> <td>24</td> <td>23</td> <td>22</td> <td>21</td> <td>20</td> <td>19</td> <td>18</td> <td>17</td> </tr> <tr> <td>SW0182</td> <td>48</td> <td>47</td> <td>46</td> <td>45</td> <td>44</td> <td>43</td> <td>42</td> <td>41</td> <td>40</td> <td>39</td> <td>38</td> <td>37</td> <td>36</td> <td>35</td> <td>34</td> <td>33</td> </tr> <tr> <td>SW0183</td> <td>64</td> <td>63</td> <td>62</td> <td>61</td> <td>60</td> <td>59</td> <td>58</td> <td>57</td> <td>56</td> <td>55</td> <td>54</td> <td>53</td> <td>52</td> <td>51</td> <td>50</td> <td>49</td> </tr> <tr> <td>SW0184</td> <td>80</td> <td>79</td> <td>78</td> <td>77</td> <td>76</td> <td>75</td> <td>74</td> <td>73</td> <td>72</td> <td>71</td> <td>70</td> <td>69</td> <td>68</td> <td>67</td> <td>66</td> <td>65</td> </tr> <tr> <td>SW0185</td> <td>96</td> <td>95</td> <td>94</td> <td>93</td> <td>92</td> <td>91</td> <td>90</td> <td>89</td> <td>88</td> <td>87</td> <td>86</td> <td>85</td> <td>84</td> <td>83</td> <td>82</td> <td>81</td> </tr> <tr> <td>SW0186</td> <td>112</td> <td>111</td> <td>110</td> <td>109</td> <td>108</td> <td>107</td> <td>106</td> <td>105</td> <td>104</td> <td>103</td> <td>102</td> <td>101</td> <td>100</td> <td>99</td> <td>98</td> <td>97</td> </tr> <tr> <td>SW0187</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>120</td> <td>119</td> <td>118</td> <td>117</td> <td>116</td> <td>115</td> <td>114</td> <td>113</td> </tr> </tbody> </table> <p>Each number in the table represents a station No. — is fixed to 0.</p> <p>(Conditions)</p> <ul style="list-style-type: none"> • This is enabled when Baton pass status (own station) (SB0047) is off. • Holds the data immediately before the error. • This is enabled only for normal stations in Baton pass status (each station) (SW00A0 to SW00A7). • Stations higher than the maximum station No. are ignored. 		b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	SW0180	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	SW0181	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	SW0182	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	SW0183	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	SW0184	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	SW0185	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	SW0186	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	SW0187	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113	○	○
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SW0187	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113																																																																																																																																													



Appendix 5 Processing Time

This chapter describes the processing time of CC-Link IE Field Network.

Appendix 5.1 Link refresh time

The following are formulas to calculate the link refresh time.

(1) Safety communication

$$\alpha_{sTR} = KM1 + KM2 \times n \text{ [ms]}$$

α_{sTR} : Link refresh time of safety communication
n: Link refresh time of the receiving side of safety communication
KM1, KM2: Constant (KM1=2.80, KM2=0.20)

(2) Standard communication

$$\alpha_T, \alpha_R = KM3 + KM4 \times \left(\frac{RX + RY + SB}{16} + RW_r + RW_w + SW \right) \text{ [ms]}$$

α_T : Link refresh time of the sending side of standard communication
 α_R : Link refresh time of the receiving side of standard communication
RX: Total number of RX points that are actually being link-refreshed *1
RY: Total number of RY points that are actually being link-refreshed *1
RW_r: Total number of RW_r points that are actually being link-refreshed *1
RW_w: Total number of RW_w points that are actually being link-refreshed *1
SB: Number of SB points
SW: Number of SW points
KM3, KM4: Constant (KM3=0.09, KM4=0.41(× 10⁻³)*2

*1 Total number of link device points for the range set by the refresh parameters and set in the network configuration setting. Note that the points assigned to reserved stations are excluded.

*2 This value is for standard communication between safety CPU modules.

Appendix 5.2 Link scan time

The following is the formula to calculate the link scan time (when the link scan mode is asynchronous).

$$LS = \left[N_p + (\text{Number of connected slave stations} \times K_a) + K_b + K_c + K_d \right] \div 1000$$

$$+ (\text{Number of interrupt conditions in the interrupt setting}) \times 0.02$$

