MITSUBISHI ELECTRIC

Programmable Controller

MELSEC iQ-R series

MELSEC iQ-R CC-Link IE Field Network User's Manual (Application)

-RJ71EN71
-RJ71GF11-T2
-R04ENCPU
-R08ENCPU
-R16ENCPU
-R32ENCPU
-R120ENCPU

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. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

The precautions given in this manual are concerned with this product only. For the safety precautions of the programmable controller system, refer to the MELSEC iQ-R Module Configuration Manual.

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

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

- Configure safety circuits external to the programmable controller to ensure that the entire system operates safely even when a fault occurs in the external power supply or the programmable controller. Failure to do so may result in an accident due to an incorrect output or malfunction.
  (1) Emergency stop circuits, protection circuits, and protective interlock circuits for conflicting operations (such as forward/reverse rotations or upper/lower limit positioning) must be configured external to the programmable controller.
  (2) When the programmable controller detects an abnormal condition, it stops the operation and all outputs are:
    - Turned off if the overcurrent or overvoltage protection of the power supply module is activated.
    - Held or turned off according to the parameter setting if the self-diagnostic function of the CPU module detects an error such as a watchdog timer error.
  (3) All outputs may be turned on if an error occurs in a part, such as an I/O control part, where the CPU module cannot detect any error. To ensure safety operation in such a case, provide a safety mechanism or a fail-safe circuit external to the programmable controller. For a fail-safe circuit example, refer to the MELSEC iQ-R Module Configuration Manual.
  (4) Outputs may remain on or off due to a failure of a component such as a relay and transistor in an output circuit. Configure an external circuit for monitoring output signals that could cause a serious accident.
- In an output circuit, when a load current exceeding the rated current or an overcurrent caused by a load short-circuit flows for a long time, it may cause smoke and fire. To prevent this, configure an external safety circuit, such as a fuse.
- Configure a circuit so that the programmable controller is turned on first and then the external power supply. If the external power supply is turned on first, an accident may occur due to an incorrect output or malfunction.
- Configure a circuit so that the external power supply is turned off first and then the programmable controller. If the programmable controller is turned off first, an accident may occur due to an incorrect output or malfunction.
- For the operating status of each station after a communication failure, refer to manuals for the network used. For the manuals, please consult your local Mitsubishi representative. Incorrect output or malfunction due to a communication failure may result in an accident.

[Design Precautions]

⚠WARNING

- When connecting an external device with a CPU module or intelligent function module to modify data of a running programmable controller, configure an interlock circuit in the program to ensure that the entire system will always operate safely. For other forms of control (such as program modification, parameter change, forced output, or operating status change) of a running programmable controller, read the relevant manuals carefully and ensure that the operation is safe before proceeding. Improper operation may damage machines or cause accidents. When a Safety CPU is used, data cannot be modified while the Safety CPU is in SAFETY MODE.
- Especially, when a remote programmable controller is controlled by an external device, immediate action cannot be taken if a problem occurs in the programmable controller due to a communication failure. To prevent this, configure an interlock circuit in the program, and determine corrective actions to be taken between the external device and CPU module in case of a communication failure.
- Do not write any data to the "system area" and "write-protect area" of the buffer memory in the module. Also, do not use any "use prohibited" signals as an output signal from the CPU module to each module. Doing so may cause malfunction of the programmable controller system. For the "system area", "write-protect area", and the "use prohibited" signals, refer to the user's manual for the module used. For areas used for safety communications, they are protected from being written by users, and thus safety communications failure caused by data writing does not occur.
- If a communication cable is disconnected, the network may be unstable, resulting in a communication failure of multiple stations. Configure an interlock circuit in the program to ensure that the entire system will always operate safely even if communications fail. Failure to do so may result in an accident due to an incorrect output or malfunction. When safety communications are used, an interlock by the safety station interlock function protects the system from an incorrect output or malfunction.

[Design Precautions]

⚠CAUTION

- Do not install the control lines or communication cables together with the main circuit lines or power cables. Doing so may result in malfunction due to electromagnetic interference. Keep a distance of 100mm or more between those cables.
- During control of an inductive load such as a lamp, heater, or solenoid valve, a large current (approximately ten times greater than normal) may flow when the output is turned from off to on. Therefore, use a module that has a sufficient current rating.
- After the CPU module is powered on or is reset, the time taken to enter the RUN status varies depending on the system configuration, parameter settings, and/or program size. Design circuits so that the entire system will always operate safely, regardless of the time.
- Do not power off the programmable controller or reset the CPU module while the settings are being written. Doing so will make the data in the flash ROM and SD memory card undefined. The values need to be set in the buffer memory and written to the flash ROM and SD memory card again. Doing so also may cause malfunction or failure of the module.
- When changing the operating status of the CPU module from external devices (such as the remote RUN/STOP functions), select "Do Not Open by Program" for "Opening Method" of "Module Parameter". If "Open by Program" is selected, an execution of the remote STOP function causes the communication line to close. Consequently, the CPU module cannot reopen the line, and external devices cannot execute the remote RUN function.
- The base unit and modules mounted on the base unit must be powered by a power supply that complies with Safety Extra-Low Voltage (SELV) and Limited Energy Circuit (LIM) or one that complies with UL 1310 Class 2.

[Security Precautions]

⚠WARNING

- To maintain the security (confidentiality, integrity, and availability) of the programmable controller and the system against unauthorized access, denial-of-service (DoS) attacks, computer viruses, and other cyberattacks from external devices via the network, take appropriate measures such as firewalls, virtual private networks (VPNs), and antivirus solutions.

[Installation Precautions]

⚠WARNING

- Shut off the external power supply (all phases) used in the system before mounting or removing the module. Failure to do so may result in electric shock or cause the module to fail or malfunction.

[Installation Precautions]

⚠CAUTION

- Use the programmable controller in an environment that meets the general specifications in the MELSEC iQ-R Module Configuration Manual. Failure to do so may result in electric shock, fire, malfunction, or damage to or deterioration of the product.
- To mount a module, place the concave part(s) located at the bottom onto the guide(s) of the base unit, and push in the module until the hook(s) located at the top snaps into place. Incorrect interconnection may cause malfunction, failure, or drop of the module.
- To mount a module with no module fixing hook, place the concave part(s) located at the bottom onto the guide(s) of the base unit, push in the module, and fix it with screw(s). Incorrect interconnection may cause malfunction, failure, or drop of the module.
- When using the programmable controller in an environment of frequent vibrations, fix the module with a screw.
- Tighten the screws within the specified torque range. Undertightening can cause drop of the component or wire, short circuit, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction. For the specified torque range, refer to the MELSEC iQ-R Module Configuration Manual.
- When using an extension cable, connect it to the extension cable connector of the base unit securely. Check the connection for looseness. Poor contact may cause malfunction.
- When using an SD memory card, fully insert it into the SD memory card slot. Check that it is inserted completely. Poor contact may cause malfunction.
- Securely insert an extended SRAM cassette or a battery-less option cassette into the cassette connector of the CPU module. After insertion, close the cassette cover and check that the cassette is inserted completely. Poor contact may cause malfunction.
- Beware that the module could be very hot while power is on and immediately after power-off.
- Do not directly touch any conductive parts and electronic components of the module, SD memory card, extended SRAM cassette, battery-less option cassette, or connector. Doing so can cause malfunction or failure of the module.

[Wiring Precautions]

⚠WARNING

- Shut off the external power supply (all phases) used in the system before installation and wiring. Failure to do so may result in electric shock or cause the module to fail or malfunction.
- After installation and wiring, attach a blank cover module (RG60) to each empty slot before powering on the system for operation. Also, attach an extension connector protective cover[*1] to each unused extension cable connector as necessary. Directly touching any conductive parts of the connectors while power is on may result in electric shock.
  *1 For details, please consult your local Mitsubishi Electric representative.

[Wiring Precautions]

⚠CAUTION

- Individually ground the FG and LG terminals of the programmable controller with a ground resistance of 100 ohms or less. Failure to do so may result in electric shock or malfunction.
- Use applicable solderless terminals and tighten them within the specified torque range. If any spade solderless terminal is used, it may be disconnected when the terminal screw comes loose, resulting in failure.
- Check the rated voltage and signal layout before wiring to the module, and connect the cables correctly. Connecting a power supply with a different voltage rating or incorrect wiring may cause fire or failure.
- Connectors for external devices must be crimped or pressed with the tool specified by the manufacturer, or must be correctly soldered. Incomplete connections may cause short circuit, fire, or malfunction.
- Securely connect the connector to the module. Poor contact may cause malfunction.
- Do not install the control lines or communication cables together with the main circuit lines or power cables. Doing so may result in malfunction due to noise. Keep a distance of 100mm or more between those cables.
- Place the cables in a duct or clamp them. If not, dangling cables may swing or inadvertently be pulled, resulting in malfunction or damage to modules or cables.
  In addition, the weight of the cables may put stress on modules in an environment of strong vibrations and shocks.
  Do not clamp the extension cables with the jacket stripped. Doing so may change the characteristics of the cables, resulting in malfunction.
- Check the interface type and correctly connect the cable. Incorrect wiring (connecting the cable to an incorrect interface) may cause failure of the module and external device.
- Tighten the terminal screws or connector screws within the specified torque range. Undertightening can cause drop of the screw, short circuit, fire, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, fire, or malfunction.
- When disconnecting the cable from the module, do not pull the cable by the cable part. For the cable with connector, hold the connector part of the cable. For the cable connected to the terminal block, loosen the terminal screw. Pulling the cable connected to the module may result in malfunction or damage to the module or cable.
- When wiring, shield the module using a cover or similar means to prevent foreign matter such as dust or wire chips from entering the module. Such foreign matter can cause a fire, failure, or malfunction. Remove the shield for heat dissipation before operating the system.
- When a protective film is attached to the top of the module, remove it before system operation. If not, inadequate heat dissipation of the module may cause a fire, failure, or malfunction.
- Programmable controllers must be installed in control panels. Connect the main power supply to the power supply module in the control panel through a relay terminal block. Wiring and replacement of a power supply module must be performed by qualified maintenance personnel with knowledge of protection against electric shock. For wiring, refer to the MELSEC iQ-R Module Configuration Manual.
- For Ethernet cables to be used in the system, select the ones that meet the specifications in the user's manual for the module used. If not, normal data transmission is not guaranteed.

[Startup and Maintenance Precautions]

⚠WARNING

- Do not touch any terminal while power is on. Doing so will cause electric shock or malfunction.
- Correctly connect the battery connector. Do not charge, disassemble, heat, short-circuit, solder, or throw the battery into the fire. Also, do not expose it to liquid or strong shock. Doing so will cause the battery to produce heat, explode, ignite, or leak, resulting in injury and fire.
- Shut off the external power supply (all phases) used in the system before cleaning the module or retightening the terminal screws, connector screws, or module fixing screws. Failure to do so may result in electric shock.

[Startup and Maintenance Precautions]

⚠CAUTION

- When connecting an external device with a CPU module or intelligent function module to modify data of a running programmable controller, configure an interlock circuit in the program to ensure that the entire system will always operate safely. For other forms of control (such as program modification, parameter change, forced output, or operating status change) of a running programmable controller, read the relevant manuals carefully and ensure that the operation is safe before proceeding. Improper operation may damage machines or cause accidents.
- Especially, when a remote programmable controller is controlled by an external device, immediate action cannot be taken if a problem occurs in the programmable controller due to a communication failure. To prevent this, configure an interlock circuit in the program, and determine corrective actions to be taken between the external device and CPU module in case of a communication failure.
- Do not disassemble or modify the modules. Doing so may cause failure, malfunction, injury, or a fire.
- Use any radio communication device such as a cellular phone or PHS (Personal Handy-phone System) 25cm or more away in all directions from the programmable controller. Failure to do so may cause malfunction.
- Shut off the external power supply (all phases) used in the system before mounting or removing the module. Failure to do so may cause the module to fail or malfunction.
- Tighten the screws within the specified torque range. Undertightening can cause drop of the component or wire, short circuit, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.
- After the first use of the product, do not perform each of the following operations more than 50 times (IEC 61131-2/JIS B 3502 compliant).
  Exceeding the limit may cause malfunction.
  - Mounting/removing the module to/from the base unit
  - Inserting/removing the extended SRAM cassette or battery-less option cassette to/from the CPU module
  - Mounting/removing the terminal block to/from the module
  - Connecting/disconnecting the extension cable to/from the base unit
- After the first use of the product, do not insert/remove the SD memory card to/from the CPU module more than 500 times. Exceeding the limit may cause malfunction.
- Do not touch the metal terminals on the back side of the SD memory card. Doing so may cause malfunction or failure of the module.

[Startup and Maintenance Precautions]

⚠CAUTION

- Do not touch the integrated circuits on the circuit board of an extended SRAM cassette or a battery-less option cassette. Doing so may cause malfunction or failure of the module.
- Do not drop or apply shock to the battery to be installed in the module. Doing so may damage the battery, causing the battery fluid to leak inside the battery. If the battery is dropped or any shock is applied to it, dispose of it without using.
- Startup and maintenance of a control panel must be performed by qualified maintenance personnel with knowledge of protection against electric shock. Lock the control panel so that only qualified maintenance personnel can operate it.
- Before handling the module, touch a conducting object such as a grounded metal to discharge the static electricity from the human body. Wearing a grounded antistatic wrist strap is recommended. Failure to discharge the static electricity may cause the module to fail or malfunction.
- After unpacking, eliminate static electricity from the module to prevent electrostatic discharge from affecting the module. If an electrostatically charged module comes in contact with a grounded metal object, a sudden electrostatic discharge of the module may cause failure. For details on how to eliminate static electricity from the module, refer to the following.
  Safety Precautions For Static Electricity Before Using MELSEC MX Controller MX-R Model and MELSEC iQ-R Series Models (FA-A-0368)
- Use a clean and dry cloth to wipe off dirt on the module.

[Operating Precautions]

⚠CAUTION

- When changing data and operating status, and modifying program of the running programmable controller from an external device such as a personal computer connected to an intelligent function module, read relevant manuals carefully and ensure the safety before operation. Incorrect change or modification may cause system malfunction, damage to the machines, or accidents.
- Do not power off the programmable controller or reset the CPU module while the setting values in the buffer memory are being written to the flash ROM in the module. Doing so will make the data in the flash ROM and SD memory card undefined. The values need to be set in the buffer memory and written to the flash ROM and SD memory card again. Doing so can cause malfunction or failure 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 on battery regulations in EU member states, refer to the MELSEC iQ-R Module Configuration Manual.

[Transportation Precautions]

⚠CAUTION

- When transporting lithium batteries, follow the transportation regulations. For details on the regulated models, refer to the MELSEC iQ-R Module Configuration Manual.
- The halogens (such as fluorine, chlorine, bromine, and iodine), which are contained in a fumigant used for disinfection and pest control of wood packaging materials, may cause failure of the product. Prevent the entry of fumigant residues into the product or consider other methods (such as heat treatment) instead of fumigation. The disinfection and pest control measures must be applied to unprocessed raw wood.

CONDITIONS OF USE FOR THE PRODUCT

(1) MELSEC programmable controller ("the PRODUCT") shall be used in conditions;
i) where any problem, fault or failure occurring in the PRODUCT, if any, shall not lead to any major or serious accident; and
ii) where the backup and fail-safe function are systematically or automatically provided outside of the PRODUCT for the case of any problem, fault or failure occurring in the PRODUCT.

(2) The PRODUCT has been designed and manufactured for the purpose of being used in general industries.
MITSUBISHI ELECTRIC SHALL HAVE NO RESPONSIBILITY OR LIABILITY (INCLUDING, BUT NOT LIMITED TO ANY AND ALL RESPONSIBILITY OR LIABILITY BASED ON CONTRACT, WARRANTY, TORT, PRODUCT LIABILITY) FOR ANY INJURY OR DEATH TO PERSONS OR LOSS OR DAMAGE TO PROPERTY CAUSED BY the PRODUCT THAT ARE OPERATED OR USED IN APPLICATION NOT INTENDED OR EXCLUDED BY INSTRUCTIONS, PRECAUTIONS, OR WARNING CONTAINED IN MITSUBISHI ELECTRIC USER'S, INSTRUCTION AND/OR SAFETY MANUALS, TECHNICAL BULLETINS AND GUIDELINES FOR the PRODUCT.
("Prohibited Application")
Prohibited Applications include, but not limited to, the use of the PRODUCT in;
- Nuclear Power Plants and any other power plants operated by Power companies, and/or any other cases in which the public could be affected if any problem or fault occurs in the PRODUCT.
- Railway companies or Public service purposes, and/or any other cases in which establishment of a special quality assurance system is required by the Purchaser or End User.
- Aircraft or Aerospace, Medical applications, Train equipment, transport equipment such as Elevator and Escalator, Incineration and Fuel devices, Vehicles, Manned transportation, Equipment for Recreation and Amusement, and Safety devices, handling of Nuclear or Hazardous Materials or Chemicals, Mining and Drilling, and/or other applications where there is a significant risk of injury to the public or property.

Notwithstanding the above restrictions, Mitsubishi Electric may in its sole discretion, authorize use of the PRODUCT in one or more of the Prohibited Applications, provided that the usage of the PRODUCT is limited only for the specific applications agreed to by Mitsubishi Electric and provided further that no special quality assurance or fail-safe, redundant or other safety features which exceed the general specifications of the PRODUCTs are required. For details, please contact the Mitsubishi Electric representative in your region.

(3) Mitsubishi Electric shall have no responsibility or liability for any problems involving programmable controller trouble and system trouble caused by DoS attacks, unauthorized access, computer viruses, and other cyberattacks.

INTRODUCTION

Thank you for purchasing the Mitsubishi Electric MELSEC iQ-R series programmable controllers.
This manual describes the functions, programming, and troubleshooting of the relevant products listed below.
Before using this product, please read this manual and the relevant manuals carefully and develop familiarity with the functions and performance of the MELSEC iQ-R series programmable controller to handle the product correctly.
When applying the program examples provided in this manual to an actual system, ensure the applicability and confirm that it will not cause system control problems.
Note that the menu names and operating procedures may differ depending on an operating system in use and its version. When reading this manual, replace the names and procedures with the applicable ones as necessary.
Please make sure that the end users read this manual.

Relevant products

RJ71GF11-T2, RJ71EN71, RnENCPU

Point

Unless otherwise specified, the buffer memory addresses in this manual are for when using the following:

- RJ71GF11-T2
- RJ71EN71 and RnENCPU in which "Port 1 Network Type" is set to "CC-Link IE Field"

For the RJ71EN71 and RnENCPU, add the following value to the buffer memory addresses when setting "Port 1 Network Type" to "Ethernet" and "Port 2 Network Type" to "CC-Link IE Field".

- Address (decimal): 2000000
- Address (hexadecimal): 1E8480H

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RELEVANT MANUALS

The following manuals are relevant to this product.

Manual name [manual number]	Description
MELSEC iQ-R CC-Link IE Field Network User's Manual (Application) [SH-081259ENG] (this manual)	Functions, parameter settings, programming, troubleshooting, I/O signals, and buffer memory of CC-Link IE Field Network
MELSEC iQ-R Module Configuration Manual [SH-081262ENG]	The combination of the MELSEC iQ-R series modules, common information on the installation/wiring in the system, and specifications of the power supply module, base unit, SD memory card, and battery
MELSEC iQ-R Ethernet/CC-Link IE User's Manual (Startup) [SH-081256ENG]	Specifications, procedures before operation, system configuration, wiring, and communication examples of Ethernet, CC-Link IE Controller Network, and CC-Link IE Field Network
MELSEC iQ-R CPU Module User's Manual (Startup) [SH-081263ENG]	Specifications, procedures before operation, and troubleshooting of the CPU module
MELSEC iQ-R CPU Module User's Manual (Application) [SH-081264ENG]	Memory, functions, devices, and parameters of the CPU module
MELSEC iQ-R Programming Manual (CPU Module Instructions, Standard Functions/Function Blocks) [SH-081266ENG]	Instructions for the CPU module and specifications for standard functions/function blocks
MELSEC iQ-R Programming Manual (Module Dedicated Instructions) [SH-081976ENG]	Dedicated instructions for the intelligent function modules
MELSEC iQ-R Ethernet, CC-Link IE, and MELSECNET/H Function Block Reference [BCN-P5999-0381]	Specifications of the following MELSEC iQ-R series module FBs: Ethernet-equipped module FBs, CC-Link IE TSN module FBs, CC-Link IE Controller Network module FBs, CC-Link IE Field Network module FBs, and MELSECNET/H network module FBs
GX Works3 Operating Manual [SH-081215ENG]	System configuration, parameter settings, and online operations of GX Works3
iQ Sensor Solution Reference Manual [SH-081133ENG]	Operation methods of the online functions for iQ Sensor Solution

TERMS

Unless otherwise specified, this manual uses the following terms.

Term	Description
Baton pass	A control mechanism in which transmission right (token) is passed around the network for data transmission.
Buffer memory	Memory in an intelligent function module to store data such as setting values and monitor values. For CPU modules, it refers to memory to store data such as setting values and monitor values of the Ethernet function, or data used for data communication of the multiple CPU system function.
Control CPU	A CPU module that controls connected I/O modules and intelligent function modules. In a multiple CPU system, a control CPU can be set for each module.
Control system	A system that controls a redundant system and performs network communications in a redundant system
CPU module (built-in Ethernet port part)	A built-in Ethernet port part of a CPU module (CPU part for an RnENCPU)
Data link	Communications that performed by cyclic transmission and transient transmission
Device	A memory of a CPU module to store data. Devices such as X, Y, M, D, and others are provided depending on the intended use.
Device station	Stations, such as a local station, remote I/O station, remote device station, and intelligent device station, other than a master station.
Engineering tool	A tool used for setting up programmable controllers, programming, debugging, and maintenance
Global label	A label that is valid for all the program data when multiple program data are created in the project. There are two types of global label: a module specific label (module label), which is generated automatically by GX Works3, and an optional label, which can be created for any specified device.
Intelligent device station	A station that exchanges I/O signals (bit data) and I/O data (word data) with the master 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.
Intelligent function module	A module that has functions other than an input or output, such as an A/D converter module and D/A converter module
Link device	A device (RX, RY, RWr, RWw, SB, or SW) in a module and board on CC-Link IE Field Network
Link refresh	Processing of data transfer between link devices of the network module and CPU module devices. Link refresh is performed in "END processing" of the sequence scan of the CPU module.
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.
Local station	A station that performs cyclic transmission and transient transmission with the master station and other local stations
Master operating station	A station that controls the entire system in the network where a master station and submaster station are connected. The connected master station or submaster station works as a master operating station.
Master station	A station that controls the entire network. This station can perform cyclic transmission and transient transmission with all stations. Only one master station can be used in a network.
Module label	A label that represents one of memory areas (I/O signals and buffer memory areas) specific to each module in a given character string. For the module used, GX Works3 automatically generates this label, which can be used as a global label.
New control system	A system that has switched to control system from standby system after system switching
Process CPU	A CPU module that performs process control and sequence control. Process control function blocks and the online module change function can be executed. This module is also used with a redundant function module as a pair and configures a redundant system. The Process CPU models include the R08PCPU, R16PCPU, R32PCPU, and R120PCPU.
Process CPU (redundant mode)	A Process CPU operating in redundant mode. A redundant system is configured with this CPU module. Process control function blocks and the online module change function can be used even in this mode.
Redundant function module	A module to configure a redundant system by using it in combination with a process CPU (redundant mode). The redundant function module model name is R6RFM.
Redundant system	A system consisting of two systems that have same configuration (CPU module, power supply module, network module, and other modules). Even after an error occurs in one of the two system, the other system takes over the control of the entire system.
Relay station	A station that relays data link to other station with mounting more than one network modules on one programmable controller.
Remote device station	A station that exchanges I/O signals (bit data) and I/O data (word data) with the master station by cyclic transmission. This station responds to a transient transmission request from another station.
Remote I/O station	A station that exchanges I/O signals (bit data) with the master station by cyclic transmission
RnENCPU (CPU part)	A module on the left-hand side of the RnENCPU (📖 MELSEC iQ-R Ethernet/CC-Link IE User's Manual (Startup))
RnENCPU (network part)	A module on the right-hand side of the RnENCPU (📖 MELSEC iQ-R Ethernet/CC-Link IE User's Manual (Startup))
Safety connection	A connection established for safety communications

Term	Description
Safety CPU	A module that performs both standard control and safety control and is used with a safety function module. The Safety CPU models include the R08SFCPU, R16SFCPU, R32SFCPU, and R120SFCPU.
Safety function module	A module for a safety control used in combination with a safety CPU. It cannot be used in combination with a CPU module other than a safety CPU. The safety function module model name is R6SFM.
Safety program	A program that performs safety control
Safety programmable controller	Modules, such as safety CPUs, Safety function modules, CC-Link IE Field Network remote I/O modules (with safety functions) for a safety control
Safety protocol version	A protocol version defined in the CC-Link IE Safety Communication Function Specification (BAP-C2007ENG-002) published by the CC-Link Partner Association. The year of issue of the applicable safety communication standard differs depending on the protocol version. (☞ Page 118 System using the Safety CPU)
Safety station	A station that performs safety communications and standard communications
SIL2 function module	A module that configures the safety system and must be used with a SIL2 Process CPU. This module can only be used with the SIL2 Process CPU. The SIL2 function module model name is R6PSFM.
SIL2 mode	An operation mode of the I/O module and the intelligent function module to perform safety input and output at the SIL2 level. (📖 Manuals of input/output modules or intelligent function module)
SIL2 Process CPU	This module is used with a SIL2 function module as a pair, and performs both standard control and safety control. This module is also used with a redundant function module as a pair and configures a redundant system. The SIL2 Process CPU models include the R08PSFCPU, R16PSFCPU, R32PSFCPU, and R120PSFCPU.
Standard communications	Communications other than safety communications, such as cyclic transmission and transient transmission of CC-Link IE Field Network
Standard program	A program that performs sequence control. (Safety programs are excluded.) (This term is used to distinguish from a safety program.)
Standard station	A station that performs standard communications
Standby system	A backup system in a redundant system
Submaster operating station	A station that monitors the status of a master operating station in the network where a master station and submaster station are connected. Only one master station can be used in a network.
Submaster station	A station that serves as a master station to control the entire network if the master station is disconnected. Only one master station can be used in a network.
System A	A system that is set as system A to distinguish two systems in a redundant system. It is used to distinguish connected two systems (system A and system B).
System B	A system that is set as system B to distinguish two systems in a redundant system. It is used to distinguish connected two systems (system A and system B).
System switching	A function which switches the systems between the control system and the standby system to continue operation of the redundant system when a failure or an error occurs in the control system
Tracking cable	An optical fiber cable used to connect two redundant function modules in a redundant system

GENERIC TERMS AND ABBREVIATIONS

Unless otherwise specified, this manual uses the following generic terms and abbreviations.