$$+ (K_e \text{ total of all stations}) \div 1000 \text{ [ms]}$$

Item	Cyclic transmission mode							
	Normal mode	High speed mode						
N _p	$\left(\frac{\alpha}{4} + \beta \times 4 \right) \times 0.08$ <p>α: Total number of points of "RX/R_Y Setting" in "Network Configuration Settings" β: Total number of points of "RWw/RWr Setting" in "Network Configuration Settings"</p>							
K _a	25.8	<table border="1"> <thead> <tr> <th>Conditions</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>When "Turn OFF or 0 Clear Input Data (RX/R_Y)" is set in the Network Operation Setting</td> <td style="text-align: center;">18.5</td> </tr> <tr> <td>When "Hold input data (RX/R_Y)" is set in the Network Operation Setting</td> <td style="text-align: center;">9.75</td> </tr> </tbody> </table>	Conditions	Value	When "Turn OFF or 0 Clear Input Data (RX/R _Y)" is set in the Network Operation Setting	18.5	When "Hold input data (RX/R _Y)" is set in the Network Operation Setting	9.75
Conditions	Value							
When "Turn OFF or 0 Clear Input Data (RX/R _Y)" is set in the Network Operation Setting	18.5							
When "Hold input data (RX/R _Y)" is set in the Network Operation Setting	9.75							
K _b	655	168						
K _c (Maximum transient processing time)	160 + 60 × Total number of slave stations set in the parameters (0 when transient transmission is not performed)	80 (0 when transient transmission is not performed)						
K _d (Maximum data link processing time when the station is disconnected from or returned to the network)	9000 + Total number of ports used in the switching hub × 3000 (9000 when the switching hub is not used)							
K _e (Processing time factor of each module)	<p>The table below shows the processing time factor of each module. Add values of all stations.</p> <table border="1"> <thead> <tr> <th>Module</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>Master/local module</td> <td>Safety station: 300 Standard station: 0</td> </tr> <tr> <td>Other than master/local module</td> <td style="text-align: center;">0</td> </tr> </tbody> </table>		Module	Value	Master/local module	Safety station: 300 Standard station: 0	Other than master/local module	0
Module	Value							
Master/local module	Safety station: 300 Standard station: 0							
Other than master/local module	0							

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Appendix 5.3 Cyclic transmission delay time

The following is the formula to calculate cyclic transmission delay time.

(1) Safety communication

The table below shows formulas to calculate time from when a device in the safety CPU module of the sending station turns on or off until that of the receiving station turns on or off. The formula for transmission delay time for safety communication through the following roots are all the same.

- Master station (safety station) ← Local station (safety station)
- Master station (safety station) → Local station (safety station)
- Local station (safety station) → Local station (safety station)

Calculation value	Formula
Normal value (in a stable connection)	$(SM \text{ of the sending station} \times 1) + (LS \times (n1+n2)) + (SM \text{ of the receiving station} \times 1)$
Normal value (in an unstable connection)	$(\text{Safety refresh monitoring time} \times 4)$ $- (\text{transmission interval monitoring time of the sending station} \times 3)$ $- (\text{transmission interval monitoring time of the receiving station} \times 4)$ $+ (SM \text{ of the receiving station} \times 3)$

SM: Sequence scan time

LS: Link scan time

n1: $SM \text{ of the receiving station} \div LS$ (Round up the calculated value to the nearest integer.)

n2: $\text{Number of safety connections at the sending station} \div 8$ (Round up the calculated value to the nearest integer.)

(2) Standard communication

(a) Between the master station and an intelligent device station

- Master station (RX/RWr) ← Intelligent device station (input)

The following time is shown:

- The time between a signal input to the intelligent device station and the CPU module device of the master station turning on or off
- The time between data input to the intelligent device station and the data being stored in the CPU module device of the master station

Calculation value	Block Data Assurance per Station		No Block Data Assurance per Station	
	Asynchronous mode	Synchronous mode	Asynchronous mode	Synchronous mode
Normal value	$(SM \times 1) + (LS \times n1) + Rio$	$(SM \times 1) + (LS \times 1) + Rio$	$(SM \times 1) + (LS \times 1) + Rio$	$(SM \times 1) + (LS \times 1) + Rio$
Maximum value	$(SM \times 1) + \{LS \times (n1 + 1)\} + Rio$	$(SM \times 1) + (LS \times 2) + Rio$	$(SM \times 1) + (LS \times 2) + Rio$	$(SM \times 1) + (LS \times 2) + Rio$

SM : Master station sequence scan time

LS : Link scan time

n1 : $SM \div LS$ (Round up the calculated value to the nearest integer.)

Rio : Intelligent device station processing time

( Manual for the intelligent device station used)

- Master station (RY/RWw) → Intelligent device station (output)

The following time is shown:

- The time between the CPU module device of the master station turning on or off and the output of the intelligent device station being turning on or off
- The time between data set to the CPU module device of the master station and the data output to the intelligent device station

Calculation value	Block data assurance per station		No block data assurance per station	
	Asynchronous mode	Synchronous mode	Asynchronous mode	Synchronous mode
Normal value	$(SM \times n2) + (LS \times 1) + Rio$	$(SM \times 1) + (LS \times 1) + Rio$	$(SM \times 1) + (LS \times 1) + Rio$	$(SM \times 1) + (LS \times 1) + Rio$
Maximum value	$(SM \times n2) + (LS \times 2) + Rio$	$(SM \times n2) + (LS \times 1) + Rio$	$(SM \times 2) + (LS \times 2) + Rio$	$(SM \times n2) + (LS \times 1) + Rio$

SM : Master station sequence scan time

LS : Link scan time

n2 : $LS \div SM$ (Round up the calculated value to the nearest integer.)

Rio : Intelligent device station processing time

( Manual for the intelligent device station used)

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(b) Master station and local stations

- Master station (RX) ← Local station (RY)

The table below shows formulas to calculate time from when a device in the CPU module of the local station turns on or off until that of the master station turns on or off.

[When m = 1]

Calculation value	Block data assurance per station		No block data assurance per station	
	Asynchronous mode	Synchronous mode	Asynchronous mode	Synchronous mode
Normal value	$(SM \times 1) + (LS \times k) + (SL \times 1)$	$(SM \times 1) + (LS \times 1) + (SL \times 1)$	$(SM \times 1) + (LS \times 1) + (SL \times 1)$	$(SM \times 1) + (LS \times 1) + (SL \times 1)$
Maximum value	$(SM \times 1) + (LS \times (k + n1)) + (SL \times 1)$	$(SM \times 1) + (LS \times k) + (SL \times 1)$	$(SM \times 1) + (LS \times 2) + (SL \times 1)$	$(SM \times 1) + (LS \times k) + (SL \times 1)$

[When m = 2 to 4]

Calculation value	Block data assurance per station		No block data assurance per station	
	Asynchronous mode	Synchronous mode	Asynchronous mode	Synchronous mode
Normal value	$(SM \times 1) + (LS \times m \times k) + (SL \times n)$	$(SM \times 1) + (LS \times m) + (SL \times n)$	$(SM \times 1) + (LS \times m) + (SL \times n)$	$(SM \times 1) + (LS \times m) + (SL \times n)$
Maximum value	$(SM \times 1) + (LS \times m \times (k + n1)) + (SL \times (n + 1))$	$(SM \times 1) + (LS \times m \times 2) + (SL \times (n + 1))$	$(SM \times 1) + (LS \times (n1 + 1)) + (SL \times 2)$	$(SM \times 1) + (LS \times m \times 2) + (SL \times 2)$

SM: Sequence scan time of the master station

LS: Link scan time

SL: Sequence scan time of the local station

n1: $SM \div LS$ (Round up the calculated value to the nearest integer.)

n: $(LS \times m) \div SL$ (Round up the calculated value to the nearest integer.)

k: $SL \div (LS \times m)$ (Round up the calculated value to the nearest integer.)

m: Number of points of "RWw/RWr Setting" set for the local station in "Network Configuration Settings"

Item	Number of points in "RWw/RWr Setting"			
	0 to 256 words	257 to 512 words	513 to 768 words	769 to 1024 words
m	1	2	3	4

- Master station (RY) → Local station (RX)

The table below shows formulas to calculate time from when a device in the CPU module of the master station turns on or off until that of the local station turns on or off.

Calculation value	Block data assurance per station		No block data assurance per station	
	Asynchronous mode	Synchronous mode	Asynchronous mode	Synchronous mode
Normal value	$(SM \times 1) + (LS \times n3) + (SL \times 1)$	$(SM \times 1) + (LS \times 1) + (SL \times 2)$	$(SM \times 1) + (LS \times 1) + (SL \times 1)$	$(SM \times 1) + (LS \times 1) + (SL \times 1)$
Maximum value	$(SM \times 1) + (LS \times (n3 + 1)) + (SL \times 2)$	$(SM \times 1) + (LS \times 2) + (SL \times 2)$	$(SM \times 1) + (LS \times 2) + (SL \times 2)$	$(SM \times 1) + (LS \times 2) + (SL \times 2)$

SM: Sequence scan time of the master station

LS: Link scan time

SL: Sequence scan time of the local station

n3: $(SL \div LS)$ (Round up the calculated value to the nearest integer.)

- Master station (RWr) ← Local station (RWw)

The table below shows formulas to calculate time from when data is set in the CPU module device of the local station until the data is stored in that of the master station.

[When $m = 1$]

Calculation value	Block data assurance per station		No block data assurance per station	
	Asynchronous mode	Synchronous mode	Asynchronous mode	Synchronous mode
Normal value	$(SM \times 1) + (LS \times k) + (SL \times 1)$	$(SM \times 1) + (LS \times 1) + (SL \times 1)$	$(SM \times 1) + (LS \times 1) + (SL \times 1)$	$(SM \times 1) + (LS \times 1) + (SL \times 1)$
Maximum value	$(SM \times 2) + (LS \times (k + n1)) + (SL \times 1)$	$(SM \times 2) + (LS \times k) + (SL \times 1)$	$(SM \times 2) + (LS \times 2) + (SL \times 1)$	$(SM \times 2) + (LS \times k) + (SL \times 1)$

[When $m = 2$ to 4]

Calculation value	Block data assurance per station		No block data assurance per station	
	Asynchronous mode	Synchronous mode	Asynchronous mode	Synchronous mode
Normal value	$(SM \times 1) + (LS \times m \times k) + (SL \times n)$	$(SM \times 1) + (LS \times m) + (SL \times n)$	$(SM \times 1) + (LS \times m) + (SL \times n)$	$(SM \times 1) + (LS \times m) + (SL \times n)$
Maximum value	$(SM \times 2) + (LS \times m \times (k + n1)) + (SL \times (n + 1))$	$(SM \times 2) + (LS \times m \times 2) + (SL \times (n + 1))$	$(SM \times 2) + ((LS \times (n1 + 1)) + (SL \times 2))$	$(SM \times 2) + (LS \times m \times 2) + (SL \times 2)$

SM: Sequence scan time of the master station

LS: Link scan time

SL: Sequence scan time of the local station

$n1$: $SM \div LS$ (Round up the calculated value to the nearest integer.)

n : $(LS \times m) \div SL$ (Round up the calculated value to the nearest integer.)

k : $SL \div (LS \times m)$ (Round up the calculated value to the nearest integer.)

m : Number of points of "RWw/RWr Setting" set for the local station in "Network Configuration Settings"

Item	Number of points in "RWw/RWr Setting"			
	0 to 256 words	257 to 512 words	513 to 768 words	769 to 1024 words
m	1	2	3	4

- Master station (RWw) → Local station (RWr)

The table below shows formulas to calculate time from when data is set in the CPU module device of the master station until the data is stored in that of the local station.