Generic term/abbreviation	Description
CC-Link IE Controller Network-equipped module	A generic term for the following modules: • RJ71GP21-SX CC-Link IE Controller Network module • RJ71GP21S-SX CC-Link IE Controller Network module • RJ71EN71 (when the CC-Link IE Controller Network function is used) • RnENCPU (when the CC-Link IE Controller Network function is used)
CCPASET instruction	A generic term for the dedicated instruction G.CCPASET and GP.CCPASET
Ethernet adapter module	An abbreviation for the NZ2GF-ETB CC-Link IE Field Network Ethernet adapter module
Ethernet device	A generic term for the devices supporting IP communication (such as a personal computer, a vision sensor, and a bar code reader)
Ethernet-equipped module	A generic term for the following modules: • RJ71EN71 (when the Ethernet function is used) • CPU module (when the Ethernet function is used)
I/O module	A generic term for the input module, output module, I/O combined module, and interrupt module
Master/local module	A generic term for the following modules: • RJ71GF11-T2 CC-Link IE Field Network master/local module • RJ71EN71 (when the CC-Link IE Field Network function is used) • RnENCPU (when the CC-Link IE Field Network function is used)
Network module	A generic term for the following modules: • Ethernet interface module • A module on CC-Link IE TSN (the RJ71GN11-T2 and a module on a remote station) • CC-Link IE Controller Network module • A module on CC-Link IE Field Network (a master/local module, and a module on a remote I/O station, a remote device station, and an intelligent device station) • MELSECNET/H network module • MELSECNET/10 network module • RnENCPU (network part)
READ instruction	A generic term for the dedicated instruction JP.READ and GP.READ
RECV instruction	A generic term for the dedicated instruction JP.RECV and GP.RECV
RECVS instruction	A generic term for the dedicated instruction G.RECVS and Z.RECVS
REMFR instruction	A generic term for the dedicated instruction JP.REMFR and ZP.REMFR
REMFRD instruction	An abbreviation for the dedicated instruction JP.REMFRD
Remote head module	An abbreviation for the RJ72GF15-T2 CC-Link IE Field Network remote head module
REMTO instruction	A generic term for the dedicated instruction JP.REMTO and ZP.REMTO
REMTOD instruction	An abbreviation for the dedicated instruction JP.REMTOD
REQ instruction	A generic term for the dedicated instruction J.REQ, JP.REQ, G.REQ, and GP.REQ
RIRD instruction	A generic term for the dedicated instruction J.RIRD, JP.RIRD, G.RIRD, and GP.RIRD
RIWT instruction	A generic term for the dedicated instruction J.RIWT, JP.RIWT, G.RIWT, and GP.RIWT
RnENCPU	A generic term for the R04ENCPU, R08ENCPU, R16ENCPU, R32ENCPU, and R120ENCPU
RWr	An abbreviation for the remote register. Word data input from a device station to the master station. (For some areas in a local station, data are input in the opposite direction.)
RWw	An abbreviation for the remote register. Word data output from the master station to a device station. (For some areas in a local station, data are output in the opposite direction.)
RX	An abbreviation for the remote input. Bit data input from a device station to the master station. (For some areas in a local station, data are input in the opposite direction.)
RY	An abbreviation for the remote output. Bit data output from the master station to a device station. (For some areas in a local station, data are output in the opposite direction.)
SB	An abbreviation for the link special relay. Bit data that indicates the operating status and data link status of a module on CC-Link IE Field Network.
SEND instruction	A generic term for the dedicated instruction JP.SEND and GP.SEND
SINFSTRD instruction	A generic term for the dedicated instruction J.SINFSTRD, JP.SINFSTRD, G.SINFSTRD, and GP.SINFSTRD
SINFTYRD instruction	A generic term for the dedicated instruction J.SINFTYRD, JP.SINFTYRD, G.SINFTYRD, and GP.SINFTYRD
SLMPREQ instruction	A generic term for the dedicated instruction J.SLMPREQ, JP.SLMPREQ, G.SLMPREQ, and GP.SLMPREQ
SREAD instruction	A generic term for the dedicated instruction JP.SREAD and GP.SREAD
SW	An abbreviation for the link special register. Word data that indicates the operating status and data link status of a module on CC-Link IE Field Network.

Generic term/abbreviation	Description
SWRITE instruction	A generic term for the dedicated instruction JP.SWRITE and GP.SWRITE
UINI instruction	A generic term for the dedicated instruction G.UINI, GP.UINI, Z.UINI, and ZP.UINI
WRITE instruction	A generic term for the dedicated instruction JP.WRITE and GP.WRITE

1 FUNCTIONS

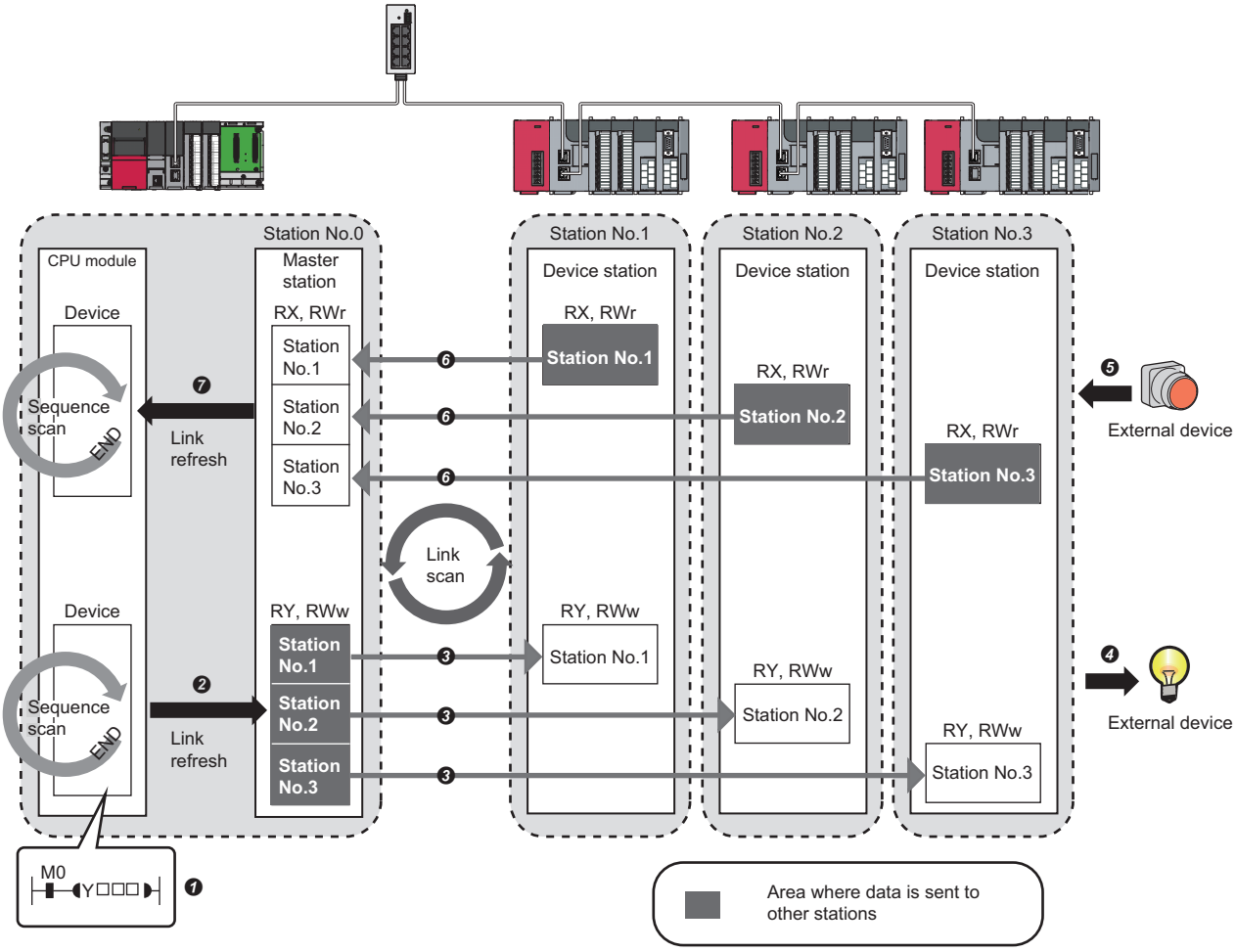
1.1 Cyclic Transmission

This function allows data to be periodically exchanged among stations on the same network using link devices.

Communications using RX, RY, RWr, and RWw

Master station and device stations (except for local stations)

One-to-one communication is possible between the master and device stations. The status data of the link devices (RY, RWw) of the master station is output to the external device of the device station, and the input status information from the external device of the device station is stored in the link devices (RX, RWr) of the master station.



- Output from the master station

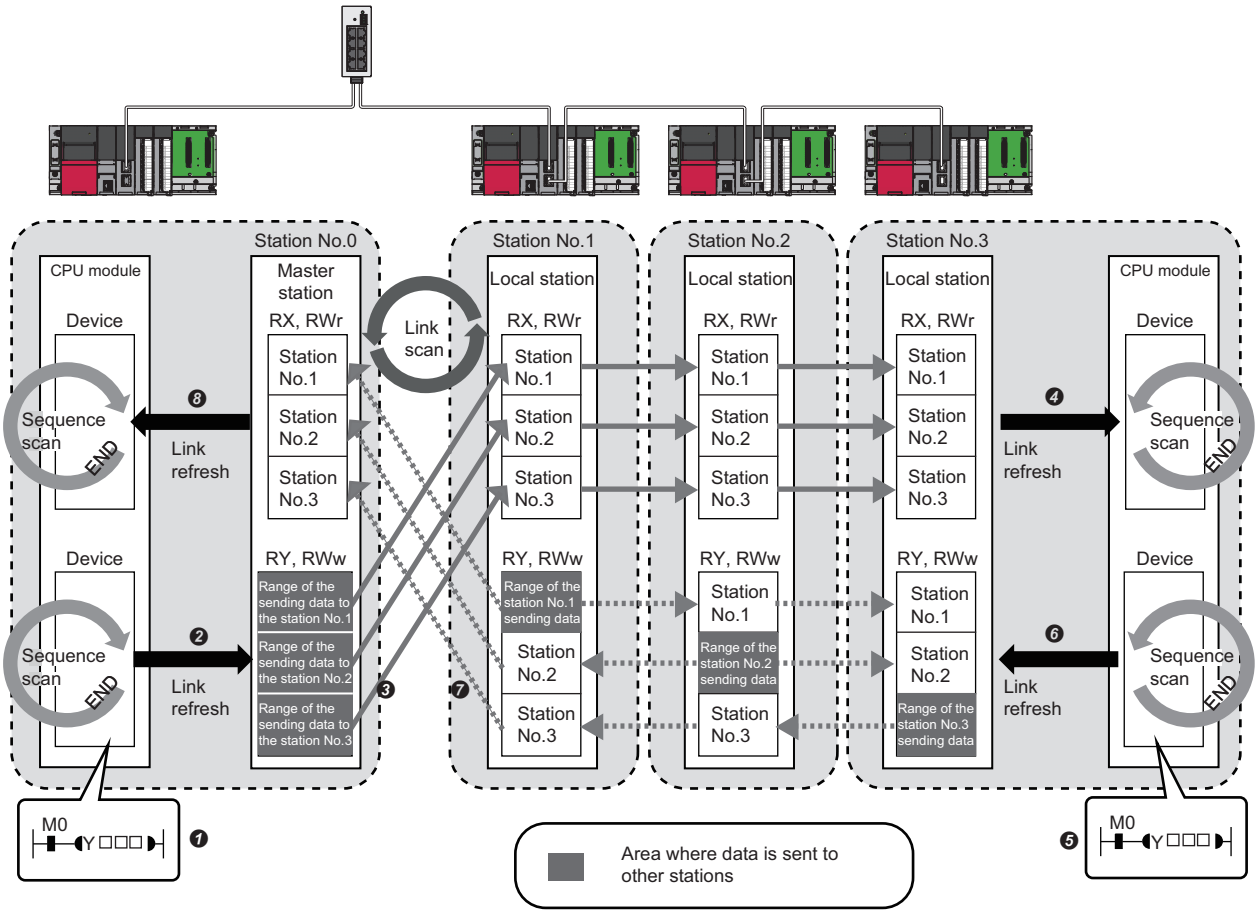
❶ The device of the CPU module turns on.
❷ The status data of the device of the CPU module are stored in the link devices (RY, RWw) of the master station by link refresh.
❸ The status data of the link devices (RY, RWw) of the master station are stored in the link devices (RY, RWw) of each device station by link scan.
❹ The status data of the link devices (RY, RWw) of the device station are output to the external device.

- Input from the device station

❺ The status data of the external device are stored in the link devices (RX, RWr) of the device station.
❻ The status data of the link devices (RX, RWr) of the device station are stored in the link devices (RX, RWr) of the master station by link scan.
❼ The status data of the link devices (RX, RWr) of the master station are stored in the devices of the CPU module by link refresh.

Master station and local stations

Data can be written into the send range of the link devices (RY, RWw) of each station and can be sent to any station on the same network. The status data of the link devices (RY, RWw) of the master 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 and the link devices (RY, RWw) of other local stations.



- Output from the master station

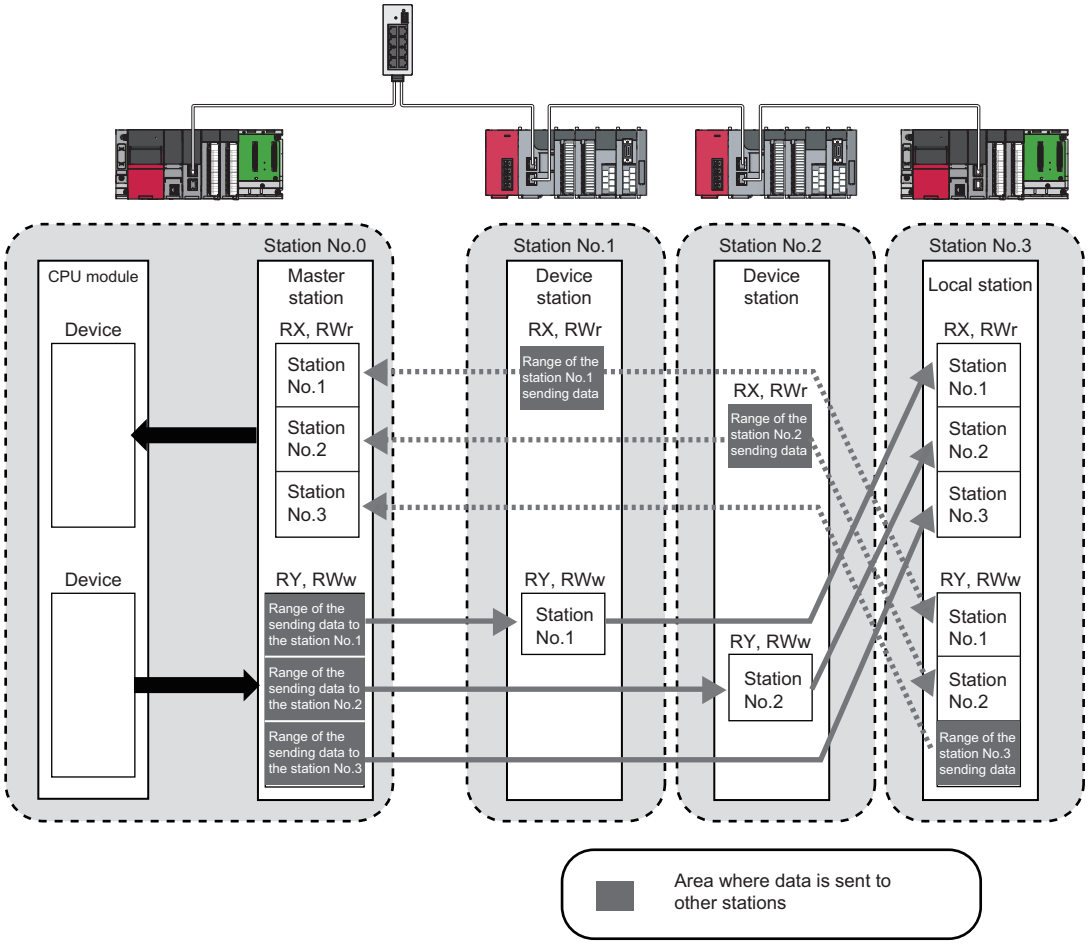
❶ The device of the CPU module turns on.
❷ The status data of the device of the CPU module are stored in the link devices (RY, RWw) of the master station by link refresh.
❸ The status data of the link devices (RY, RWw) of the master station are stored in the link devices (RX, RWr) of the local station by link scan.
❹ The status data of the link devices (RX, RWr) of the local station are stored in the devices of the CPU module.

- Input from the local station

❺ The device of the CPU module turns on.
❻ The device status data of the CPU module are stored in the own station send range of the link devices (RY, RWw).
❼ The status data of the link devices (RY, RWw) of the local station are stored in the link devices (RX, RWr) of the master station by link scan.
❽ The status data of the link devices (RX, RWr) of the master station are stored in the devices of the CPU module by link refresh.

Coexistence of local stations and the other device stations (other than local stations)

The data of all device stations are also stored in the local stations in the same way as the master station.



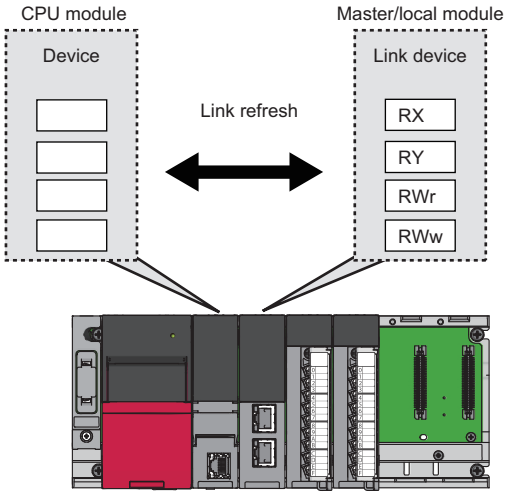
Setting method

The link devices can be assigned in "Network Configuration Settings" under "Basic Settings". (☞ Page 141 Network Configuration Settings)

The link refresh is assigned in "Refresh Settings" under "Basic Settings". (☞ Page 148 Refresh Settings)

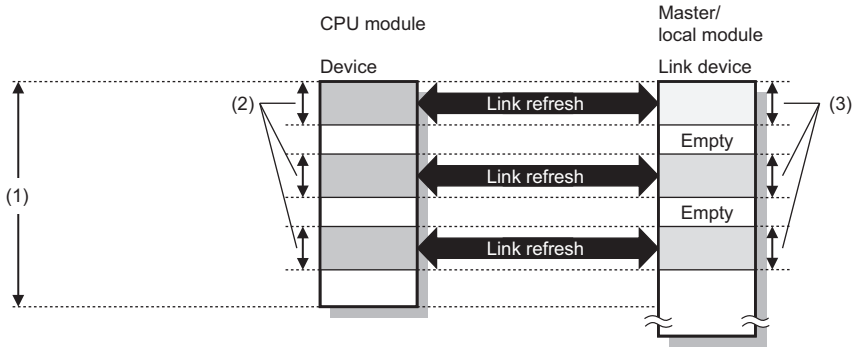
Link refresh

This function automatically transfers data between the link devices of the master/local module and the devices of the CPU module.



Concept of the link refresh range (number of points)

The link refresh is performed to the area set in "Refresh Settings" under "Basic Settings" and also specified in "Network Configuration Settings" under "Basic Settings".



(1) Range set in "Refresh Settings" under "Basic Settings"
(2) Actual link refresh range
(3) Range set in "Network Configuration Settings" under "Basic Settings"

Shortening the link refresh time and transmission delay time

The link refresh time and transmission delay time can be shortened by reducing the number of link refresh points to the CPU module. The following methods can be used to reduce the number of the link refresh points.

- In "Refresh Settings" under "Basic Settings", set only the link devices used in the CPU module as the link refresh range. (☞ Page 148 Refresh Settings)
- Directly access infrequently used link devices from the program, and remove the corresponding settings from the link refresh range. (☞ Page 26 Direct access to link devices)

Setting method

The link refresh is assigned in "Refresh Settings" under "Basic Settings". (☞ Page 148 Refresh Settings)

Precautions

■Latched devices of the CPU module

If data in latched devices of the CPU module are cleared to zero on a program when the CPU module is powered off and on or reset, the data may be output without being cleared to zero, depending on the timing of the link scan and link refresh. Take the following actions not to output the data in the latched devices of the CPU module.

CPU module device	How to disable the device data
Latch relay (L), file register (R, ZR)	Use the initial device value of the CPU module to clear the device to zero.*1
CPU module device within the latch range	Delete all the latch range settings specified in "Latch Interval Operation Setting" under "Device Latch Interval Setting" in "Memory/Device Setting" of "CPU Parameter".

*1 For the initial device value setting of the CPU module, refer to the following.
GX Works3 Operating Manual

Direct access to link devices

This function directly accesses the link devices (RX, RY, RWr, RWw, SB, or SW) of the master/local module from the program. Specify a link device as the link direct device (J□\□) for direct access.

Specification method

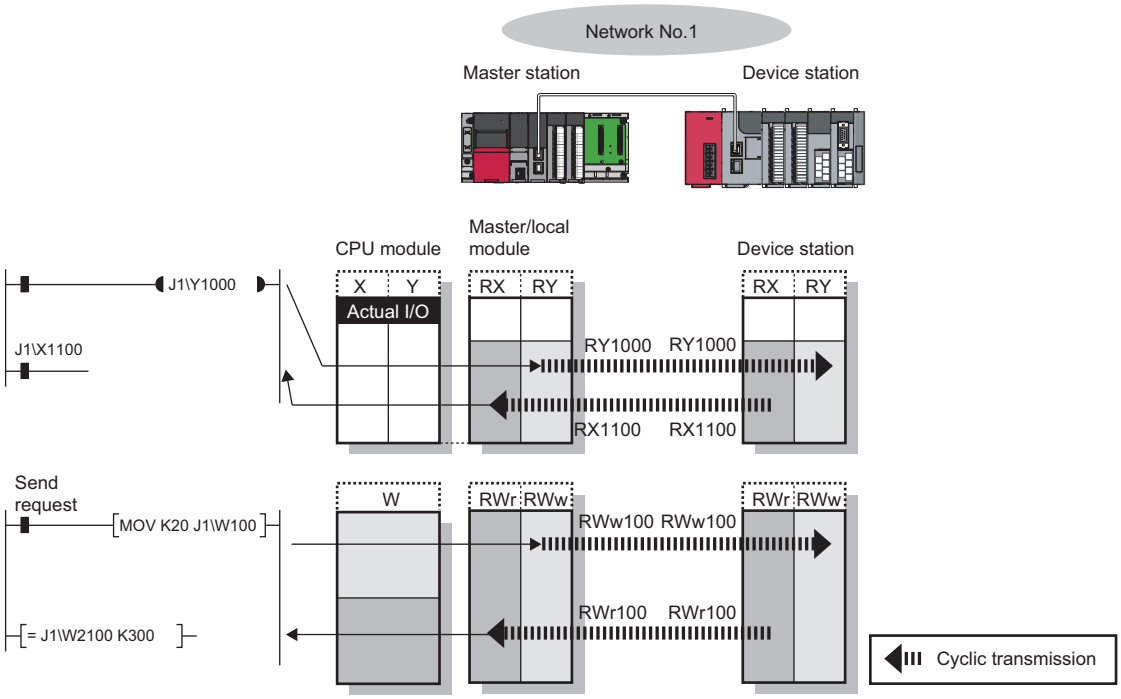
Specify the network number and the link device of the master/local module for reading or writing.

J□\□
(1) (2)

(1) Network number: 1 to 239

(2) RX: X0 to X3FFF
RY: Y0 to Y3FFF
RWw: W0 to W1FFF
RWr: W2000 to W3FFF
SB: SB0 to SB1FF
SW: SW0 to SW1FF

Ex.



Readable and writable range

Data can be read or written between the master/local module and CPU module mounted on the same base unit.

■Read

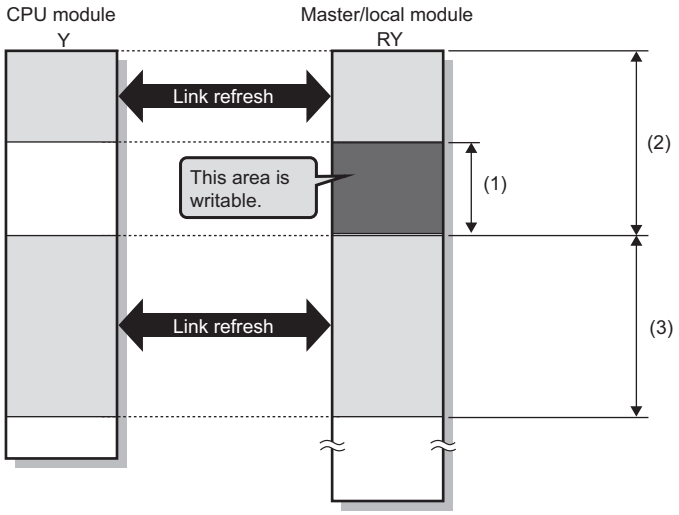
All link devices of the master/local module can be specified. (☞ Page 26 Specification method)

■Write

The range that satisfies all of the following conditions can be specified.

- Area where data is sent to other stations and outside the link refresh range (☞ Page 21 Communications using RX, RY, RWr, and RWw)
- Within the link device range of the master/local module (☞ Page 26 Specification method)

Ex.



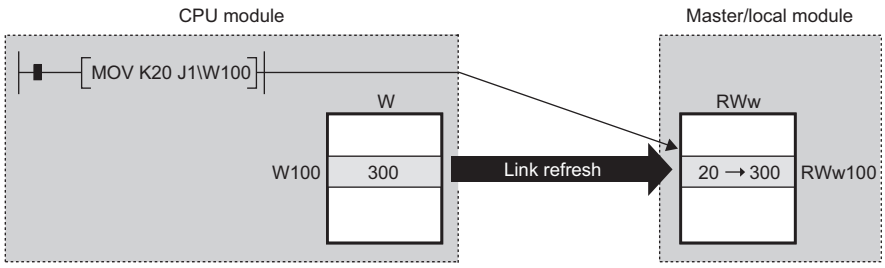
(1) Out of the link refresh range
(2) Area where data is sent to other stations
(3) Area for receiving the data from other stations

Point

When writing data to the area in the link refresh range, directly access the link device and write the same data in the device of the CPU module.

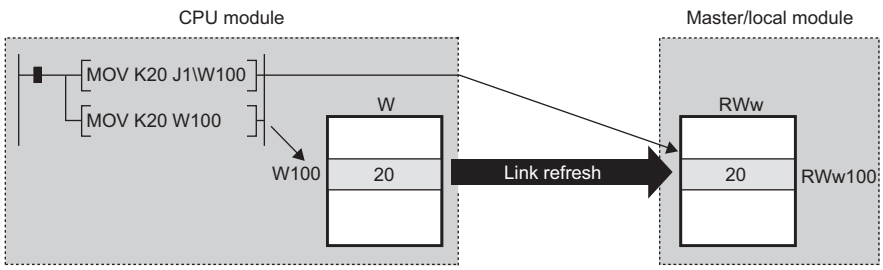
• Bad example (Only direct access to the link refresh target)

Link refresh overwrites the value.



• Good example (In addition to direct access, writing the same data to the CPU module device)

The value written by direct access is reflected.



Differences from link refresh

Item	Access method	
	Link refresh	Direct access
Number of steps	1 step	2 steps
Processing speed*1	High speed	Low speed
Cyclic data integrity assurance	Available	Not available

*1 For actual values, refer to the following.
MELSEC iQ-R Programming Manual (CPU Module Instructions, Standard Functions/Function Blocks)

Shortening the link refresh time and transmission delay time

■Shortening the link refresh time

Remove infrequently used link devices from the link refresh range, and directly read or write the corresponding data using link direct devices. This reduces the number of the link refresh points to the CPU module, resulting in a shorter link refresh time. (☞ Page 24 Link refresh)

■Shortening the transmission delay time

Because the link direct device allows direct reading or writing of data to the link devices of the master /local module at the time of the instruction execution, the transmission delay time can be shortened.

Point

Link refresh is executed in END processing of the sequence scan of the CPU module.

Precautions

■Cyclic data integrity assurance

Direct access to link devices does not provide station-based block data assurance. Use 32-bit data assurance, or if cyclic data of more than 32 bits needs to be assured, use interlock programs. (☞ Page 28 Cyclic data integrity assurance)

■Mounting multiple modules of the same network number

When multiple master/local modules of the same network number are mounted, the target of direct access is the module which has the smallest slot number in the base unit.

■Link direct device in a multiple CPU system

In a multiple CPU system, link direct devices cannot be used for the CC-Link IE Controller Network-equipped module controlled by another CPU module.

Cyclic data integrity assurance

This function assures the cyclic data integrity in units of 32 bits or station-based units.

○: Assured, ×: Not assured

Method	Description	Availability		
		Link refresh	Direct access to link devices	Access to buffer memory
32-bit data assurance	Assures data in 32-bit units. Data is automatically assured by satisfying assignment conditions of link devices.	○	○	○
Station-based block data assurance	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.	○	○	○

Point

When there is a remote device station in the network, use station-based block data assurance. If it is disabled, the functions of the remote device station cannot be assured.

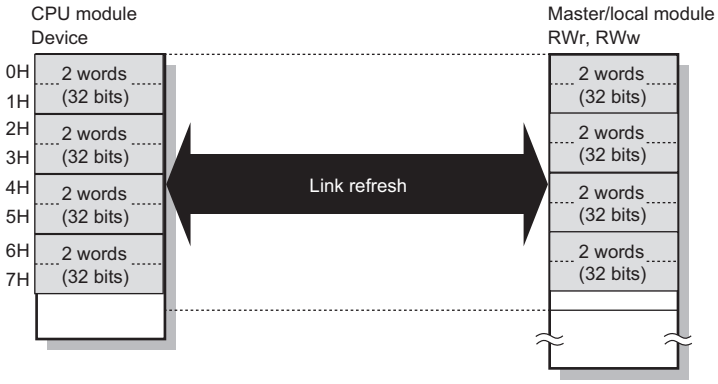
32-bit data assurance

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

■Data assurance at the time of direct access to link devices

When link refresh target devices are accessed, the integrity of 32-bit data can be assured by satisfying the following conditions.

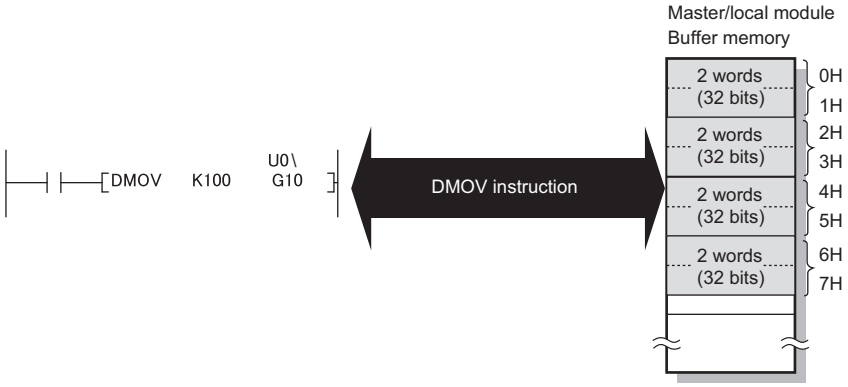
- The start device number of RWr, RWw is multiples of 2.
- The number of points assigned to RWr, RWw is multiples of 2.



■Data integrity assurance at the time of access to buffer memory

The integrity of 32-bit data can be assured by satisfying the following conditions.

- Access using the DMOV instruction
- The start address of the buffer memory is multiples of 2.



Point

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

Station-based block data assurance

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

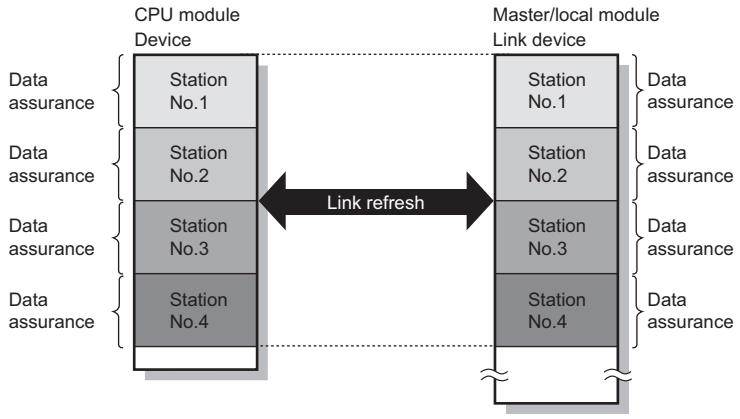
■Setting

Set station-based block data assurance under "Supplementary Cyclic Settings" in "Application Settings" of the master station. (☞ Page 152 Application Settings)

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

■Access to link devices

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



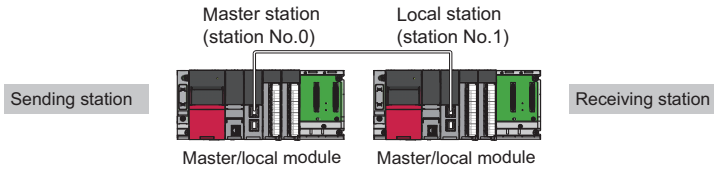
Interlock program

Data of more than 32 bits can be assured with the station-based block data assurance setting disabled. Use either of the following methods.

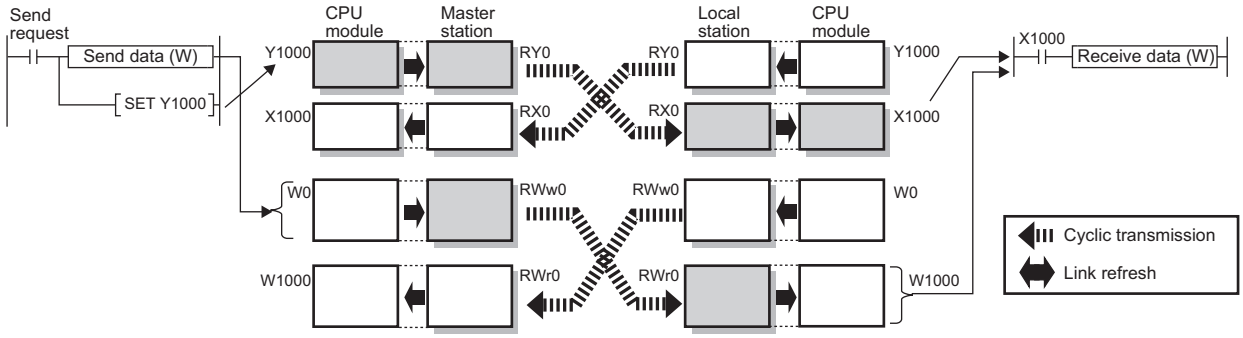
- Interlock using X and Y
- Interlock using devices other than X and Y (when X, Y cannot be used as an interlock device)

■Example of interlock using X and Y

An example of sending data in W0 to W3 of the master station (station No.0) to W1000 to W1003 of the local station (station No.1) is shown below. (X1000 and Y1000 are used for a handshake to the CPU module.)



- Data flow

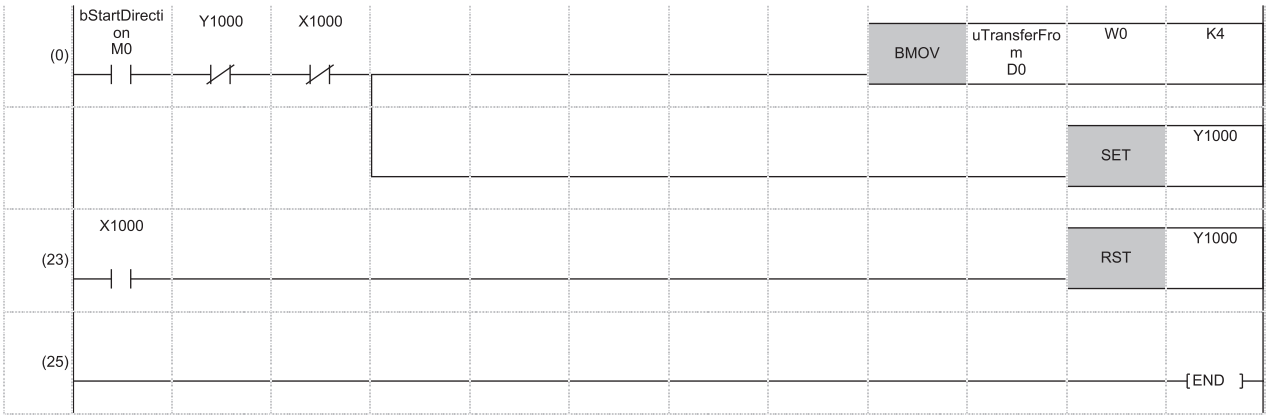


• Program

Sending station: Master station (station No.0)

Classification	Description
Label to be defined	Define global labels as shown below:

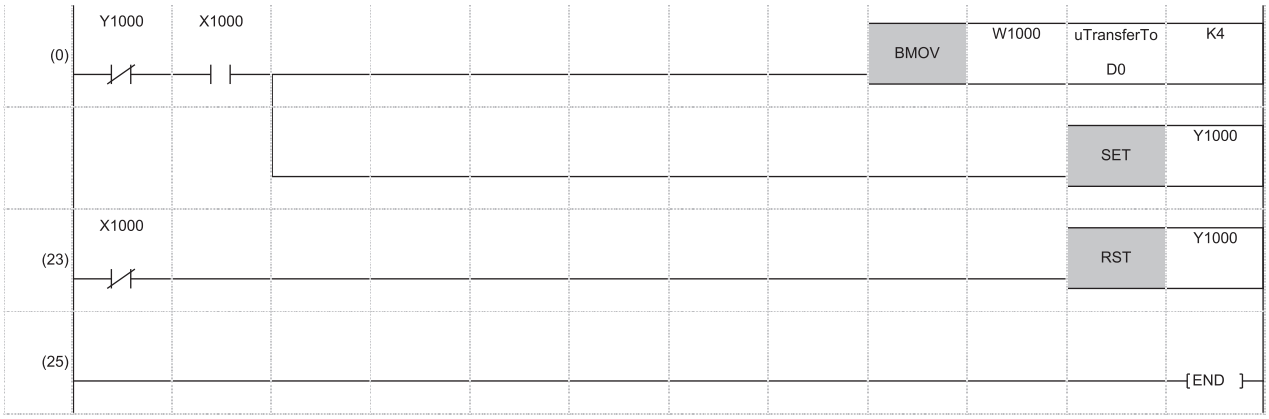
	Label Name	Data Type		Class	Assign (Device/Label)
1	bStartDirection	Bit	...	VAR_GLOBAL	M0
2	uTransferFrom	Word [Unsigned]/Bit String [16-bit](0..3)	...	VAR_GLOBAL	D0



Receiving station: Local station (station No.1)

Classification	Description
Label to be defined	Define global labels as shown below:

	Label Name	Data Type		Class	Assign (Device/Label)
1	uTransferTo	Word [Unsigned]/Bit String [16-bit](0..3)	...	VAR_GLOBAL	D0



• Program flow

❶ Sending station (0) 'bStartDirection' (M0) is turned on.

❷ Sending station (0) The contents of 'uTransferFrom' (D0 to D3) are stored in W0 to W3.

❸ Sending station (0) Upon completion of storage in W0 to W3, turn on Y1000 of the sending station for a handshake.

❹ Receiving station (0) Cyclic transmission sends RWw followed by RY, and X1000 of the receiving station turns on.

❺ Receiving station (0) The contents of W1000 to W1003 are stored in 'uTransferTo' (D0 to D3).

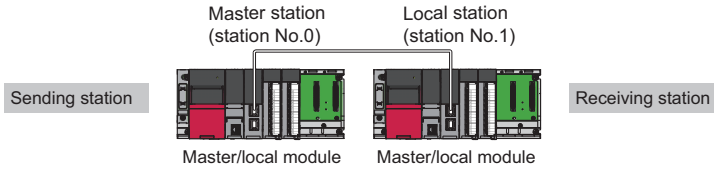
❻ Receiving station (0) Upon completion of storage in 'uTransferTo' (D0 to D3), turn on Y1000 of the receiving station for a handshake.

❼ Sending station (23) When X1000 of the sending station turns on, turn off Y1000 of the sending station.

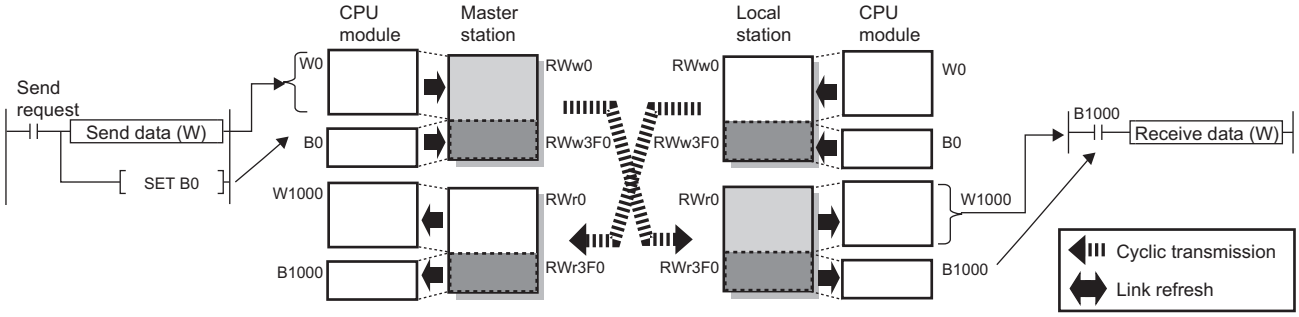
❽ Receiving station (23) When X1000 of the receiving station turns off, turn off Y1000 of the receiving station.

■Example of interlock using devices other than X and Y

An example of sending data in W0 to W3 of the master station (station No.0) to W1000 to W1003 of the local station (station No.1) is shown below. This is a method used when X and Y cannot be used as interlock devices. (B0 and B1000 are used for a handshake to the CPU module.)