Calculation value	Block data assurance per station		No block data assurance per station	
	Asynchronous mode	Synchronous mode	Asynchronous mode	Synchronous mode
Normal value	$(SM \times 1) + (LS \times n3) + (SL \times 1)$	$(SM \times 1) + (LS \times 1) + (SL \times 1)$	$(SM \times 1) + (LS \times 1) + (SL \times 1)$	$(SM \times 1) + (LS \times 1) + (SL \times 1)$
Maximum value	$(SM \times 1) + (LS \times (n3 + 1)) + (SL \times 2)$	$(SM \times 1) + (LS \times 2) + (SL \times 2)$	$(SM \times 1) + (LS \times 2) + (SL \times 2)$	$(SM \times 1) + (LS \times 2) + (SL \times 2)$

SM: Sequence scan time of the master station

LS: Link scan time

SL: Sequence scan time of the local station

$n3$: $SL \div LS$ (Round up the calculated value to the nearest integer.)

A

Appendix 5.4 Transmission interval monitoring time

Transmission interval monitoring time is the time monitored by the receiving station for each safety connection to detect the following safety communication errors.

- Delay in transmission interval of safety data due to an error on the sending station
- Safety data loss on the transmission path due to noise

Set transmission interval monitoring time to both safety stations (active side and passive side) that perform safety communication. (☞ Page 90, Section 7.6)

The time value must satisfy the following formula.

Asynchronous mode	Synchronous mode
$\text{SM of sending station} + 2 \text{ [ms]}^{*1}$ <p style="text-align: center;">or</p> $\text{LS} \times \alpha \times 2 + 2 \text{ [ms]}^{*1}$	$\text{SM of sending station} + 2 \text{ [ms]}^{*1}$ <p style="text-align: center;">or</p> $\text{LS} + 2 \text{ [ms]}^{*1}$

*1 Use the larger value.

- SM: • To calculate transmission interval monitoring time on the active side: Sequence scan time of the active side (maximum value)
 • To calculate transmission interval monitoring time on the passive side: Sequence scan time of the passive side (maximum value)

LS: Link scan time

α : Number of safety connections at the sending station \div 8 (Round up the calculated value to the nearest integer.)

If time between a safety data transmission and the next safety data transmission on the sending station exceeds the transmission interval monitoring time, the receiving station detects a safety monitoring timeout error and stops safety communication. The safety data to be received from the sending station is cleared at the time.

Point

- When the safety CPU module detects a safety monitoring timeout error, check if the transmission interval monitoring time satisfies the formula above.
- If the difference between the transmission interval monitoring time of own station and that of the communication target station is four times or more, change the transmission interval monitoring time so that the difference stays less than four times.

Appendix 5.5 Safety refresh monitoring time

Safety refresh monitoring time is the time monitored by the receiving station for each safety connection to detect the following safety communication errors.

- Safety communication stop due to an error on the sending station
- Safety communication stop due to an error on the transmission path, such as cable disconnection or hub failure.

Set safety refresh monitoring time to one of the safety stations (active side) that performs safety communication.*1 (Page 90, Section 7.6)

*1 The active side and the passive side use the same safety refresh monitoring time.

The time value must satisfy the following formula.

$$\text{Safety refresh monitoring time} \geq \begin{aligned} &\text{Transmission interval monitoring time (active side)} \\ &+ \text{Transmission interval monitoring time (passive side)} \\ &+ \text{LS} \times (\beta + 1) \text{ [ms]} \end{aligned}$$

LS: Link scan time

- β :
- Number of safety connections on the active side \geq Number of safety connections on the passive side:
Number of safety connections on the active side $\div 8$ (Round up the calculated value to the nearest integer.)
 - Number of safety connections on the active side $<$ Number of safety connections on the passive side:
Number of safety connections on the passive side $\div 8$ (Round up the calculated value to the nearest integer.)

If time between a safety data reception and the next safety data reception on the receiving station exceeds the safety refresh monitoring time, the receiving station detects a safety monitoring timeout error and stops safety communication. The safety data to be received from the sending station is cleared at the time.

Point

When the safety CPU module detects a safety monitoring timeout error, check if the safety refresh monitoring time satisfies the formula above.

A

Appendix 5.6 Transmission delay time of dedicated instructions

The following is the formula to calculate the transmission delay time of dedicated instructions (time after a dedicated instruction is issued until the execution of the instruction is completed).

(1) Between the master station and an intelligent device station

(a) Master station (safety station) → Intelligent device station (standard station)

$$TD1: 2.0 + LS \times 12 \times m + Rio + SM \text{ [ms]}$$

LS: Link scan time

Rio: Intelligent device station processing time

SM: Master station sequence scan time

m: Number of divided sending = Value that "Data length ÷ 480" is rounded up to the nearest integer

(2) Between the master station and a local station

(a) Master station → Local station

The formula for transmission delay time of dedicated instructions through the following roots is all the same.

- Master station (safety station) → Local station (standard station)
- Master station (standard station) → Local station (safety station)
- Master station (safety station) → Local station (safety station)

$$TD1: 2.0 + LS \times 12 \times m + SL + SM \text{ [ms]}$$

LS: Link scan time

SL: Local station sequence scan time

SM: Master station sequence scan time

m: Number of divided sending = Value that "Data length ÷ 480" is rounded up to the nearest integer

(b) Master station ← Local station

The formula for transmission delay time of dedicated instructions through the following roots is all the same.