• Data flow

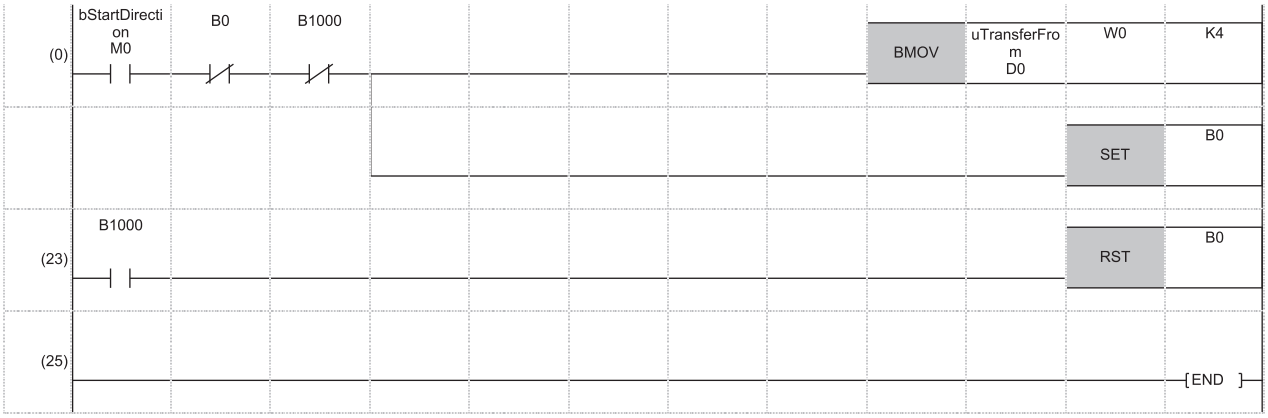


• Program

Sending station: Master station (station No.0)

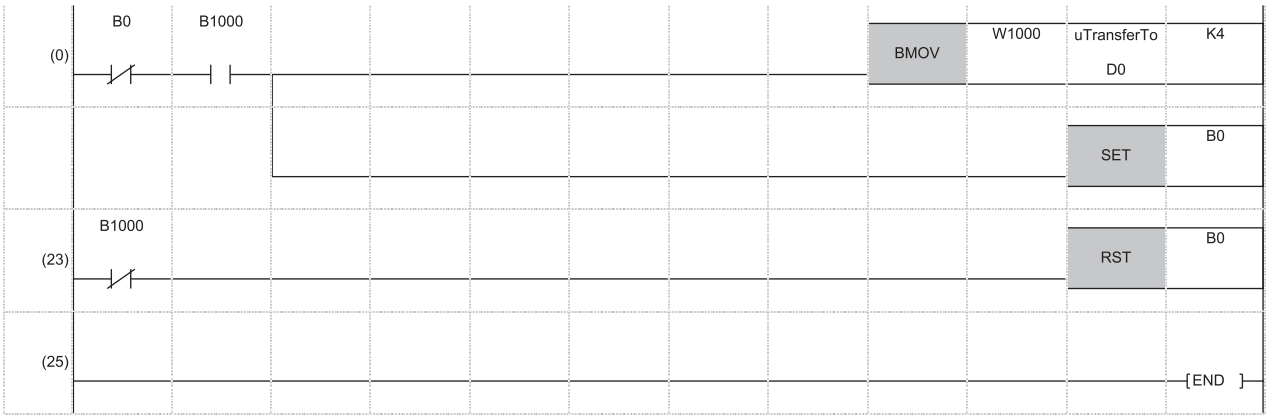
Classification	Description
Label to be defined	Define global labels as shown below:

	Label Name	Data Type		Class	Assign (Device/Label)
1	bStartDirection	Bit	...	VAR_GLOBAL	M0
2	uTransferFrom	Word [Unsigned]/Bit String [16-bit](0..3)	...	VAR_GLOBAL	D0



Receiving station: Local station (station No.1)

Classification	Description
Label to be defined	Define global labels as shown below: Label Name: 1 uTransferTo; Data Type: Word [Unsigned]/Bit String [16-bit](0..3); Class: VAR_GLOBAL; Assign (Device/Label): D0

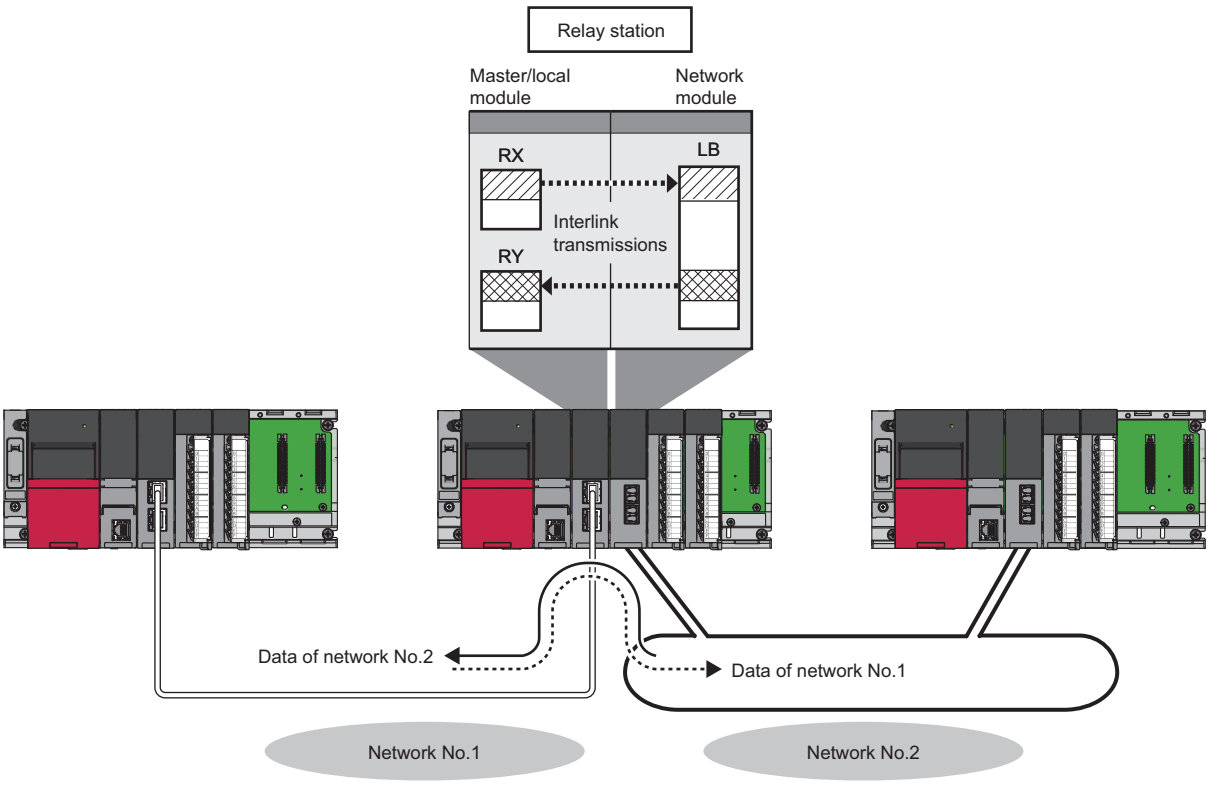


- Program flow

❶	Sending station (0)	'bStartDirection' (M0) is turned on.
❷	Sending station (0)	The contents of 'uTransferFrom' (D0 to D3) are stored in W0 to W3.
❸	Sending station (0)	Upon completion of storage in W0 to W3, turn on B0 of the sending station for a handshake.
❹	Receiving station (0)	Cyclic transmission sends signals from RWw0 to RWw3EF followed by RWw3F0 and stores them in RWr0 to RWr3EF and RWr3F0 in this order at the receiving station. B1000 of the receiving station turns on.
❺	Receiving station (0)	The contents of W1000 to W1003 are stored in 'uTransferTo' (D0 to D3).
❻	Receiving station (0)	Upon completion of storage in 'uTransferTo' (D0 to D3), turn on B0 of the receiving station for a handshake.
❼	Sending station (23)	When B1000 of the sending station turns on, turn off B0 of the sending station.
❽	Receiving station (23)	When B1000 of the receiving station turns off, turn off B0 of the receiving station.

Interlink transmission

This function transfers data in the link devices of the master station or submaster station to another network module on a relay station.



Setting method

Set interlink transmission in "Interlink Transmission Settings" in "Application Settings". (☞ Page 161 Interlink Transmission Settings)

Precautions

For the precautions, refer to the following.

☞ Page 161 Interlink Transmission Settings

Sequence scan synchronization specification

This function selects whether link scan is set to asynchronous or synchronous with the sequence scan of the CPU module.

Difference between asynchronous and synchronous settings

■Asynchronous setting

Link scan is performed asynchronously with the sequence scan of the CPU module. Select this item to shorten input transmission delay time when sequence scan takes much more time than link scan. Note that output transmission delay time will become longer.

■Synchronous setting

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

- To shorten output transmission delay time (Note that when sequence scan takes much more time than link scan, input transmission delay time will become longer.)
- To keep transmission delay time constant (In "RAS Setting" of "CPU parameter", "Constant Scan Setting" must be set, and the sequence scan must be set to be performed at the specified intervals.)

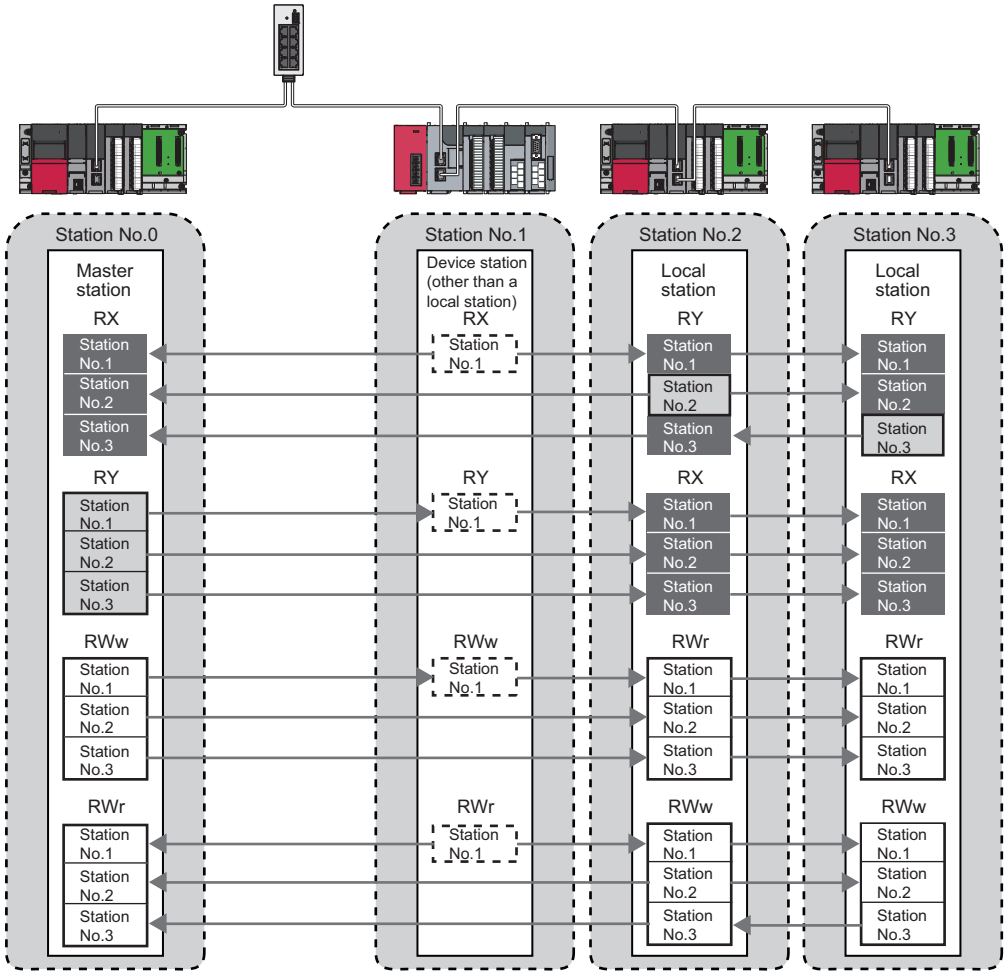
Setting method

Set sequence scan synchronization under "Supplementary Cyclic Settings" in "Application Settings". (☞ Page 152 Application Settings)

I/O maintenance settings

This function sets whether to hold or clear output from the sending side or input to the receiving side by using the following settings. (☞ Page 154 Supplementary Cyclic Settings)

Setting	Description	Range where the settings are enabled
Data link faulty station setting	Sets whether to clear or hold input from a disconnected station. Set it on the receiving side.	Whether to clear or hold the following RX and RY input data can be selected. • 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 communication failure such as Ethernet cable disconnection. The RWr and RWw input data are held regardless of the setting. • Master station RWr • Local station RWr and RWw (only the input data from other stations)
Output mode upon CPU error	Sets whether to hold or clear output when a stop error occurs in the CPU module. Set it on the sending side.	Whether to clear or hold the RY data (only the output data from the own station) of the master station and local station can be selected.



Area for which "Clear" or "Hold" can be selected in the data link faulty station input status setting

Area for which "Clear" or "Hold" can be selected in the cyclic output setting for a stop error of the CPU module

Area where data are held regardless of the setting

Area that depends on the specifications of the device station (other than a local station)*1

*1 For the specifications, refer to the manual for the device station used.
For the remote head module, refer to "Output status for each status" described in the following manual.
MELSEC iQ-R CC-Link IE Field Network Remote Head Module User's Manual (Application)

Precautions

■When data link is stopped by users

When cyclic transmission is stopped using one of the following methods, the input status of the own station is held even if "Data Link Error Station Setting" is set to "Clear".

- CC-Link IE Field Network diagnostics (☞ Page 275 Checking the Network Status)
- SB and SW (☞ Page 348 List of SB, Page 369 List of SW)

■When a stop error of the CPU module occurs on a station with a data link error

If a stop error occurs in the CPU module on the sending side, the behavior of RY and RWw on the receiving side depends on the specifications of the device station side. For the specifications, refer to the manual for the device station used.

The operation depending on the settings in "I/O Maintenance Settings" are as follows:

- When "Output Hold/Clear Setting during CPU STOP" is set to "Hold", the input status of the own station is held even if "Data Link Error Station Setting" is set to "Clear".
- When "Output Mode upon CPU Error" is set to "Hold", the input status of the own station is held even if "Data Link Error Station Setting" is set to "Clear".
- When "Output Mode upon CPU Error" is set to "Clear", a data link in a station where a stop error occurs stops if the stop error occurs in the CPU module.

Output hold/clear setting during CPU STOP

Whether to hold or clear output when the status of CPU module is changed from RUN to STOP is set on the sending side.

Precautions

■When the setting is disabled

When the link refresh source of RY is set to Y, the cyclic data output is cleared even if the output status setting for CPU STOP is set to be held. For RWw, the cyclic data output is held regardless of the device of the link refresh source, even if the output status setting for CPU STOP is set to be cleared.

■When the output status setting for CPU STOP is set to clear

When the CPU module is in the STOP state, the forced output to device stations cannot be executed using the engineering tool.

■When data is refreshed by a link direct device

The output status for CPU STOP depends on the parameter specified in "Output Hold/Clear Setting during CPU STOP".

■When the Safety CPU is used

When the Safety CPU is in the safety mode, output of safety communications will be cleared even if "Hold" is set in "Output Hold/Clear Setting during CPU STOP".

■When the SIL2 Process CPU is used

When the SIL2 Process CPU is in the safety mode, output of safety communications will be cleared even if "Hold" is set in "Output Hold/Clear Setting during CPU STOP".

Cyclic transmission stop and restart

This function stops the cyclic transmission during debugging and other operations. (Data reception from a device station and data sending from the own station are stopped.) Also, the stopped cyclic transmission can be restarted. Transient transmission does not stop.

Cyclic transmission is stopped and restarted using the link start/stop of the CC-Link IE Field Network diagnostics. (☞ Page 294 Link Start/Stop)

Remote device test

The output operation of the intelligent device station and remote device station during CPU STOP can be turned on or off if desired.
The output of the intelligent device station and remote device station with the output HOLD/CLEAR setting function ordinarily cannot be turned on or off. In that case, use remote device test function.
When checking the connection between the remote device station and the external device by turning the remote output signal on or off, the connection can be checked during CPU STOP (without using a program) if the remote device test function is used.
For the output HOLD/CLEAR setting function, refer to the following.
📖 Manual for the intelligent device station/remote device station used

Restriction

Before using this function, check the firmware version of the network module used. (☞ Page 440 Added and Enhanced Functions)

Setting method

Execute the remote device test according to the following procedure.

1. Set the RUN/STOP/RESET switch to the STOP position of the CPU module.
2. Turn off and on the 'Remote device forced output request' (SB0016) to start the remote device test.
3. Check that the 'Remote device forced output request accept' (SB0086) and 'Remote device forced output status' (SB0087) are on. (Check that the 'Remote device forced output result' (SW0073) is 0 (no error))
4. Turn on and off the remote output signal of the intelligent device station and remote device station to check the status.
5. Turn on and off the 'Remote device forced output request' (SB0016) to end the remote device test.

Point

After starting the remote device test, errors can be checked by the 'Remote device forced output result' (SW0073).
If an error has occurred, the error code is stored. Take actions according to the error code. (☞ Page 310 List of Error Codes)

Precautions

■Conditions

- The remote device test does not start even if the 'Remote device forced output request' (SB0016) is turned off and on while the CPU module is in RUN state.
- Even if the CPU module is changed to STOP state after the 'Remote device forced output request' (SB0016) is turned off and on, the remote device test does not start.
- If the CPU module is changed to RUN state during the remote device test, the remote device test ends.

■Output HOLD/CLEAR setting function

- During the remote device test, the output HOLD/CLEAR setting function of the intelligent device station and remote device station is disabled and turned on or off by the master station. In addition, the output HOLD/CLEAR setting function of all modules connected to the CC-Link IE Field Network is disabled.
- If a stop error occurs in the CPU module during the remote device test, the test ends and the data is output from the module of the intelligent device station and remote device station according to the output HOLD/CLEAR setting function.

■When using the submaster function

- Only the master operating station supports the remote device test. If the operating station is switched to the submaster operating station, the remote device test ends.
- Even if the operating station is switched to the master operating station after 'Remote device forced output request' (SB0016) is turned off and on during submaster operation, the remote device test does not start.

■When using a redundant system

- The value output from this function is not held when system switching occurs in the redundant system.

1.2 Transient Transmission

This function allows communications with other stations when a request is made by a method such as a dedicated instruction and engineering tool. Communications with different networks is also possible.

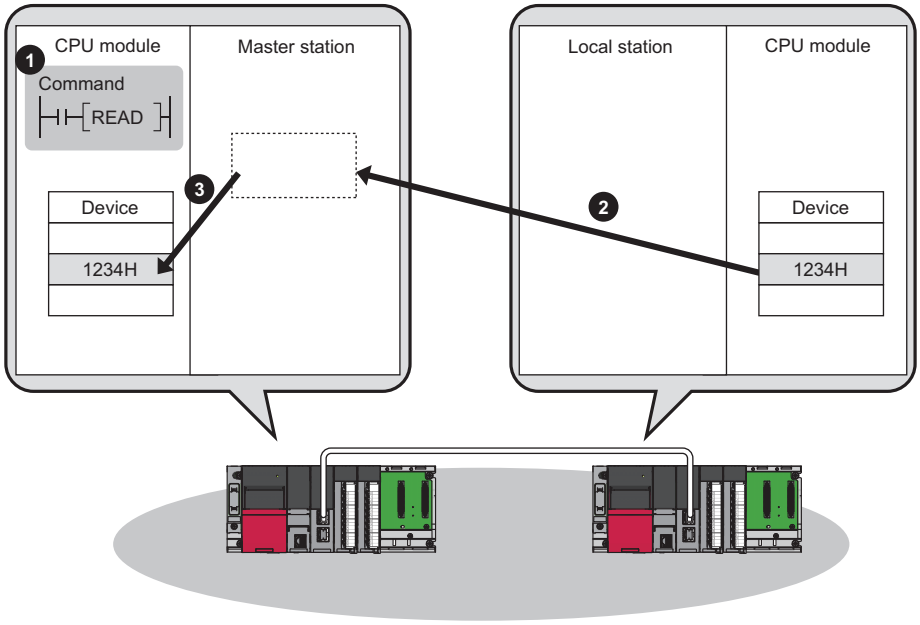
Communications within the same network

This function performs the transient transmission to other stations using dedicated instructions and the engineering tool. For details on dedicated instructions, refer to the following.

MELSEC iQ-R Programming Manual (Module Dedicated Instructions)

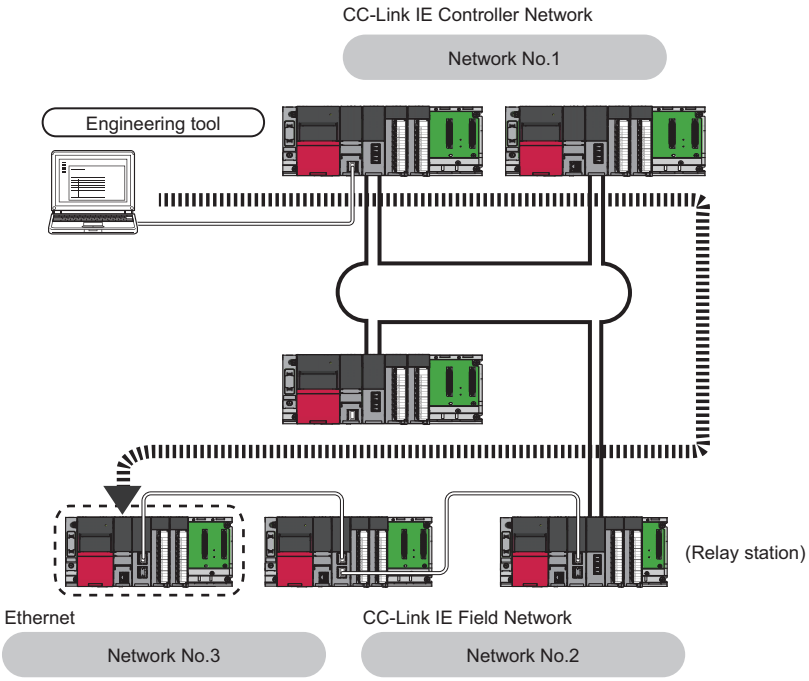
Ex.

Accessing a programmable controller of another station using the dedicated instruction (READ instruction)



Communications with different networks

This function performs the transient transmission seamlessly to stations on different networks using dedicated instructions and the engineering tool.



Point

Communications can be made with stations up to eight networks apart (number of relay stations: 7). (☞ Page 391 Dedicated Instruction)

When the networks consist of only MELSEC iQ-R series

Communication paths are automatically set for communication with the following networks of MELSEC iQ-R series.

- Ethernet
- CC-Link IE Controller Network
- CC-Link IE Field Network

■Setting method

Check that "Dynamic Routing" in "Application Settings" is set to "Enable".

Point

- Communication paths are automatically set, but they can also be manually set. (☞ Page 42 When the networks consist of MELSEC iQ-R series and other series)
- Communication paths cannot be automatically set to Ethernet-equipped modules connected via a router. Set communication paths manually for such modules. (☞ Page 42 When the networks consist of MELSEC iQ-R series and other series)

When the networks consist of MELSEC iQ-R series and other series

Setting communication paths allows communication with the following networks configured with modules other than MELSEC iQ-R series.

- Ethernet
- CC-Link IE Controller Network
- CC-Link IE Field Network
- MELSECNET/H
- MELSECNET/10

■Setting method

Set communication paths in "Routing Setting" of "CPU Parameter". (📖 MELSEC iQ-R CPU Module User's Manual (Application))

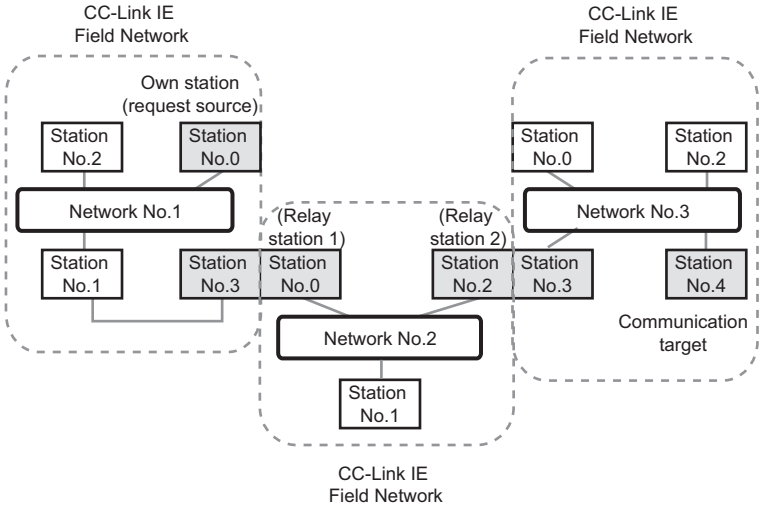
When the networks contain a redundant system

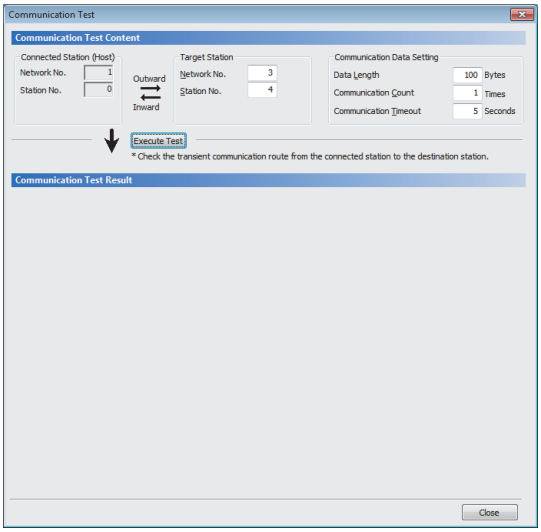
- When the communication paths are automatically set, the paths are updated if system switching occurs in a redundant system on the paths. During update of the communication paths, communications may be interrupted or data may be lost because the paths are temporarily undetermined. If an error occurs in communications, resend data from the request source.
- When the request source is a redundant system and the communication paths are automatically set, perform the transient transmission from the control system. When performing the transient transmission from the standby system, set "Routing Setting" of "CPU Parameter"
- When the request destination is a redundant system and the communication paths are automatically set, specify the control system station as the destination. When specifying the standby system as the request destination, set "Routing Setting" of "CPU Parameter".
- When relaying a redundant system and setting the communication paths manually, set the control system station as a relay station in "Routing Setting" of "CPU Parameter". If system switching occurs, the relay station needs to be changed to a station in the new control system using the RTWRITE instruction.

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.





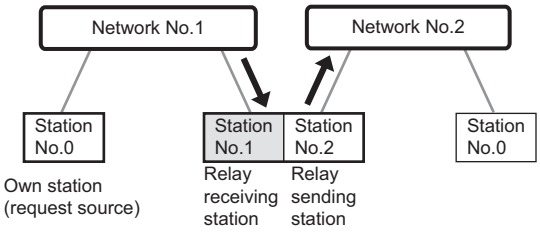
1. Open the "Communication Test" window and enter values for "Target Station" and "Communication Data Setting".

[Diagnostics] ⇨ [CC-Link IE Field Diagnostics] ⇨ [Communication Test] button

2. Click the [Execute Test] button to execute the communication test. If an error occurs, take corrective actions according to the error message.

Precautions

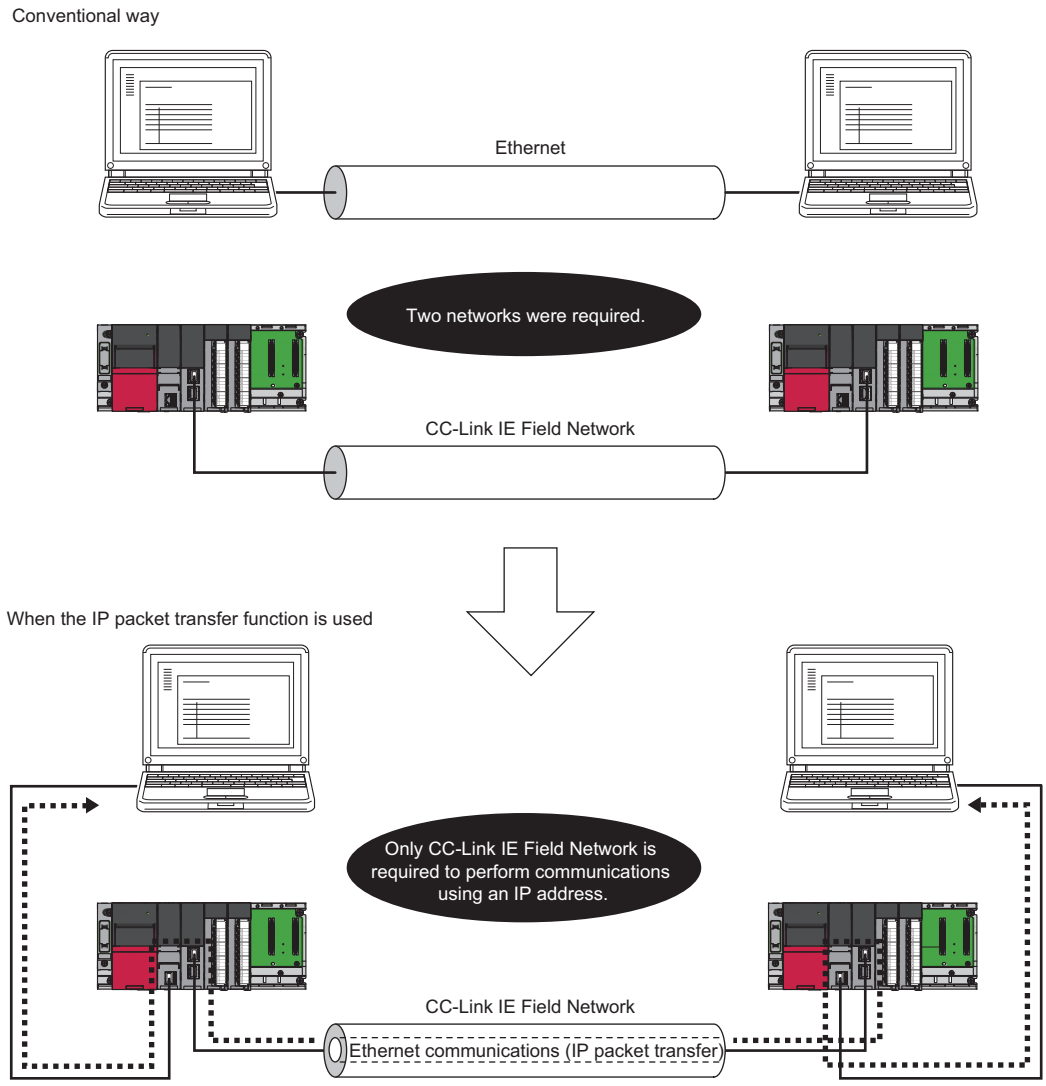
- When a relay sending station is set to "Target Station", only an error code appears without an error message. Set a relay receiving station to "Target Station".



- When a station mounted on top of the same base unit (main base unit and extension base unit) is set to "Target Station", only an error code appears without an error message. Set a station mounted on the different base unit to "Target Station".
- When the request source is a redundant system and the communication path has automatically been set, execute a communication test from the control system. If a communication test is executed from the standby system, it may complete with an error.
- When the request destination is a redundant system and the communication path has automatically been set, specify the control system station for "Target Station". If the standby system is set for the access destination station, a communication test may complete with an error.

1.3 IP Packet Transfer Function

This function enables communications using the specified IP address over CC-Link IE Field Network.
For example, a personal computer can communicate with the FTP server.
With this function, two networks of CC-Link IE Field Network and Ethernet are not required, resulting in reduced wiring cost.



Point

The data that are communicated using the IP packet transfer function are communicated separately by the link scan of the CC-Link IE Controller Network.
Because of this, the speed of communications using the IP packet transfer function is slower than the speed of communications with the Ethernet line. (☞ Page 64 Communication speed)

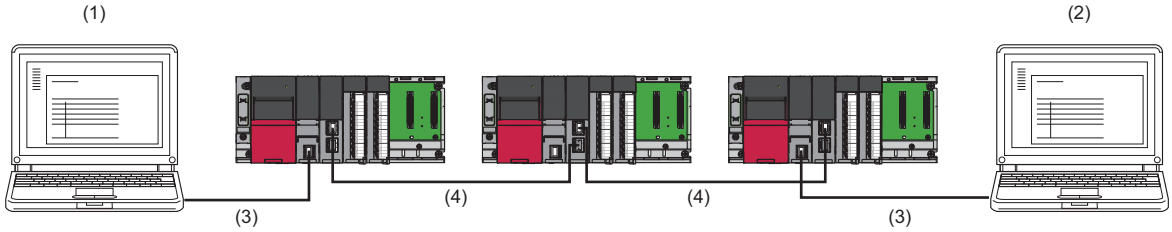
System configuration

The IP packet transfer function allows communications to be performed by connecting an Ethernet device in one of the following ways.

Ethernet device connection

■Connecting an Ethernet device to an Ethernet-equipped module

Connect an Ethernet device to an Ethernet-equipped module.



(1) Ethernet device (request source device)
(2) Ethernet device (request destination device)
(3) Ethernet
(4) CC-Link IE Field Network

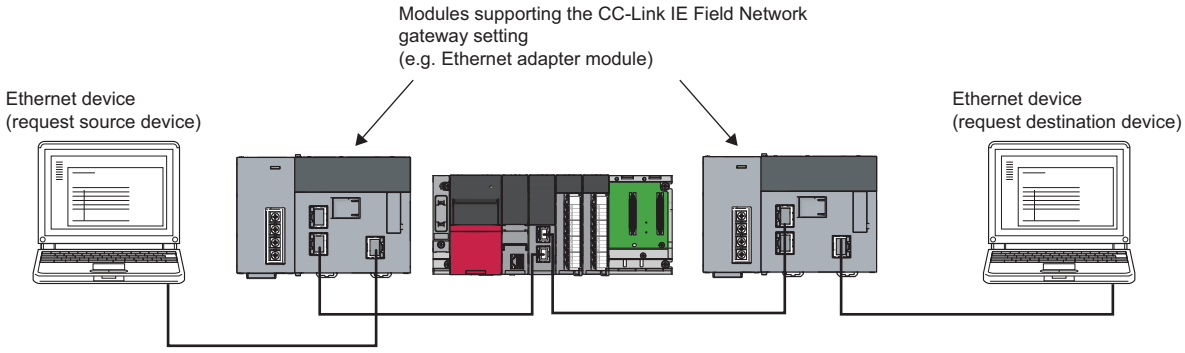
Point

The IP packet transfer function can be used on the remote head module. An Ethernet device can also be connected by mounting the RJ71EN71 with the remote head module.

■Connecting an Ethernet device to a module compatible with the CC-Link IE Field Network gateway setting

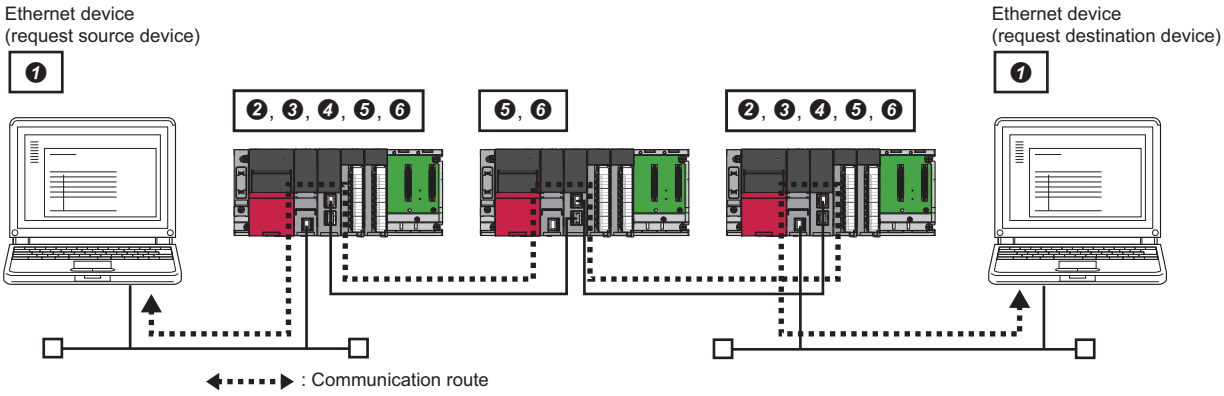
Connect an Ethernet device to a module compatible with the CC-Link IE Field Network gateway setting (such as an Ethernet adapter module).

Doing so allows communications to be performed with an Ethernet device having a different network address.



Setting

To use the IP packet transfer function, the following items need to be set.



❶ Ethernet device gateway address setting
Set the IP address of the Ethernet-equipped module connected to an Ethernet device for the gateway address of the Ethernet device used.

❷ IP address setting of the Ethernet-equipped module (☞ Page 50 Setting in the Ethernet-equipped module)

❸ Setting of the network number and station number of the RJ71EN71 or the RnENCPU (network part) connected to the Ethernet device
When the RJ71EN71 or the RnENCPU (network part) is set for the Ethernet-equipped module connected to the Ethernet device, set "Communications by Network No./Station No." in the module parameter of the Ethernet to "Enable".

❹ IP packet transfer setting (☞ Page 50 Setting in the Ethernet-equipped module)
This setting is required for the IP packet to be passed between an Ethernet-equipped module and a master/local or remote head module.

❺ IP address setting of a master/local module (☞ Page 50 Setting in the master station)

❻ Routing parameter setting
Set routing parameters in the following cases. (☞ Page 51 Routing parameter setting)
- When modules other than MELSEC iQ-R series exist in the communication path
- When an Ethernet device needs to be connected to a module that does not support routing parameters

Point

- When the Ethernet device is a personal computer (only Ethernet devices having the route command, such as Microsoft® Windows®), it is recommended to set the gateway address using the route command. If the gateway address is set in the default gateway, packets not related to the IP packet transfer are also transmitted through the CPU module. Consequently, the service processing of the CPU module drops under heavy load, causing other service processings to be slow or other problems. For the gateway address setting of when an Ethernet device is connected to a module other than an Ethernet-equipped module, refer to the manual for the module connected to the Ethernet device.
- After the setting is completed, execute the IP communication test to check for an error in the communication path. (☞ Page 52 IP communication test)

Rules for the IP address setting

IP addresses specified for the IP packet transfer function need to satisfy the following rules.

<table>
<tr><th rowspan="2">Device to be set</th><th colspan="3">Setting range of the IP address</th></tr>
<tr><th>First and second octets</th><th>Third octet</th><th>Fourth octet</th></tr>
<tr><td>Ethernet device</td><td rowspan="2">❶
0.0 to 223.255*1
(Same numbers for the request source device, request destination device, and modules between them)</td><td rowspan="2">❷, ❸, ❹
1 to 239*1
(Same number for the Ethernet device and the Ethernet-equipped module)</td><td rowspan="2">❷
1 to 120*1</td></tr>
<tr><td>Ethernet-equipped module connected to the Ethernet device</td></tr>
<tr><td>Master/local module</td><td rowspan="2">❷, ❹
Automatically set (network number of the own station)
1 to 239</td><td rowspan="2">❷
Automatically set (station number of the own station)
• 1 to 120
• 125 (125 is always set in the master station.)</td></tr>
<tr><td>Remote head module</td><td>❺
Automatically set (Same value as the master station)
0.0 to 223.255</td></tr>
<tr><td>Ethernet-equipped module on the communication path (not connected to an Ethernet device)</td><td colspan="3">IP address setting not required</td></tr>
</table>

*1 Set the numbers according to the range applicable to the Ethernet device used. A certain range of numbers cannot be used depending on the Ethernet device. Check the specifications of the Ethernet device used.

❶ Use the same numbers for the first and second octets of the IP addresses of the request source device, request destination device, and modules between them.

192 . 168 . 10 . 36

The first and second octets (network addresses)

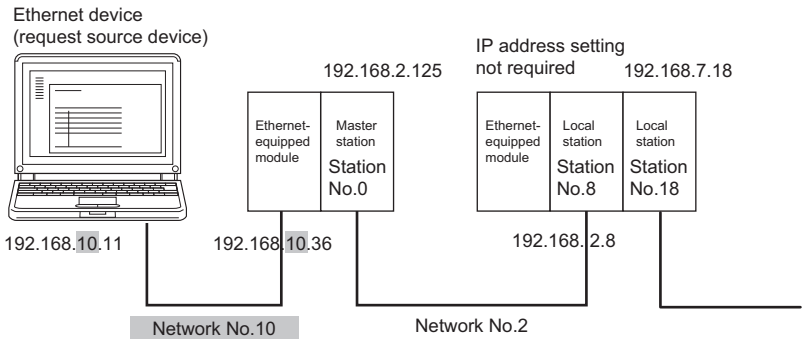
❷ For the IP addresses of the Ethernet-equipped modules, set a number between 1 and 239 for the third octet and a number between 1 and 120 for the fourth octet. The network number of the own station is automatically assigned to the third octet of the IP address of the master/local and remote head modules each. The station number of the own station is automatically assigned to the fourth octet of the IP address of the master/local or remote head modules each. (The fourth octet of the IP address of the master station is always 125.)

The third octet

192 . 168 . 10 . 36

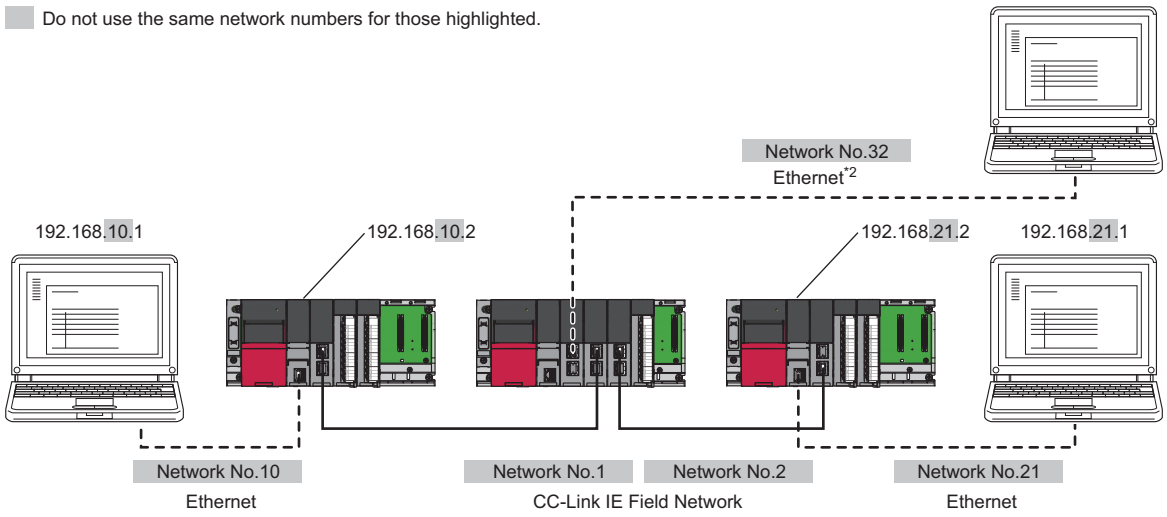
The fourth octet

❸ Use the same number for the third octet (network number) of the IP addresses of an Ethernet device and an Ethernet-equipped module connected to the Ethernet device.



❹ Do not use the third octet (network number) of the IP address same as that of other network modules and other CPU modules using the IP packet transfer function.

Do not use the same network numbers for those highlighted.



*2 Do not use the same network numbers for those of network modules other than the master/local module.

❺ The values in the first and second octets of the remote head module IP address are obtained from the master station IP address so that the same values as those of the master station can be set.

■CC-Link IE Field Network gateway setting

Through a module, such as an Ethernet adapter module, where the CC-Link IE Field Network gateway can be set, any IP address can be used for the Ethernet device side. (☞ Page 54 Access range, Page 59 When an Ethernet device with a different network address is accessed)

Note, however, that the network addresses on the CC-Link IE Field Network side must be the same.

For the IP address setting range, refer to the following table.

Device to be set	Setting range of the IP address		
	First and second octets	Third octet	Fourth octet
Ethernet device	Within the range applicable to the Ethernet device		
Module compatible with the CC-Link IE Field Network gateway setting	Within the range applicable to the module compatible with the CC-Link IE Field Network gateway setting (📖 Manual for the module compatible with the CC-Link IE Field Network gateway setting)		
Master/local module	0.0 to 255.255	Automatically set (network number of the own station) 1 to 239	Automatically set (station number of the own station) • 1 to 120 • 125 (125 is always set in the master station.)
Remote head module	Automatically set (Same value as the master station) 0.0 to 223.255		
Ethernet-equipped module on the communication path (not connected to an Ethernet device)	IP address setting not required		

Point

When setting the IP address in each device, do not use the IP addresses already used for other devices.

Setting method

For a communication example, refer to the following.

☞ Page 58 Example of communications using the IP packet transfer function

■Setting in the Ethernet-equipped module

1. Set the IP address of the Ethernet-equipped module in the following item.

[Navigation window] ⇨ [Parameter] ⇨ Target module ⇨ [Basic Settings] ⇨ [Own Node Settings] ⇨ [IP Address]

Follow the rules to set the IP address. (☞ Page 48 Rules for the IP address setting)

2. Change the following setting to "Use".

[Navigation window] ⇨ [Parameter] ⇨ Target module ⇨ [Application Settings] ⇨ [IP Packet Transfer Setting]

■Setting in the master station

1. Set the IP address of the master station in the following item.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Target module ⇨ [Application Settings] ⇨ [IP Address]

Follow the rules to set the IP address. (☞ Page 48 Rules for the IP address setting)

Point

When setting the network address in the submaster station, set the same network address as that of the master station.

■Setting in the local stations

The IP address setting is not required for the local stations. The same network address as the master station is automatically assigned to the first and second octets. The network number of the own station is assigned to the third octet, and the station number of the own station is assigned to the fourth octet.

Routing parameter setting

Set routing parameters in the following cases.

- When modules other than MELSEC iQ-R series exist in the communication path
- When an Ethernet device needs to be connected to a module that does not support routing parameters

■When modules other than MELSEC iQ-R series exist in the communication path

To set routing parameters, refer to the following.

MELSEC iQ-R CPU Module User's Manual (Application)

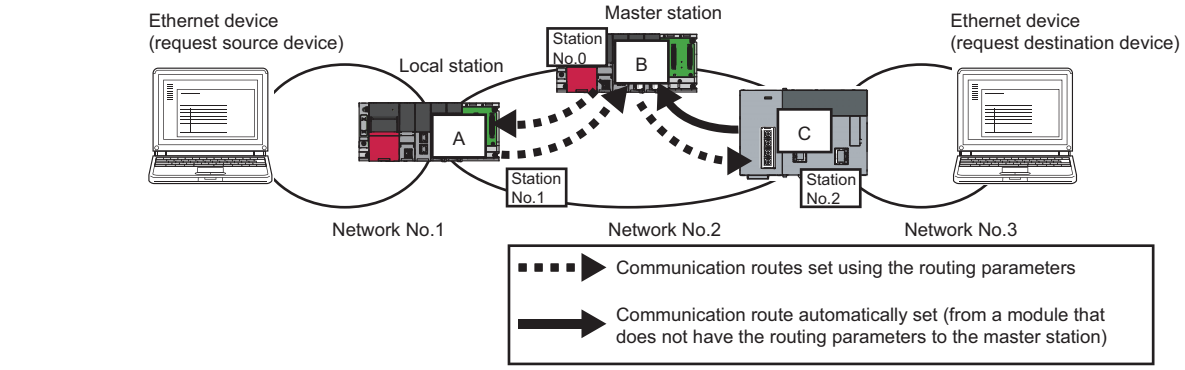
■When an Ethernet device needs to be connected to a module that does not support routing parameters

When an Ethernet device needs to be connected to a module, such as an Ethernet adapter module, that does not support routing parameters, set the routing parameters so that communications are made through the master station.

Communications from a module that does not have the routing parameters are automatically transmitted through the master station. The communication paths must be the same for data sending and receiving; therefore, set the routing parameters so that communications are transmitted through the master station.

Ex.

Proper setting



Setting for A

Relay station		Target station
Network No.	Station	Network No.
2	**0**	3

Set this column to pass communications through the master station.

Setting for B

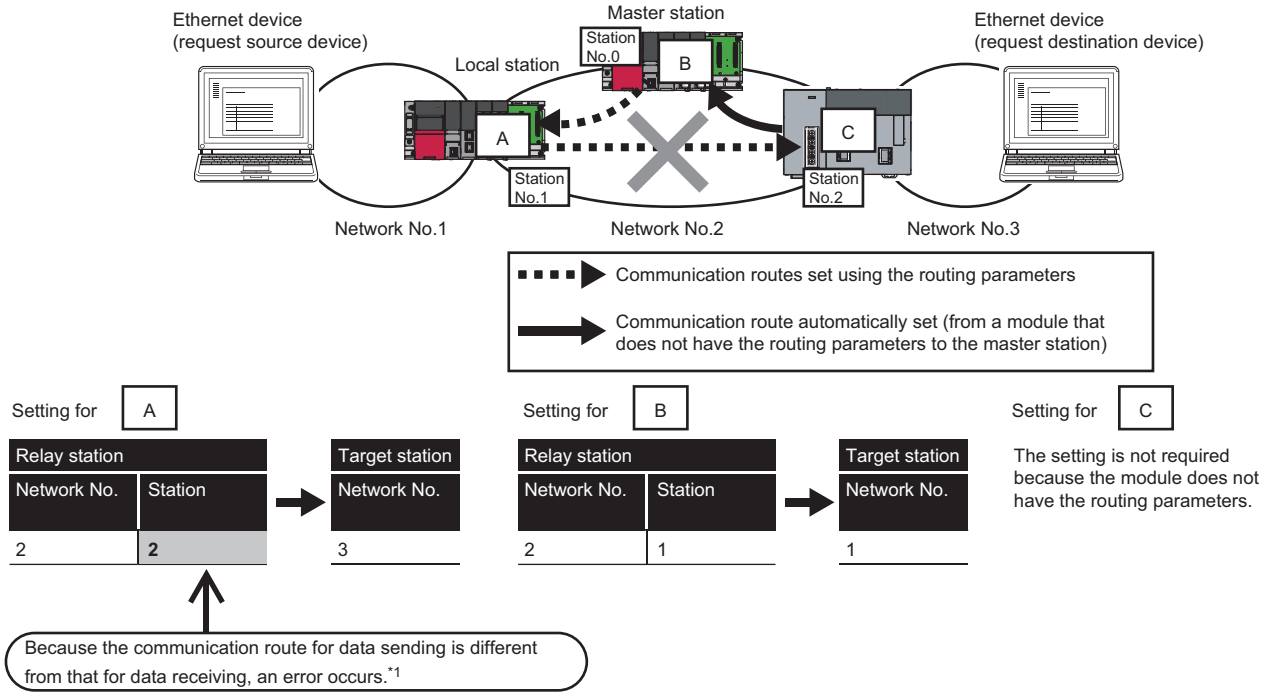
Relay station		Target station
Network No.	Station	Network No.
2	1	1
2	2	3

Setting for C

The setting is not required because the module does not have the routing parameters.