- Master station (safety station) ← Local station (standard station)
- Master station (standard station) ← Local station (safety station)
- Master station (safety station) ← Local station (safety station)

$$TD1: 2.0 + LS \times 12 \times m + SM + SL \text{ [ms]}$$

LS: Link scan time

SM: Master station sequence scan time

SL: Local station sequence scan time

m: Number of divided sending = Value that "Data length ÷ 480" is rounded up to the nearest integer

(3) Between local stations

The formula for transmission delay time of dedicated instructions through the following roots is all the same.

- Local station (safety station) → Local station (standard station)
- Local station (standard station) → Local station (safety station)
- Local station (safety station) → Local station (safety station)

TD1: $2.0 + LS \times 12 \times m + SLr + SLs$ [ms]

LS: Link scan time

SLr: Sequence scan time of the receiving side local station

SLs: Sequence scan time of the sending side local station


m: Number of divided sending = Value that "Data length ÷ 480" is rounded up to the nearest integer

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Appendix 6 New and Improved Functions

The following table lists the new and improved functions.

—: No restriction on serial number and version

New or improved function	Applicable module (first five digits of the serial number)	Applicable GX Developer version
Connecting the MELSEC iQ-R series module as a local station ( Page 320, Appendix 8)	"16022" or later	—

Appendix 7 Comparison with an Existing Product

This chapter explains the difference between the master/local module and an existing product.

Appendix 7.1 Comparison between the CC-Link Safety master module and the master/local module

(1) Performance specifications comparison

Item		Specifications		
		CC-Link Safety master module (QS0J61BT12)	Master/local module (QS0J71GF11-T2)	
Number of connectable stations per network	Safety master station or Master station (safety station)	1 station (Up to 64 remote stations can be connected to the safety master station.)	1 station (Up to 120 slave stations can be connected to the master station (safety station).)	
	Local station (standard station)	—	120 stations	
Maximum link points per network	RX	2048 points	16384 points	
	RY	2048 points	16384 points	
	RWr	256 points	8192 points	
	RWw	256 points	8192 points	
Maximum link points per station	Own station: Safety master station or Master station (safety station)	RX	2048 points	16384 points
		RY	2048 points	16384 points
		RWr	256 points	8192 points
		RWw	256 points	8192 points
	Own station: Local station	RX	—	2048 points
		RY	—	2048 points
		RWr	—	1024 points
		RWw	—	1024 points
	Receiving station: Safety remote station	RX	32 points	—
		RY	32 points	—
		RWr	0 points	—
		RWw	0 points	—
	Receiving station: Standard remote station	RX	128 points	—
		RY	128 points	—
		RWr	16 points	—
		RWw	16 points	—

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Appendix 7 Comparison with an Existing Product
Appendix 7.1 Comparison between the CC-Link Safety master module and the master/local module

Item		Specifications	
		CC-Link Safety master module (QS0J61BT12)	Master/local module (QS0J71GF11-T2)
Transmission specification	Communication speed	Selectable from 156kbps/625kbps/2.5Mbps/5Mbps/10Mbps	1Gbps
	Connection cable	Ver.1.10-compatible CC-Link dedicated cable	An Ethernet cable that meets the 1000BASE-T standard: Category 5e or higher (double shielded, STP), straight cable (☞ Page 56, Section 5.2.1)
	Maximum station-to-station distance	Maximum 100m (at transmission speed of 10Mbps)	Maximum 100m (Compliant with ANSI/TIA/EIA-568-B(Category 5e)) (☞ Page 66, Section 6.3 (2))
	Total distance	100m (at transmission speed of 10Mbps)	<ul style="list-style-type: none"> • Line topology: 12000m (when connected to 1 master station and 120 slave stations) • Star topology: Depends on the system configuration • Ring topology: 12100m (when connected to 1 master station and 120 slave stations)
	Network topology	Bus topology	Line topology, star topology (Coexistence of line topology and star topology is possible.), and ring topology
Station type		Safety master station	Master station (safety station), local station (safety station), local station (standard station)
Communication method		Broadcast polling	Token passing method
Number of occupied I/O points		32 points (I/O assignment: Intelligent 32 points)	
Internal current consumption (5VDC)		0.46A	0.85A
External dimensions		98(H) × 27.4(W) × 90(D) [mm]	98(H) × 27.4(W) × 115(D) [mm]
Weight		0.12kg	0.18kg

(2) Functional comparison

(a) Added functions


The following are the functions added on the master/local module.