Ex.

Improper setting



*1 An IP communication test related error (error code: 4A28H) occurs in the IP communication test.

IP communication test

This function checks whether no error occurs in the communication path within CC-Link IE Field Network when the IP packet transfer function is used. The following can be checked using the IP communication test:

- Cables are properly connected on the communication path.
- Parameters related to the IP packet transfer function, such as an IP address and routing parameters, are correctly set on the communication path.
- All the CPU modules and master/local modules on the communication path support the IP packet transfer function.

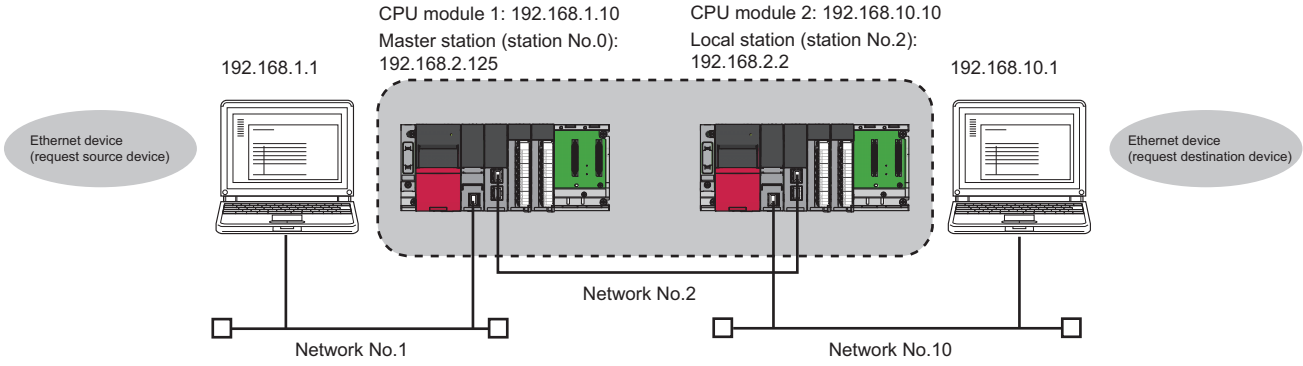
The following system configuration is used to explain the procedure of the IP communication test.

The IP communication test allows the communication paths in the dotted line above to be checked.

Restriction

The IP communication test cannot be executed if the engineering tool is connected to the RJ71EN71 or the RnENCPU (network part). Use one of the following methods to check whether no error occurs in the communication path.

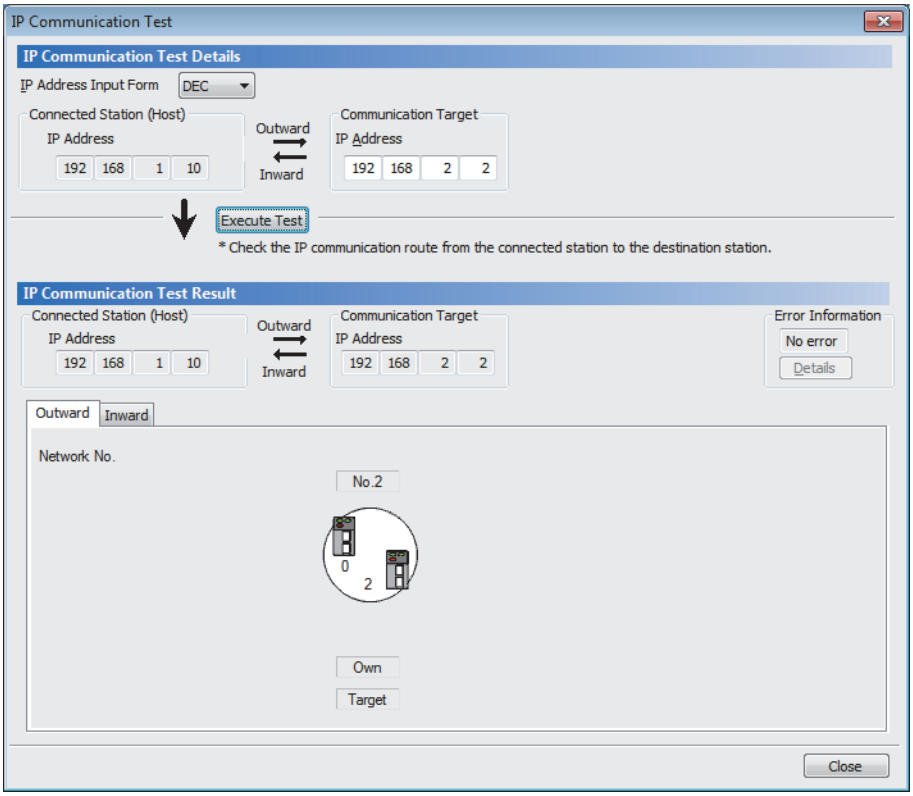
- Directly connect using the Ethernet and execute a PING test in the Ethernet diagnostics. (MELSEC iQ-R Ethernet User's Manual (Application))
- Execute a PING from the Ethernet device connected.



1. Open the "IP Communication Test" window. Enter the IP address of the CPU module 2 or the local station (station No.2) connected to the request destination device in "Communication Target". When the module that is connected to the request destination device is an Ethernet adapter module, enter the IP address of the request destination device in "Communication Target".

[Diagnostics] ⇨ [CC-Link IE Field Diagnostics] ⇨ [IP Communication Test] button

2. Click on the [Execute Test] button to execute the test. When the test is completed, the route to the device set in "Communication Target" is displayed on the underside of the window. If the test fails, click the [Details] button in the "Error Information" area to check the error information.



Point

- If the cause cannot be identified from the error information after the IP communication test is executed, or communications cannot be performed even though the IP communication test is normally completed, follow the troubleshooting instructions and take corrective actions. (☞ Page 305 When IP communications cannot be performed using the IP packet transfer function)
- Up to 127 levels of modules can be connected when the IP communication test is executed.
- When an Ethernet device (request destination device) is connected to an Ethernet-equipped module, the communication path to a master/local module, remote head module, or the Ethernet-equipped module connected to the Ethernet device (request destination device) can be checked using the IP communication test. Setting the IP address of the Ethernet device in "Communication Target" on the "IP Communication Test" window causes an error. (Error code of the CPU module: 4A2AH)
- When an Ethernet device (request destination device) is connected to an Ethernet adapter module, the communication path to the Ethernet device (request destination device) can be checked using the IP communication test. For the IP communication test performed from an Ethernet adapter module, refer to the manual for the Ethernet adapter module.

Precautions

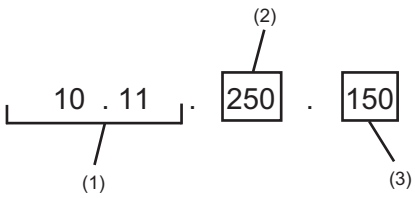
Communications cannot be performed via modules that do not support the IP packet transfer function such as MELSECNET/H. Only an error code appears without any information displayed in "Error Information".

Access range

The access range differs depending on whether the IP address setting conditions are met or not. (☞ Page 48 Rules for the IP address setting)

- When one of the Ethernet devices does not have an IP address that does not meet the IP address setting rules, both of the request source device and request destination device need to be connected to a module compatible with the CC-Link IE Field Network gateway setting, such as an Ethernet adapter module. Setting the CC-Link IE Field Network gateway allows communications to be performed. (📖 Manual for the module compatible with the CC-Link IE Field Network gateway setting used)
- To perform communications between Ethernet devices with an IP address following the setting rules, a module compatible with the CC-Link IE Field Network gateway setting is not required to be connected.

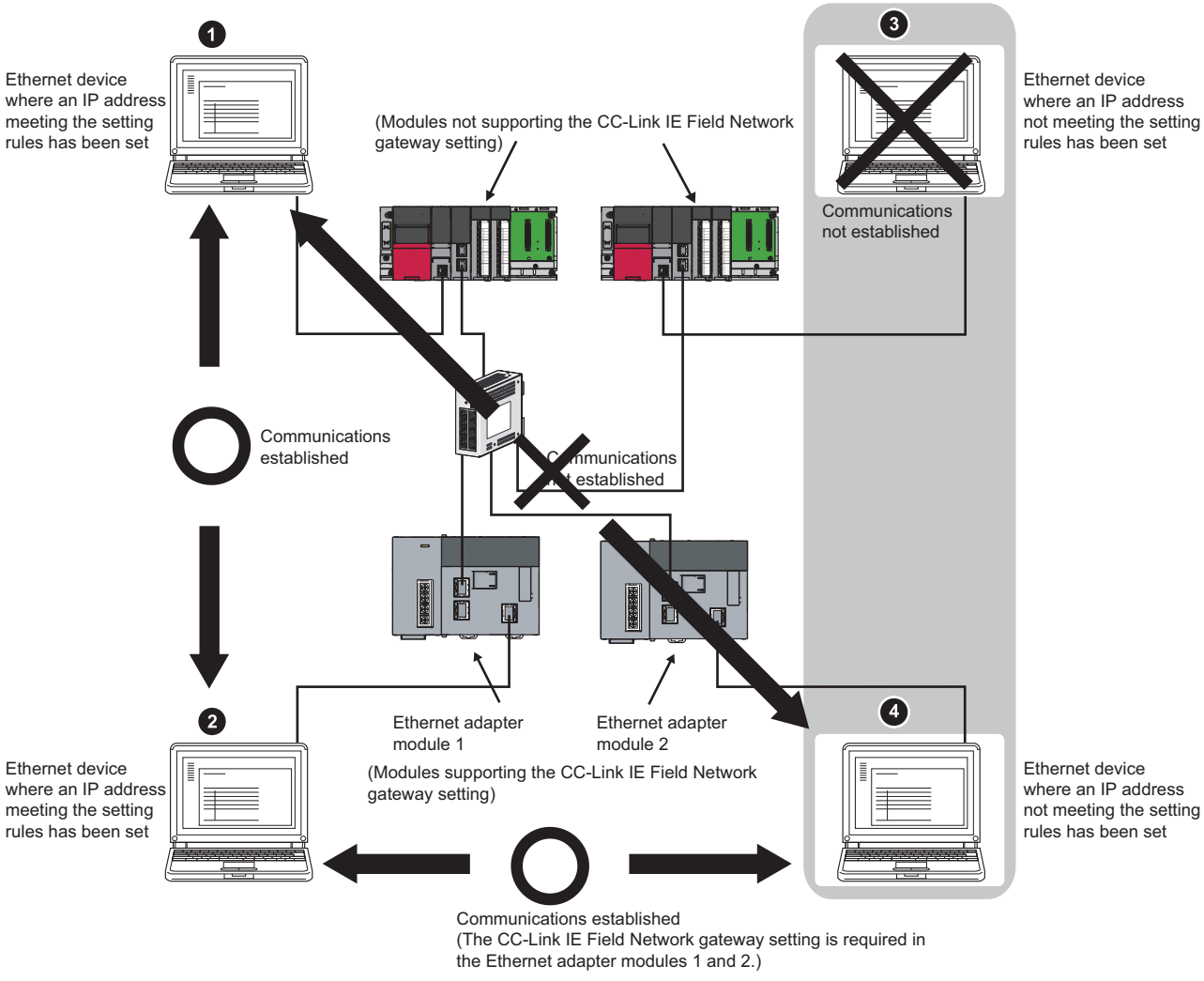
IP address that does not follow the IP address setting rules



(1) Different network addresses
(2) Value other than 1 to 239
(3) Value other than 1 to 120

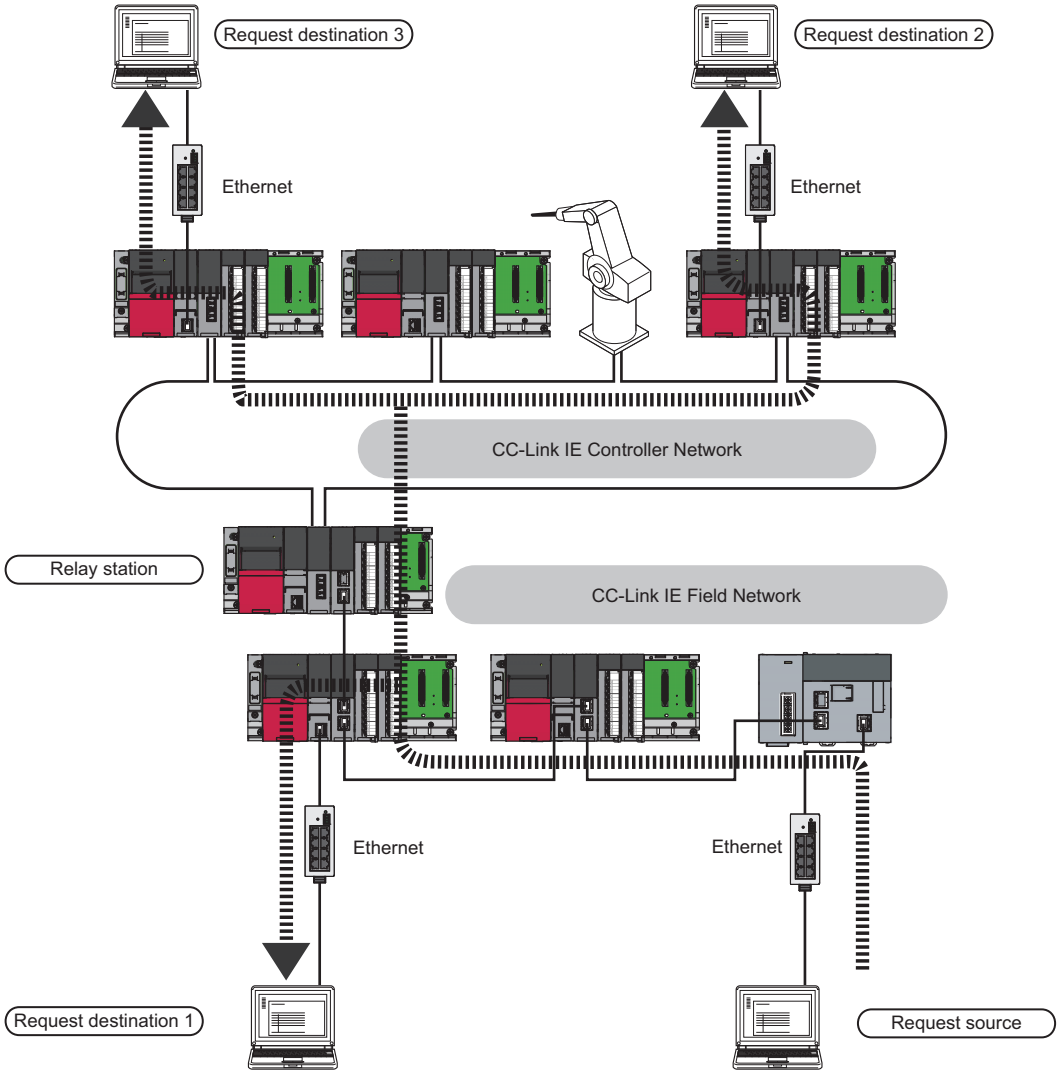
Ex.

Range of communications of when ❸ and ❹ are Ethernet devices with an IP address that does not meet the IP address setting rules



Relay using CC-Link IE Controller Network

The IP packet transfer function can be used through a relay from CC-Link IE Field Network to CC-Link IE Controller Network.



Point

When using the IP packet transfer function on CC-Link IE Controller Network, refer to the following.

User's manual for the CC-Link IE Controller Network used

Precautions

Support for the IP packet transfer function

MELSEC iQ-R series modules support the IP packet transfer function from the first release.

To check whether other modules support the IP packet transfer function, refer to the following.

📖 User's manual for the module used

Using different networks

Communications cannot be performed via modules that do not support the IP packet transfer function such as MELSECNET/H.

Communications before a baton pass is established (D LINK LED off)

The IP packet transfer function can be used after a baton pass was established. If communications are performed before the establishment, a timeout error occurs in an Ethernet device (request source device). Whether the baton pass is established in the own station can be checked on the D LINK LED.

Precautions when using the UDP communication

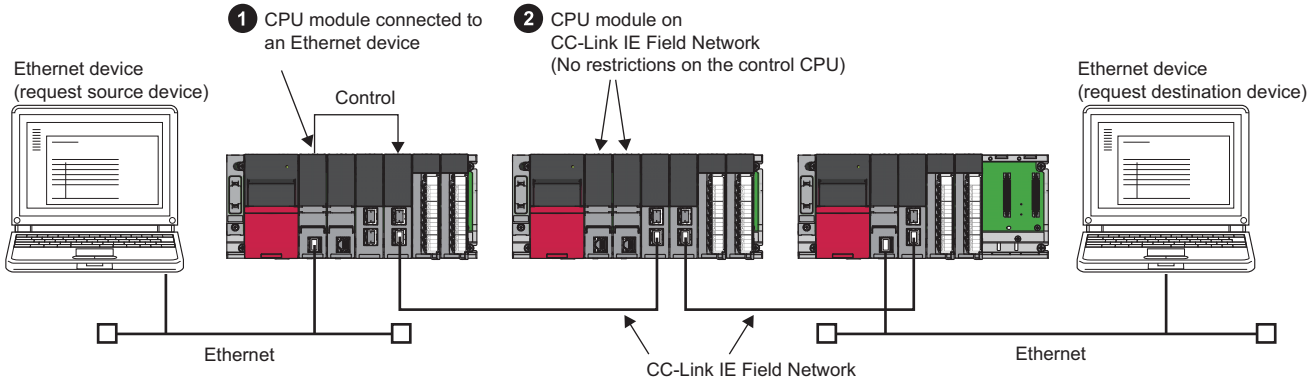
Using UDP may reduce the reliability of data communications compared to TCP, causing a problem, such as data missing and changed order of data receiving. If any problem occurs, change the protocol to TCP.

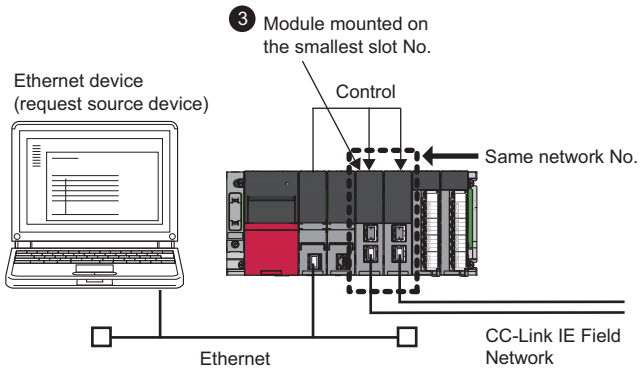
Communications of Broadcast and Multicast

Communications of Broadcast and Multicast cannot be transferred using the IP packet transfer function. Use Unicast (identifying a single request destination) instead.

Precautions when configuring a multiple CPU system

❶ Set a CPU module connected to an Ethernet device as a control CPU of the master/local module performing the IP packet transfer.
❷ Any CPU module in a relay station on CC-Link IE Field Network can be served as a control CPU of the master/local module transferring the IP packet.
❸ When multiple master/local modules with the same network number are connected to one system, the master/local module with the smallest slot number transfers the IP packet. To transfer the IP packet, connect the Ethernet device to a control CPU of the master/local module with the smallest slot number among the modules with the same network number.

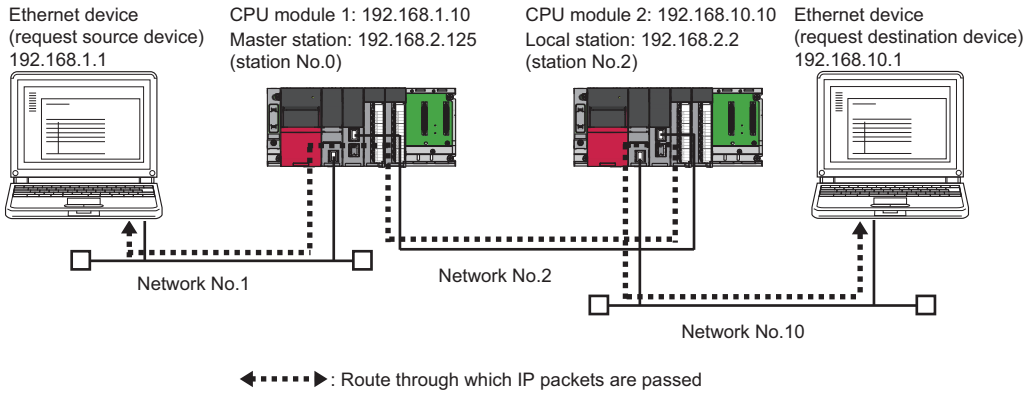




Example of communications using the IP packet transfer function

When the request source and destination devices have the same network address

The following system configuration is used to explain an example of communications.



■Setting in the CPU module 1 and master station (station No.0)

1. Set the IP address of the CPU module 1 as follows.

[Navigation window] ⇨ [Parameter] ⇨ Target module ⇨ [Basic Settings] ⇨ [Own Node Settings] ⇨ [IP Address]

Item	Setting
Own Node Settings	
Parameter Setting Method	Parameter Editor
IP Address	
IP Address	192 . 168 . 1 . 10

2. Change the following setting to "Use" in the CPU module 1.

[Navigation window] ⇨ [Parameter] ⇨ Target module ⇨ [Application Settings] ⇨ [IP Packet Transfer Setting]

IP Packet Transfer Setting	
IP Packet Transfer Function	Use

3. Set the IP address of the master station (station No.0) as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Target module ⇨ [Application Settings] ⇨ [IP Address]

IP Address	
IP Address	192 . 168 . 2 . 125

4. Write the set parameters to the CPU module 1. Then reset the CPU module 1 or power off and on the system.

■Setting in the CPU module 2 and local station (station No.2)

1. Set the IP address of the CPU module 2 as follows.

[Navigation window] ⇨ [Parameter] ⇨ Target module ⇨ [Basic Settings] ⇨ [Own Node Settings] ⇨ [IP Address]

Item	Setting
Own Node Settings	
Parameter Setting Method	Parameter Editor
IP Address	
IP Address	192 . 168 . 10 . 10

2. Change the following setting to "Use" in the CPU module 2.

[Navigation window] ⇨ [Parameter] ⇨ Target module ⇨ [Application Settings] ⇨ [IP Packet Transfer Setting]

IP Packet Transfer Setting	
IP Packet Transfer Function	Use

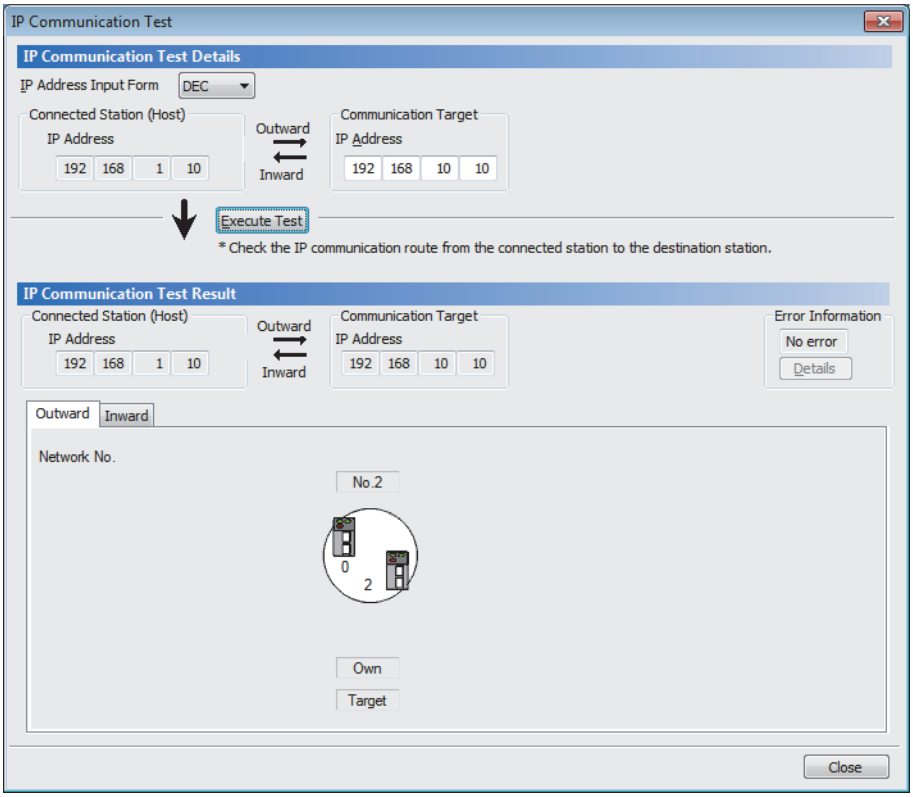
3. The local station (station No.2) does not require an IP address.

The network address set in the master station (station No.0) is automatically assigned.

4. Write the set parameters to the CPU module 2. Then reset the CPU module 2 or power off and on the system.

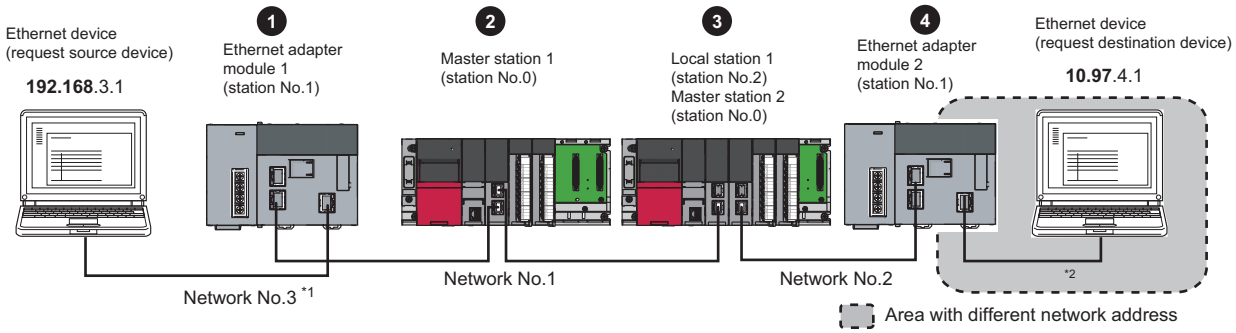
■Checking the status of communications

After the setting is completed in each module, execute the IP communication test to check for an error in the communication path on CC-Link IE Field Network. (☞ Page 52 IP communication test)



When an Ethernet device with a different network address is accessed

The following system configuration is used to explain an example of communications.



No.	Module transferring the IP packet		IP address
❶	Ethernet adapter module 1 (station No.1)	Ethernet part	192.168.3.30
		CC-Link IE Field Network part	192.168.1.1
❷	Master station 1 (station No.0)		192.168.1.125
❸	Local station 1 (station No.2)		192.168.1.2
	Master station 2 (station No.0)		192.168.2.125
❹	Ethernet adapter module 2 (station No.1)	Ethernet part	10.97.4.2
		CC-Link IE Field Network part	192.168.2.1

*1 When the network address of the Ethernet device and Ethernet adapter module (Ethernet part) is the same as that of the master station, the third octet of the IP address of the Ethernet device side is used as a network number. In the routing parameters of the CPU module, set the communication path to the network No.3.

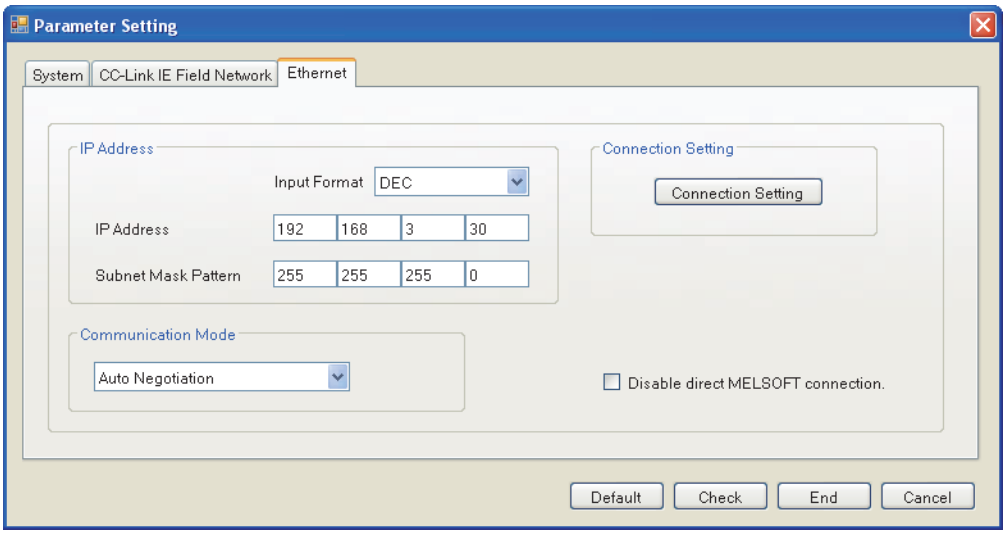
*2 Because the network address of the Ethernet device (request destination device) is different from that of the master station, the Ethernet part does not have a network number. In the routing parameters, set the communication path to the network No.2.

■Setting in the Ethernet adapter module 1 (station No.1)

Use the configuration tool to set the IP address.

1. Set the IP address in the Ethernet adapter module 1 (Ethernet part) as follows.

Setting item tree ⇨ NZ2GF-ETB ⇨ [Parameter] ⇨ "Ethernet"

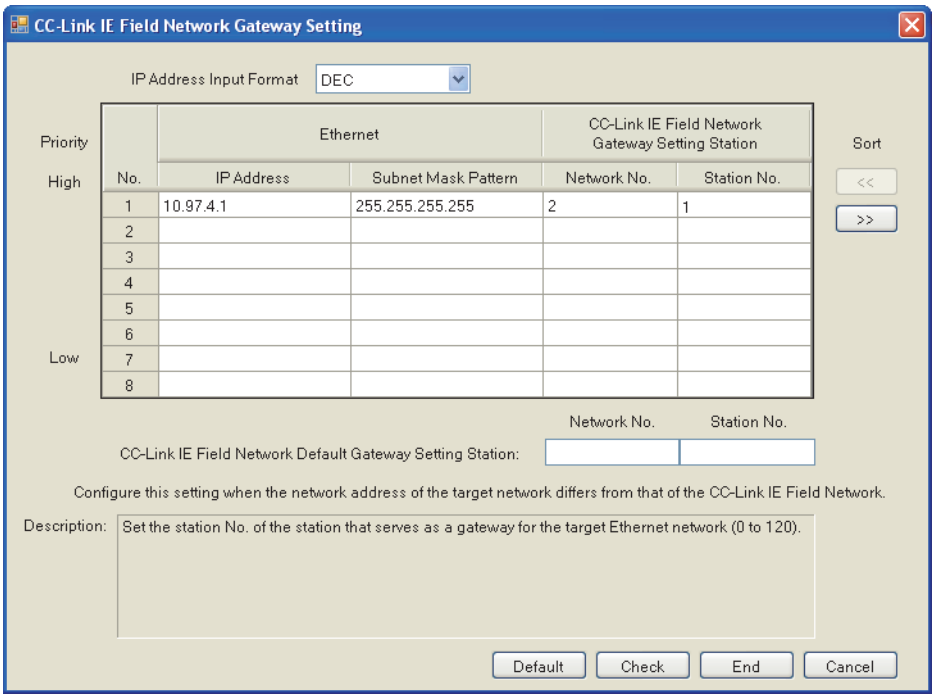


2. The IP address setting is not required for the Ethernet adapter module 1 (CC-Link IE Field Network part).

The network address set in the master station 1 (station No.0) is automatically assigned.

3. Set the CC-Link IE Field Network gateway in the Ethernet adapter module 1 as follows.

Setting item tree ⇨ NZ2GF-ETB ⇨ [Parameter] ⇨ "CC-Link IE Field Network" ⇨ [CC-Link IE Field Network Gateway Setting]



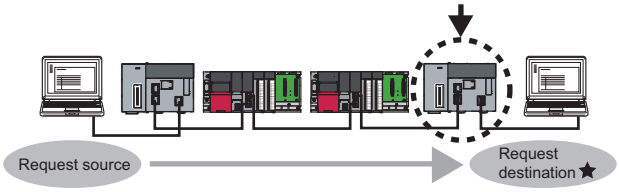
Point

Set the gateway as follows.

To transmit communications to the request destination★,
the IP packet passes through the station
with the network address No.▲and station No.■.

No.	Ethernet		CC-Link IE Field Network Gateway Setting Station	
	IP Address	Subnet Mask Pattern	Network No.	Station No.
1		★	▲	■

Station where the IP packet passes through last
(Network No.▲, station No.■)



4. Write the set parameters to the Ethernet adapter module 1.

■Setting in the CPU module 1 and master station 1 (station No.0)

1. Set the routing parameters to the CPU module 1 as follows.

[Navigation window] ⇨ [Parameter] ⇨ Target module ⇨ [CPU parameter] ⇨ [Routing Setting]

Setting Item

No.	Relay Station		⇨	Target Station
	Network No.	Station No.		Network No.
1	1	2		2
2	1	1		3

Because the network address is different from that of the request destination device, the Ethernet adapter module 2 (Ethernet part) does not have a network number. Set the communication path to the network No.2.

2. Set the IP address in the master station 1 (station No.0) as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Target module ⇨ [Application Settings] ⇨ [IP Address]

IP Address	
IP Address	192 . 168 . 1 . 125

3. Write the set parameters to the CPU module 1. Then reset the CPU module 1 or power off and on the system.

■Setting in the CPU module 2, local station 1 (station No.2), and master station 2 (station No.0)

1. Set the routing parameters to the CPU module 2 as follows.

[Navigation window] ⇨ [Parameter] ⇨ Target module ⇨ [CPU parameter] ⇨ [Routing Setting]

Setting Item

No.	Relay Station		⇨	Target Station
	Network No.	Station No.		Network No.
1	1	0		3

2. Set the IP address in the master station 2 (station No.0) as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Target module ⇨ [Application Settings] ⇨ [IP Address]

IP Address	
IP Address	192 . 168 . 2 . 125

3. The IP address setting is not required for the local station 1 (station No.2).
The network address set in the master station 1 (station No.0) is automatically assigned.

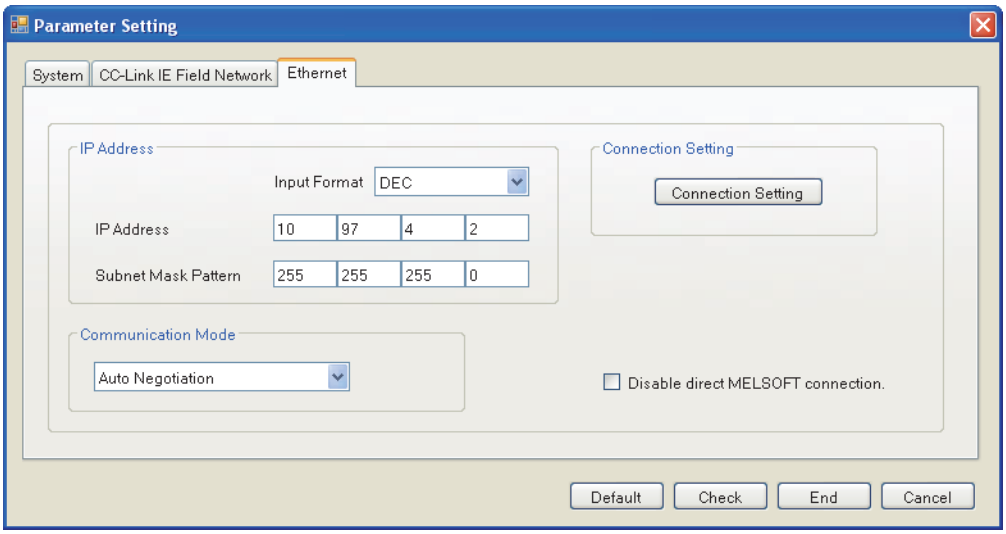
4. Write the set parameters to the CPU module 2. Then reset the CPU module 2 or power off and on the system.

■Setting in the Ethernet adapter module 2 (station No.1)

Use the configuration tool to set the IP address.

1. Set the IP address in the Ethernet adapter module 2 (Ethernet part) as follows.

Setting item tree ⇨ NZ2GF-ETB ⇨ [Parameter] ⇨ "Ethernet"



2. The IP address setting is not required for the Ethernet adapter module 2 (CC-Link IE Field Network part).

The network address set in the master station 2 (station No.0) is automatically assigned.

3. The CC-Link IE Field Network gateway setting is not required for the Ethernet adapter module 2.

Because the network address of the request destination (Ethernet adapter module 1) is the same as that of the master station, setting only the communication path in the routing parameters allows communications to be performed with the request destination.

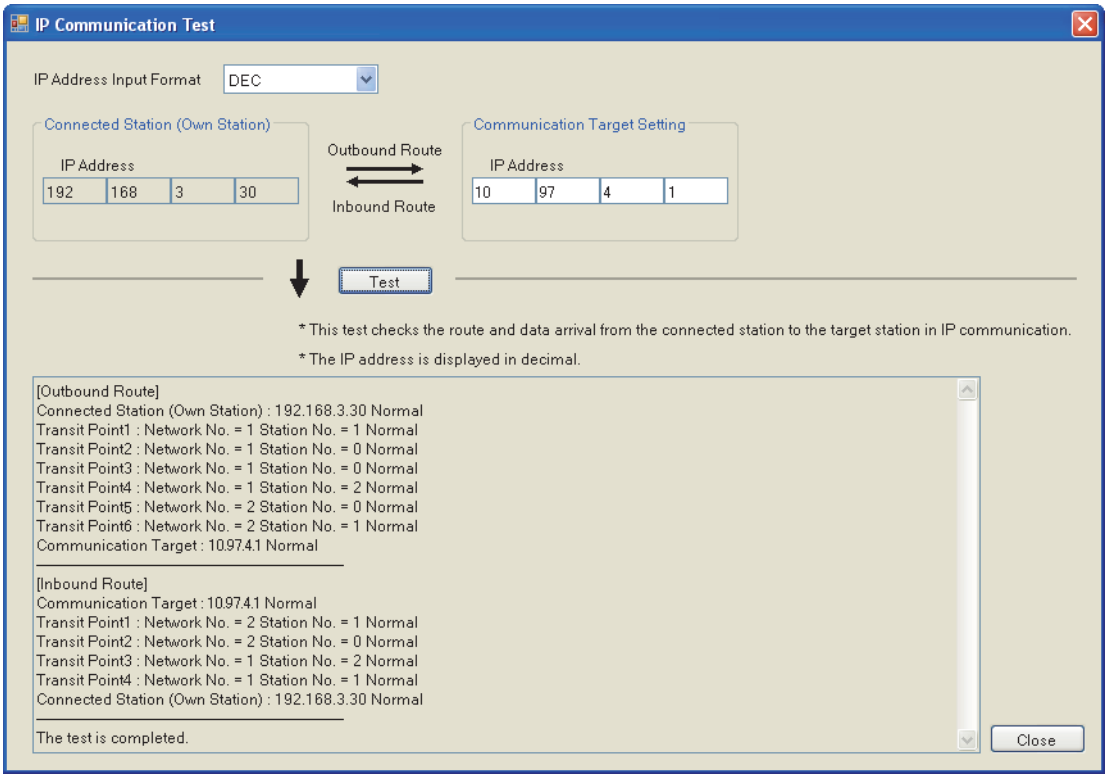
4. Write the set parameters to the Ethernet adapter module 2.

■Checking the status of communications

After the setting is completed in each module, execute the IP communication test using the configuration tool of the Ethernet adapter module. Then check for an error in the communication path between the Ethernet device (request source device) and Ethernet device (request destination device).

For the IP communication test using the configuration tool, refer to the following.

CC-Link IE Field Network Ethernet Adapter Module User's Manual



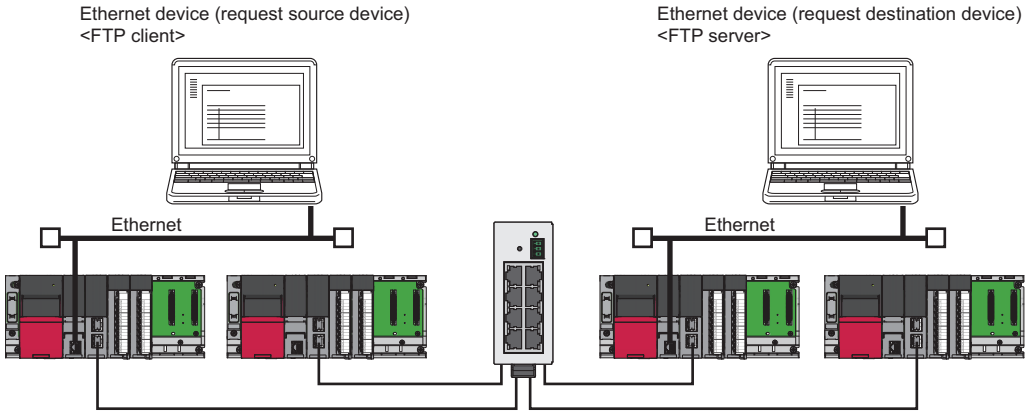
Communication speed

This section provides the results of communication speed measured using the IP packet transfer function. Use the results as a reference.

When request source and destination devices are connected to a CPU module

The results are based on measurement when FTP communications are performed with four modules connected in star topology.

■System configuration



Device	Description	
Ethernet device (request source device) <FTP client>	CPU	Intel® Core™ 2 Duo processor 2.00GHz
	OS	Microsoft® Windows® 7 Professional Operating System
	Ethernet board	1000BASE-T
	FTP client application	FFFTP
Ethernet device (request destination device) <FTP server>	CPU	Intel® Core™ i5 Duo processor 2.67GHz
	OS	Microsoft® Windows® 7 Professional Operating System
	Ethernet board	1000BASE-T
	FTP server application	FileZilla Server
Programmable controller	CPU module	• R04CPU • Sequence scan time: 1ms
	CC-Link IE Field Network	• Cyclic transmission: 128 points assigned to each station for the RX and RY, 256 points assigned to each station for the RWw and RWr • Transient transmission: N/A

■Measurement result of the communication speed

The following table lists the time that takes until a file is read from a request source device to a request destination device.

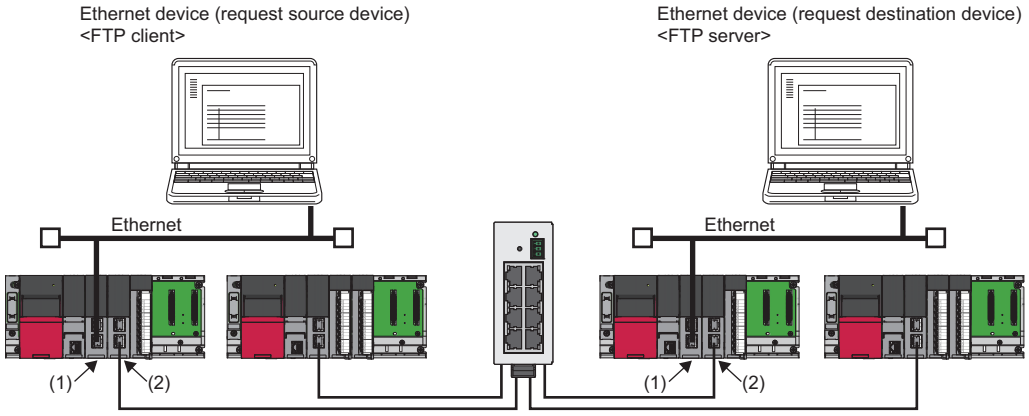
Size of a file to be communicated	Time
1K bytes	10ms
50K bytes	300ms
100K bytes	600ms
1M bytes	4000ms

When request source and destination devices are connected to RJ71EN71

The results are based on measurement when FTP communications are performed with four modules connected in star topology.

■System configuration (RJ71EN71, RJ71GF11-T2)

When "Port 1 Network Type" and "Port 2 Network Type" is set to "Ethernet" for the RJ71EN71



(1) RJ71EN71 ("Port 1 Network Type" and "Port 2 Network Type" is set to "Ethernet")
(2) RJ71GF11-T2

Device	Description
Ethernet device (request source device) <FTP client>	Same as those when a request source device and a request destination device are connected to a CPU module (☞ Page 64 When request source and destination devices are connected to a CPU module)
Ethernet device (request destination device) <FTP server>	
Programmable controller	

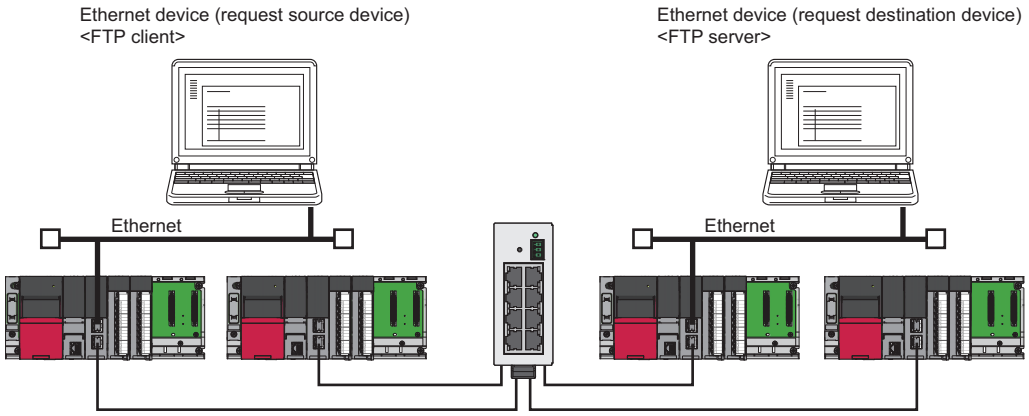
■Measurement result of the communication speed

The following table lists the time that takes until a file is read from a request source device to a request destination device.

Size of a file to be communicated	Time
1K bytes	10ms
50K bytes	100ms
100K bytes	200ms
1M bytes	2000ms

■System configuration (RJ71EN71)

When "Port 1 Network Type" is set to "Ethernet" and "Port 2 Network Type" is set to "CC-Link IE Field" for the RJ71EN71



Device	Description
Ethernet device (request source device) <FTP client>	Same as those when a request source device and a request destination device are connected to a CPU module (☞ Page 64 When request source and destination devices are connected to a CPU module)
Ethernet device (request destination device) <FTP server>	
Programmable controller	

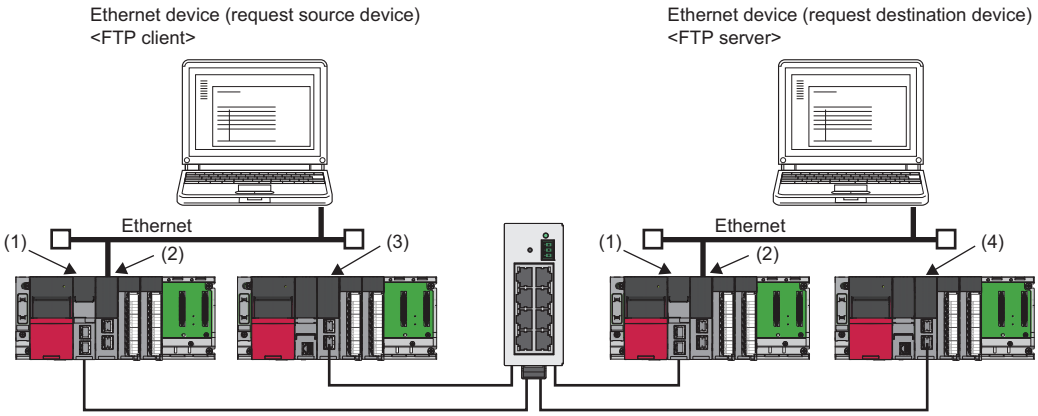
■Measurement result of the communication speed

The following table lists the time that takes until a file is read from a request source device to a request destination device.