Function		Description	Reference
Cyclic transmission	Mode selection for cyclic transmission	This mode can be selected for optimizing the performance of cyclic transmission based on the frequencies of cyclic transmission and transient transmission. The mode can be selected from "Online (Normal mode)" and "Online (High-speed mode)".	Page 79, Section 7.2 (1)
	Assurance of cyclic data integrity	The cyclic data integrity is assured in units of 32 bits or station-based units.	Page 106, Section 8.2.3
	Input status setting for data link faulty station	Select whether the input data from another station where the data link error occurred is cleared or held.	Page 113, Section 8.2.5
	Output status setting for CPU STOP	When the safety CPU module mounted with a master/local module is set to STOP, whether cyclic data output is held or cleared can be selected.	Page 115, Section 8.2.6
	Cyclic transmission stop and restart	During debugging and other operations, cyclic transmission is stopped. (Data reception from the slave station and data transmission from own stations are stopped). Also, the stopped cyclic transmission is restarted. Transient transmission is not stopped.	Page 116, Section 8.2.7 Page 138, Section 9.4
Transient transmission	Communication with different networks	By presetting routing parameters (communication paths) through GX Developer, transient transmission can be performed among stations of different network types using dedicated instructions and GX Developer. Seamless communications with the following networks can be achieved: <ul style="list-style-type: none"> • Ethernet • CC-Link IE Controller Network • MELSECNET/H • MELSECNET/10 • CC-Link (using GX Developer) 	Page 92, Section 7.7 Page 118, Section 8.3.2
CC-Link IE Field Network diagnostics	Network configuration display	The network configuration can be checked on the CC-Link IE Field Network diagnostics of GX Developer.	Page 124, CHAPTER 9
	Self-loopback test	Check the communication circuit of the transmission system of the master/local module.	Page 62, Section 6.2.2
	Cable test	Check the connection status of the Ethernet cable.	Page 74, Section 6.4.2
	Communication test	Check whether transient transmission's communication path from the own station to the target station is correct.	Page 75, Section 6.4.3
	Network event history	The history of events that occurred in the own station and on the network is displayed. For the master station, the event history of the entire network can be displayed, and so it can be used for troubleshooting at network start-up.	Page 140, Section 9.5
Slave station additional functions		Slave stations that are not set in the master station parameters can be added during data link.	—
Other functions	Reserved Station Function disable	Reserved station specification can be temporarily canceled without changing the parameters.	Page 119, Section 8.4 Page 142, Section 9.6

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(b) Modified functions

The following are the functions modified in the master/local module.

Function	Note for replacement
Slave station cut-off function	When the master/local module is connected in line topology, stations placed after the disconnected station become data link faulty station. To prevent disconnection of normal stations, connect CC-Link IE Field Network in star topology.  Page 49, Section 5.1.1 (2))
Standby master function	This function is not available for the master/local module.
Data link status setting if the CPU module on the master station is faulty	This setting is fixed to "Continue" for the master/local module.

Appendix 7.2 Comparison between the Q series master/local module and the master/local module

(1) Performance specifications comparison

Item	Specifications	
	Q series master/local module (QJ71GF11-T2)	Master/local module
Number of connectable safety stations per network	—	32 stations
Maximum number of safety connections per station	Asynchronous mode	31 connections
	Synchronous mode	8 connections
Number of safety inputs/outputs per safety connection	Input	8 words
	Output	8 words
Station type	Master station (standard station) Submaster station (standard station) Local station (standard station)	Master station (safety station) Local station (safety station) Local station (standard station)

(2) Functional comparison

(a) Added functions

The following are the functions added on the master/local module (QS0J71GF11-T2).

Function	Description	Reference	
Safety communication function	Communication with safety stations	Communication starts among safety stations on the same network after safety connections are established.	Page 96, Section 8.1.1
	Error log registration function	Information on errors occurred in safety stations and errors occurred in communications among safety stations are transferred to the safety CPU module and registered as error logs.	Page 99, Section 8.1.2
	Safety station interlock function	If an error occurs in safety communication, this function cuts off the safety communication and prevents automatic resumption of the communication.	Page 100, Section 8.1.3

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(b) Modified functions

The following are the functions modified in the master/local module (QS0J71GF11-T2).

Function		Note for replacement
Cyclic transmission	Direct access to link devices	Cannot be performed with the master/local module (QS0J71GF11-T2).
	Interlink transmission parameters	
	Input status setting for data link faulty station	Input data of safety communication from the data link faulty station is cleared regardless of the input status setting of the data link faulty station and the safety CPU operation mode.
	Output status setting for CPU STOP	Safety communication output data under the STOP status of the safety CPU module can be hold only when the safety CPU operation mode is on the test mode.
	Output status setting for CPU stop error	Cannot be performed with the master/local module (QS0J71GF11-T2).
	Cyclic transmission stop and restart	Cannot be performed when the safety CPU operation mode is the safety mode.
Transient transmission	Communication by dedicated instruction	<p>The following dedicated instructions cannot be used with the master/local module (QS0J71GF11-T2).</p> <ul style="list-style-type: none"> • SEND (sends data to a programmable controller on other station) • RECV (receives data from a programmable controller on other station) • RECVS (receives data from a programmable controller on other station) • REMFR (reads out data from the intelligent device station) • REMTO (writes data into the intelligent device station) • RIRD (reads out data from a target station) • RIWT (writes data into a target station) • CCPASET (parameter settings) • UINI (own Station (local station) number setting) <p>Note that remote RUN/STOP cannot be operated by the REQ instruction.</p>
Diagnostic function	CC-Link IE Field Network diagnostics	<p>(1) The following items cannot be diagnosed for modules that are not applicable to GX Developer (such as the Ethernet adapter module).</p> <ul style="list-style-type: none"> • Display of selected station status and error details • System Monitor • Remote operation <p>(2) Diagnosis of the following items from the master station is available only when the safety CPU operation mode is on the test mode.</p> <ul style="list-style-type: none"> • Link Start/Stop • Reserved Station Function Enable • Temporary Error Invalid Station Setting/Restore <p>(3) When setting station No. of slave stations from the master station (safety station), diagnosis is available only when the safety CPU operation mode is on the test mode.</p> <p>(4) Network event history data can be collected/cleared only when the safety CPU operation mode is test mode.</p>

Function		Note for replacement
Other functions	Reserved station specification	Cannot be performed when the safety CPU operation mode is the safety mode.
	Reserved station function disable	
	Error invalid station and temporary error invalid station setting	<ul style="list-style-type: none"> • Cannot be performed when the safety CPU operation mode is the safety mode. • Even when a local station (safety station) is set as an error invalid station or a temporary error invalid station, the master station (safety station) recognizes the local station (safety station) as a faulty station if the local station (safety station) gets disconnected during data link.
	Interrupt request to CPU Module	Cannot be performed with the master/local module (QS0J71GF11-T2).
	IP packet transfer function	
	Submaster function	
	Communication by GX Works2	GX Works2 cannot be used.

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Appendix 8 Precautions for When Connecting the MELSEC iQ-R Series Module

Follow the precautions below when connecting the MELSEC iQ-R series module as a local station in a system where the master station is the module of the MELSEC-QS series.

(1) Serial number of the master station

Use the modules with a serial number (first five digits) of the master station of "16022" or later.

(2) When the serial number (first five digits) of the master station is "16021" or earlier

If the serial number (first five digits) of the master station is "16021" or earlier, set "RX/RV Setting" in "Network Configuration Settings" of the master station to any of the following.

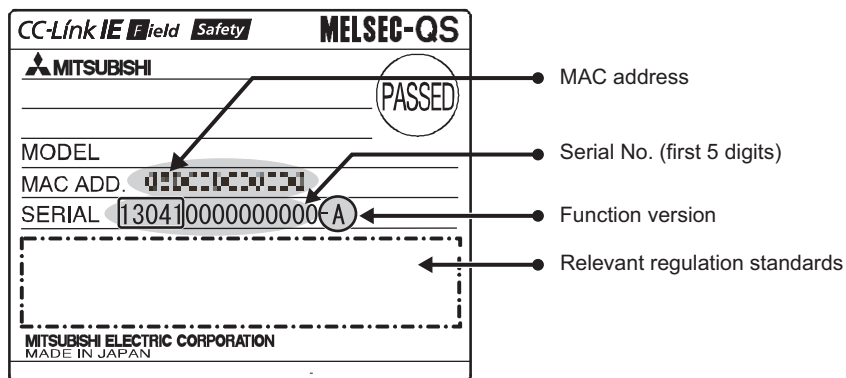
Action	Example																																																																																																						
<p>Set the largest end number in all stations to multiples of 32 - 1 by changing the number of cyclic assignment points or adding the reserved station.</p>	<ul style="list-style-type: none"> • Before change <table border="1"> <thead> <tr> <th rowspan="2">Number of PLCs</th> <th rowspan="2">Station No.</th> <th rowspan="2">Station Type</th> <th colspan="3">RX/RV Setting</th> </tr> <tr> <th>Points</th> <th>Start</th> <th>End</th> </tr> </thead> <tbody> <tr><td>1</td><td>1</td><td>Local Station</td><td>32</td><td>0000</td><td>001F</td></tr> <tr><td>2</td><td>2</td><td>Intelligent Device Station</td><td>16</td><td>0020</td><td>002F</td></tr> <tr><td>3</td><td>3</td><td>Intelligent Device Station</td><td>16</td><td>0030</td><td>003F</td></tr> <tr><td>4</td><td>4</td><td>Intelligent Device Station</td><td>16</td><td>0040</td><td>004F</td></tr> <tr><td>5</td><td>5</td><td>Intelligent Device Station</td><td>16</td><td>0050</td><td>005F</td></tr> <tr><td>6</td><td>6</td><td>Intelligent Device Station</td><td>16</td><td>0060</td><td>006F</td></tr> <tr><td>7</td><td>7</td><td>Local Station</td><td>32</td><td>0070</td><td>008F</td></tr> </tbody> </table> <ul style="list-style-type: none"> • After change <table border="1"> <thead> <tr> <th rowspan="2">Number of PLCs</th> <th rowspan="2">Station No.</th> <th rowspan="2">Station Type</th> <th colspan="3">RX/RV Setting</th> </tr> <tr> <th>Points</th> <th>Start</th> <th>End</th> </tr> </thead> <tbody> <tr><td>1</td><td>1</td><td>Local Station</td><td>32</td><td>0000</td><td>001F</td></tr> <tr><td>2</td><td>2</td><td>Intelligent Device Station</td><td>16</td><td>0020</td><td>002F</td></tr> <tr><td>3</td><td>3</td><td>Intelligent Device Station</td><td>16</td><td>0030</td><td>003F</td></tr> <tr><td>4</td><td>4</td><td>Intelligent Device Station</td><td>16</td><td>0040</td><td>004F</td></tr> <tr><td>5</td><td>5</td><td>Intelligent Device Station</td><td>16</td><td>0050</td><td>005F</td></tr> <tr><td>6</td><td>6</td><td>Intelligent Device Station</td><td>16</td><td>0060</td><td>006F</td></tr> <tr><td>7</td><td>7</td><td>Local Station</td><td>48</td><td>0070</td><td>009F</td></tr> </tbody> </table>	Number of PLCs	Station No.	Station Type	RX/RV Setting			Points	Start	End	1	1	Local Station	32	0000	001F	2	2	Intelligent Device Station	16	0020	002F	3	3	Intelligent Device Station	16	0030	003F	4	4	Intelligent Device Station	16	0040	004F	5	5	Intelligent Device Station	16	0050	005F	6	6	Intelligent Device Station	16	0060	006F	7	7	Local Station	32	0070	008F	Number of PLCs	Station No.	Station Type	RX/RV Setting			Points	Start	End	1	1	Local Station	32	0000	001F	2	2	Intelligent Device Station	16	0020	002F	3	3	Intelligent Device Station	16	0030	003F	4	4	Intelligent Device Station	16	0040	004F	5	5	Intelligent Device Station	16	0050	005F	6	6	Intelligent Device Station	16	0060	006F	7	7	Local Station	48	0070	009F
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Appendix 9 Checking the Serial Number and Function Version

The serial No. and function version of a master/local module can be checked on the rating plate, the front of the module, and the system monitor of GX Developer.

(1) Checking on the rating plate

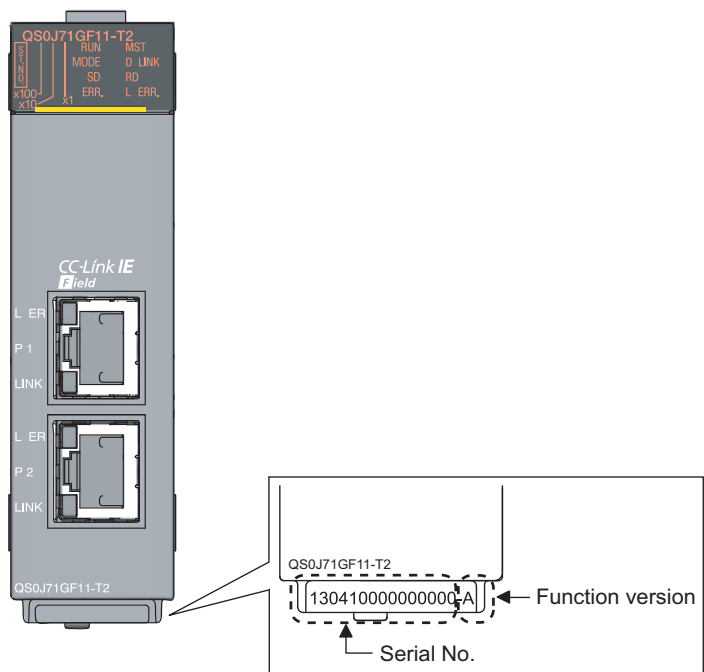
The rating plate is located on the side of the master/local module.



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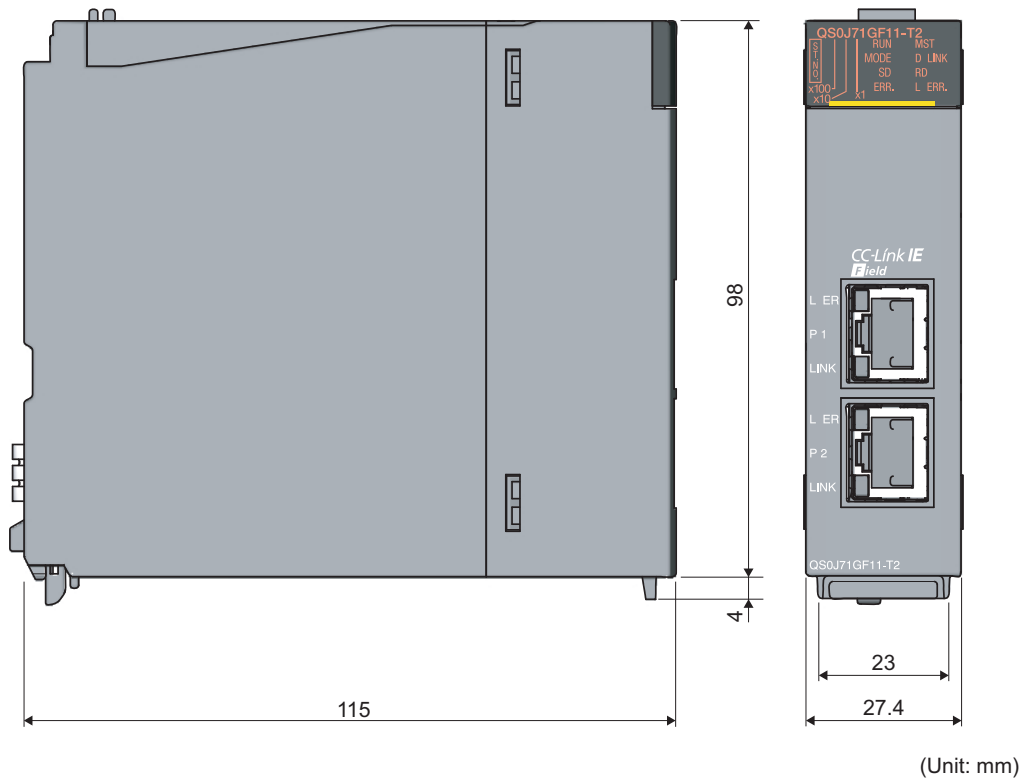
(2) Checking on the front of the module

The serial No. and function version on the rating plate are printed on the front (at the bottom) of the module.



Appendix 9 Checking the Serial Number and Function Version

Appendix 10 External Dimension Diagram



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Appendix 10 External Dimension Diagram

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REVISIONS

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