Size of a file to be communicated	Time
1K bytes	10ms
50K bytes	100ms
100K bytes	200ms
1M bytes	2000ms

■System configuration (RJ71EN71, RJ72GF15-T2)

When "Port 1 Network Type" and "Port 2 Network Type" is set to "Ethernet" for the RJ71EN71



(1) RJ72GF15-T2
(2) RJ71EN71 ("Port 1 Network Type" and "Port 2 Network Type" is set to "Ethernet")
(3) RJ71GF11-T2 (master station)
(4) RJ71GF11-T2 (local station)

■Measurement result of the communication speed

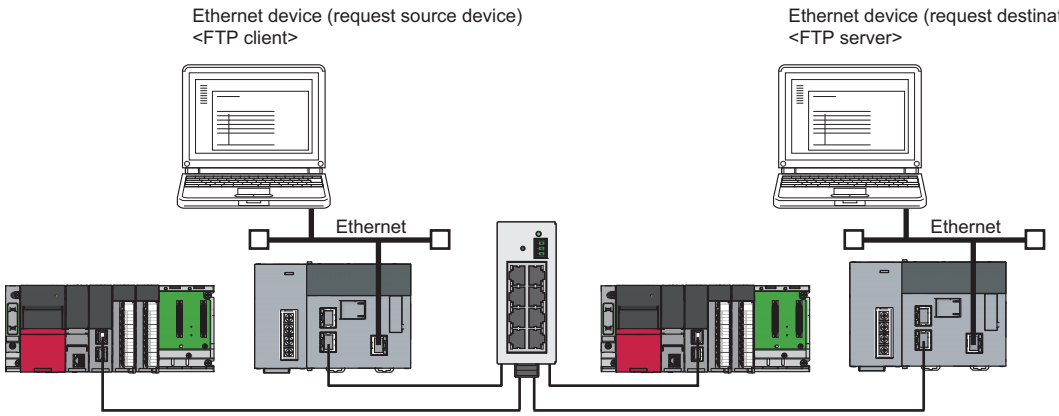
The following table lists the time that takes until a file is read from a request source device to a request destination device.

Size of a file to be communicated	Time
1K bytes	100ms
50K bytes	900ms
100K bytes	2000ms
1M bytes	20000ms

When source and destination devices are connected to an Ethernet adapter module

The results are based on measurement when FTP communications are performed with four modules connected in star topology.

■System configuration



Device	Description
Ethernet device (request source device) <FTP client>	Same as those when a request source device and a request destination device are connected to a CPU module (☞ Page 64 When request source and destination devices are connected to a CPU module)
Ethernet device (request destination device) <FTP server>	
Programmable controller	

■Measurement result of the communication speed

The following table lists the time that takes until a file is read from a request source device to a request destination device.

Size of a file to be communicated	Time
1K bytes	10ms
50K bytes	300ms
100K bytes	500ms
1M bytes	5000ms

To increase communication speed

Communication speed can be increased by checking the following items again.

■Sequence scan of a CPU module

Shortening sequence scan time can increase communication speed.

For causes extending sequence scan time, refer to the following.

MELSEC iQ-R CPU Module User's Manual (Application)

Point

When a request source device and a request destination device are connected to an Ethernet adapter module, correct the settings in the CPU module of a master station and program.

■Transient transmission frequency

Communications using the IP packet transfer function are performed with transient transmission. Taking one of the following actions can increase communication speed.

- Executing the COM instruction on a program and executing a service processing at any timing other than an END processing increase the frequency of transient transmission (the amount of processing per transient transmission). Consequently, the frequency of communications using the IP packet transfer function increases, resulting in increased communication speed. (MELSEC iQ-R Programming Manual (CPU Module Instructions, Standard Functions/Function Blocks))
- Decreasing the number of other transient transmission ensures the processing time of the IP packet transfer function; therefore, communication speed can be increased.

Point

When a request source device and a request destination device are connected to an Ethernet adapter module, correct the program of the CPU module on the master station by executing the COM instruction.

■Link scan time

Minimizing the number of link device points used in the cyclic transmission shortens link scan time, resulting in increased communication speed.

1.4 RAS

RAS stands for Reliability, Availability, and Serviceability. This function improves overall usability of automated equipment.

Device station disconnection

Data link of the device station where an error occurred is stopped, and the data link continues only for device stations that are operating normally.
In a line topology, the device station where an error occurred and all subsequent stations are disconnected.

Automatic return

When the device station that was disconnected due to an error becomes normal again, the data link is automatically restarted.

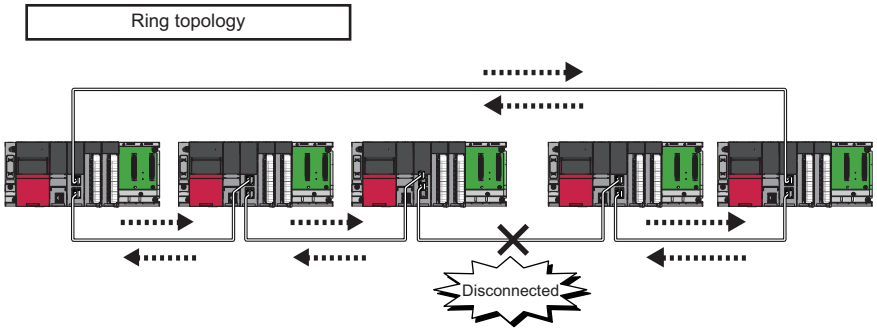
Loopback Function

This function continues data link with normal stations even if a cable disconnection or faulty station occurs. All stations after the cable disconnection point or faulty station are disconnected in a line topology. By using this function with ring topology, data link continues with normal stations.

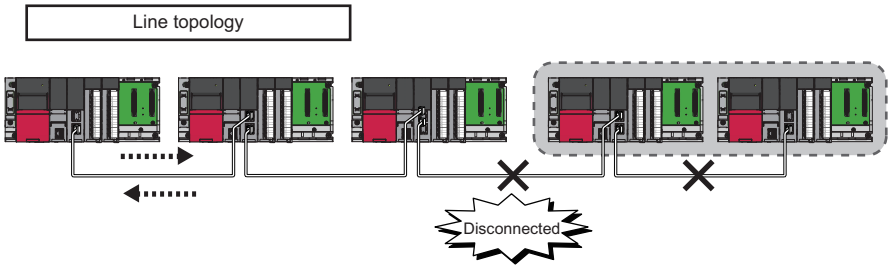
Point

The RJ71EN71 and RnENCPU can be used only when "Port 1 Network Type" is set to "CC-Link IE Field".

Cable disconnection

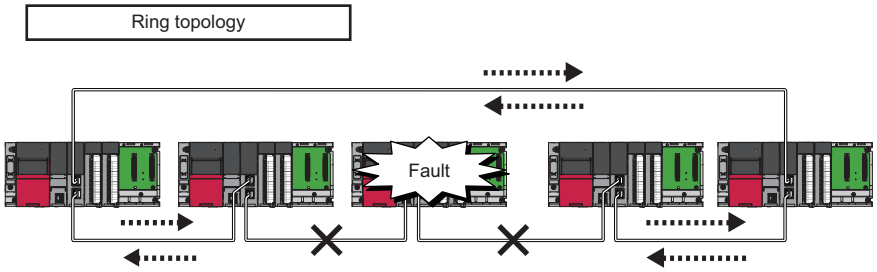


Even if a cable disconnection occurs, the system automatically performs loopback to continue the data link.

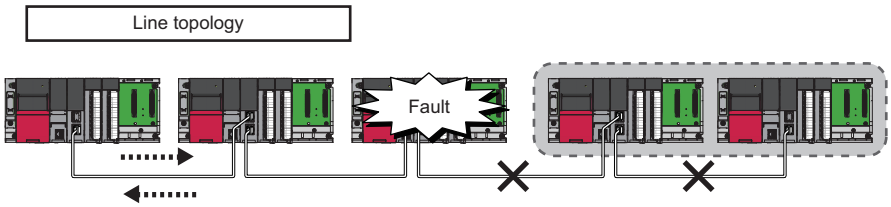


Stations connected after the cable disconnection point are disconnected.

Occurrence of faulty stations



The system disconnects faulty stations and automatically performs loopback to continue the data link.



Stations connected after the faulty station are disconnected.

Setting method

1. Configure the network in ring topology.
2. Set "Network Topology" to "Ring" in "Basic Settings" of the master station.

Program that detects loopback station numbers (master operating station only)

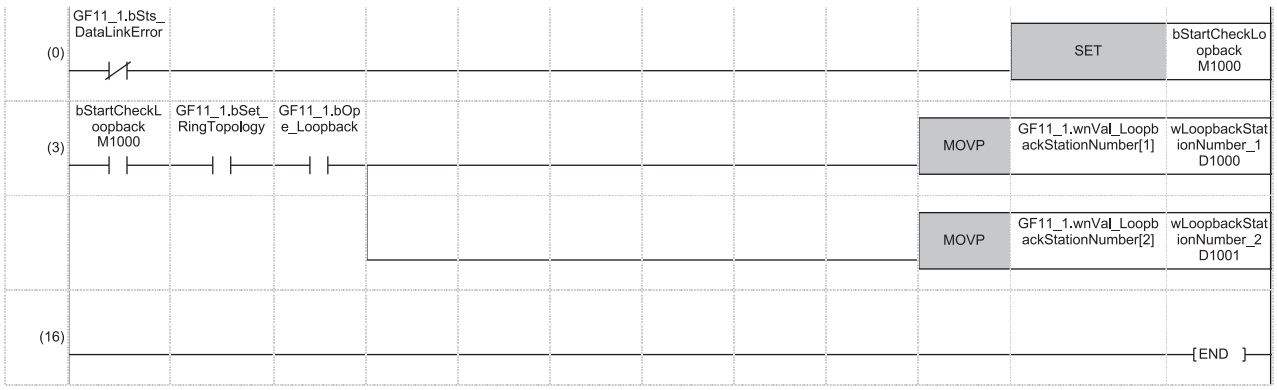
By detecting loopback station numbers, a faulty station can be found. Whether loopback is being performed or not can be checked using 'Network topology setting' (SB0078) and 'Loopback status' (SB0065) of the master operating station.

Ex.

Program that stores loopback station numbers to 'wLoopbackStationNumber_1' (D1000) and 'wLoopbackStationNumber_2' (D1001)

Classification	Label name	Description	Device
Module label	GF11_1.bSts_DataLinkError	Data link error status of own station	SB0049
	GF11_1.bOpe_Loopback	Loopback status	SB0065
	GF11_1.bSet_RingTopology	Network topology setting	SB0078
	GF11_1.wnVal_LoopbackStationNumber[1]	Loopback station number 1	SW0070
	GF11_1.wnVal_LoopbackStationNumber[2]	Loopback station number 2	SW0071
Label to be defined	Define global labels as shown below:		

	Label Name	Data Type		Class	Assign (Device/Label)
1	wLoopbackStationNumber_1	Word [Signed]	...	VAR_GLOBAL	D1000
2	wLoopbackStationNumber_2	Word [Signed]	...	VAR_GLOBAL	D1001
3	bStartCheckLoopback	Bit	...	VAR_GLOBAL	M1000



(3) When 'Network topology setting' (SB0078) and 'Loopback status' (SB0065) are on, 'Loopback station number 1' (SW0070) and 'Loopback station number 2' (SW0071) are saved.

Precautions

■Support for the loopback function

To use the loopback function, check whether the master/local module on the master station supports the loopback function. To check the support for the loopback function, refer to the following.

📖 User's manual for the master/local module used

■Loopback function setting and network configuration

To use the loopback function, configure the network in ring topology and set "Network Topology" to "Ring" in "Basic Settings" of the master station. If "Network Topology" and the network configuration are inconsistent, an error may occur in all stations and data link cannot be performed.

Communication path switch at an instantaneous interruption

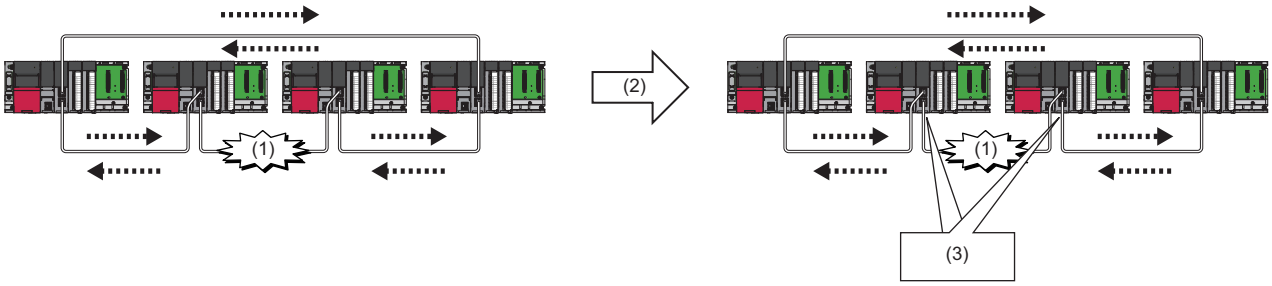
When loopback occurrence and clear are repeated due to instantaneous interruptions in the cable connection, the communication path is switched to another path to avoid the cable where the instantaneous interruptions occur.
This function enables controlling of the loopback occurrence and clear when the instantaneous interruptions occur due to the module failure or poor cable connection.
Turning on 'Enabling communication path switch at an instantaneous interruption' (SB0004) on the master operating station enables this function. (Default: Disable)

Point

- The current status (enable/disable) can be checked in 'Enable/disable status for communication path switch at an instantaneous interruption' (SB0084).
- To disable this function, reset the control CPU module on the master operating station or power off and on the system.

■Instantaneous interruption occurrence

If instantaneous interruptions repeatedly occur, the station where the instantaneous interruptions have occurred performs loopback and the station is disconnected from the communication path.
The station numbers of the stations that are performing loopback by this function are stored in 'Instantaneous interruption station number 1' (SW0196) and 'Instantaneous interruption station number 2' (SW0197).
Loopback occurrence by the communication path switch at an instantaneous interruption (event code: 00C3DH) is also registered in the event history.
The loopback for communication path switch at an instantaneous interruption is performed until the clear instruction is issued.
(☞ Page 73 Clearing an instantaneous interruption)



(1) Instantaneous interruption
(2) Repeated instantaneous interruption occurrence
(3) Loopback to avoid the area where the instantaneous interruption has occurred

Point

When communication path switch at an instantaneous interruption is disabled, the operations are as follows:

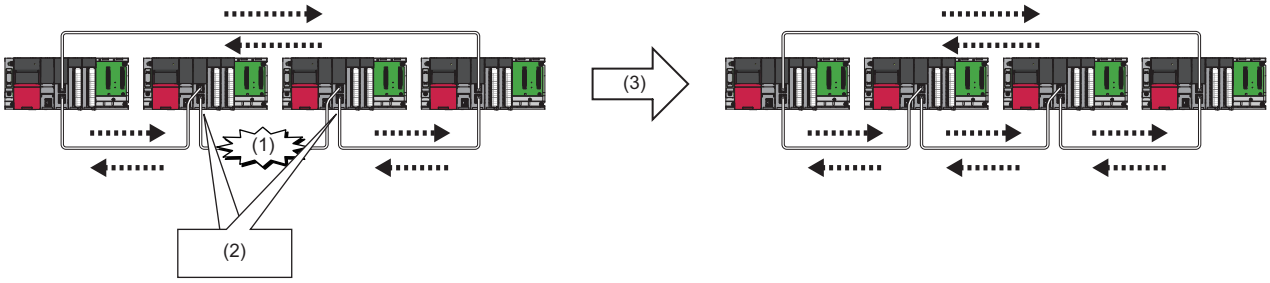
- If the instantaneous interruptions repeatedly occur, the numbers of the stations where the first instantaneous interruption occurred after powering on the master station are stored in 'Instantaneous interruption station number 1' (SW0196) and 'Instantaneous interruption station number 2' (SW0197).
- Instantaneous interruption occurrence (event code: 00C3CH) is registered in the event history.

■Clearing an instantaneous interruption

By turning on 'Clear loopback by communication path switch at an instantaneous interruption' (SB0005) after clearing the instantaneous interruption caused by problems such as a module failure or poor cable connection, the loopback occurrence will be cleared, returning the communication to the former path.

"0" (No loopback stations) is stored in 'Instantaneous interruption station number 1' (SW0196) and 'Instantaneous interruption station number 2' (SW0197).

<<Own station>> Clear loopback by the communication path switch at an instantaneous interruption (SB0005 is on.) (event code: 2430DH) is also registered in the event history.



(1) Instantaneous interruption
(2) Loopback to avoid the area where the instantaneous interruption has occurred
(3) Turning on 'Clear loopback by communication path switch at an instantaneous interruption' (SB0005)

Point

The loopback by communication path switch at an instantaneous interruption is also cleared in the following cases:

- The control CPU module on the master operating station is reset or the system is powered off and on.
- Errors occur on all stations.
- Master operation is switched to submaster operation.

Precautions

■L ER LED

If the loopback occurs by the communication path switch at an instantaneous interruption, the L ER LED of the port on the loopback station may not turn on.

■Loopback by the communication path switch at an instantaneous interruption

Loopback by the communication path switch at an instantaneous interruption is performed only once. In the following cases, the system does not perform loopback by the communication path switch at an instantaneous interruption, even if an instantaneous interruption occurs while loopback is already being performed:

- When loopback by the communication path switch at an instantaneous interruption is performed, and another instantaneous interruption occurs before the loopback is cleared.
- When loopback due to a cable disconnection is performed, and an instantaneous interruption occurs before the loopback is cleared.

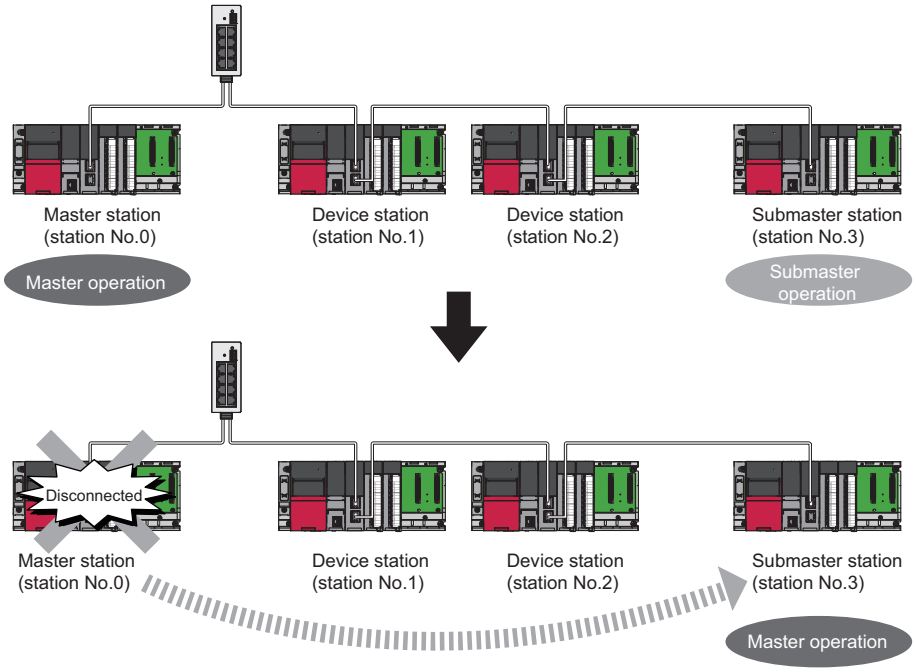
■When using the submaster function

When the operating station is switched from the master operating station to the submaster operating station, the enable/disable status of communication path switch at an instantaneous interruption is not transferred to the submaster station operating as a master station.

Program the function to be enabled at the timing of switching the operating station from the master operating station to the submaster station.

1.5 Submaster Function

This function allows the submaster station to control device stations instead of the master station when the master station is disconnected in a system where the master station and submaster station are connected on the same network. Using this function prevents the entire network from going down due to disconnection of the master station.



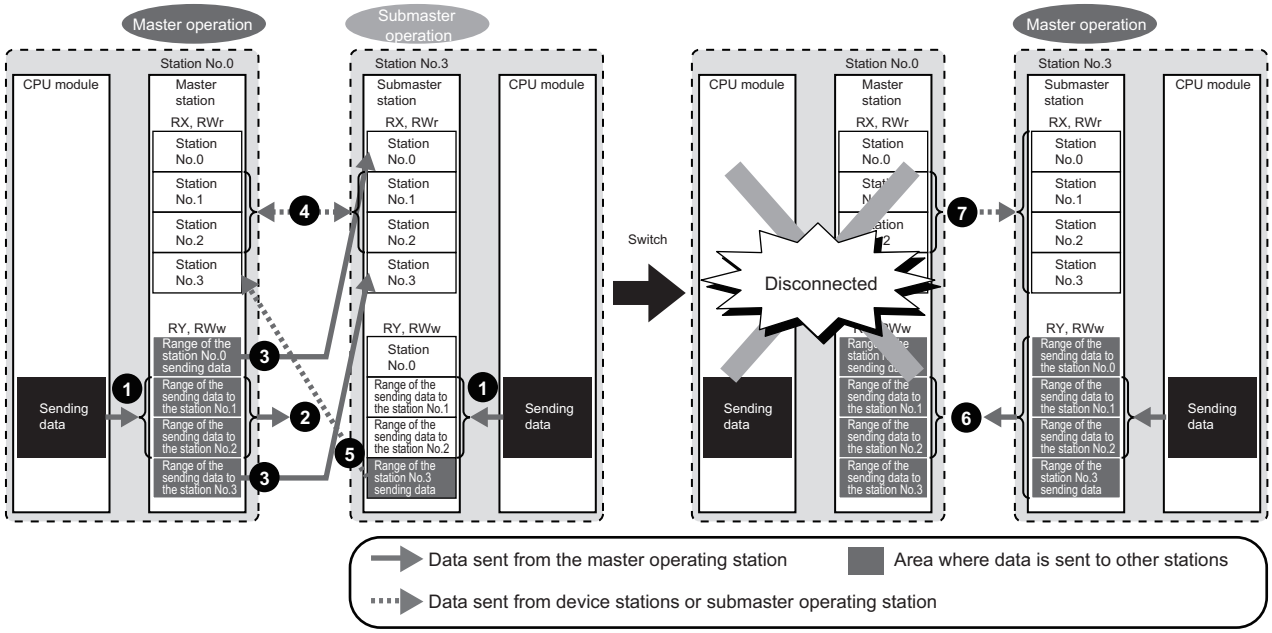
Cyclic transmission of when the submaster function is used

In cyclic transmission, data are periodically communicated among stations on the same network. Link devices (RX, RY, RWr, RWw) are used for data communications. In the submaster function, the submaster station is performing data link in case of disconnection of the master station; therefore, the submaster station can smoothly start to take in control if the master station is disconnected.

Link device assignment of the master station and submaster station

Even if the control is shifted to the submaster station due to disconnection of the master station, the assignment of areas for communications with the device stations is the same as that of the master station; therefore, the same program can be used for the master station and submaster station. A send area for the master station allows information to be exchanged between the master station and the submaster station.

Link device assignment is explained using the following example of when the station No.1 and No.2 are device stations and the station No.3 is a submaster station.



■Before the control is switched

- RY/RWw assignment

❶ Create a program where send data to the device stations are the same in the master station and submaster station.
❷ Data is sent from the master station (master operation) to the device stations. Data does not be sent from the submaster station (submaster operation).
❸ Data that is sent to the master station and data that is sent to the submaster station are stored in the link devices (RX, RWr) of the submaster station.

- RX/RWr assignment

❹ Data that is sent from the device stations is stored in the same area of the master station and submaster station.
❺ Data that is sent from the submaster station is stored in the link devices (RX, RWr) of the master station.

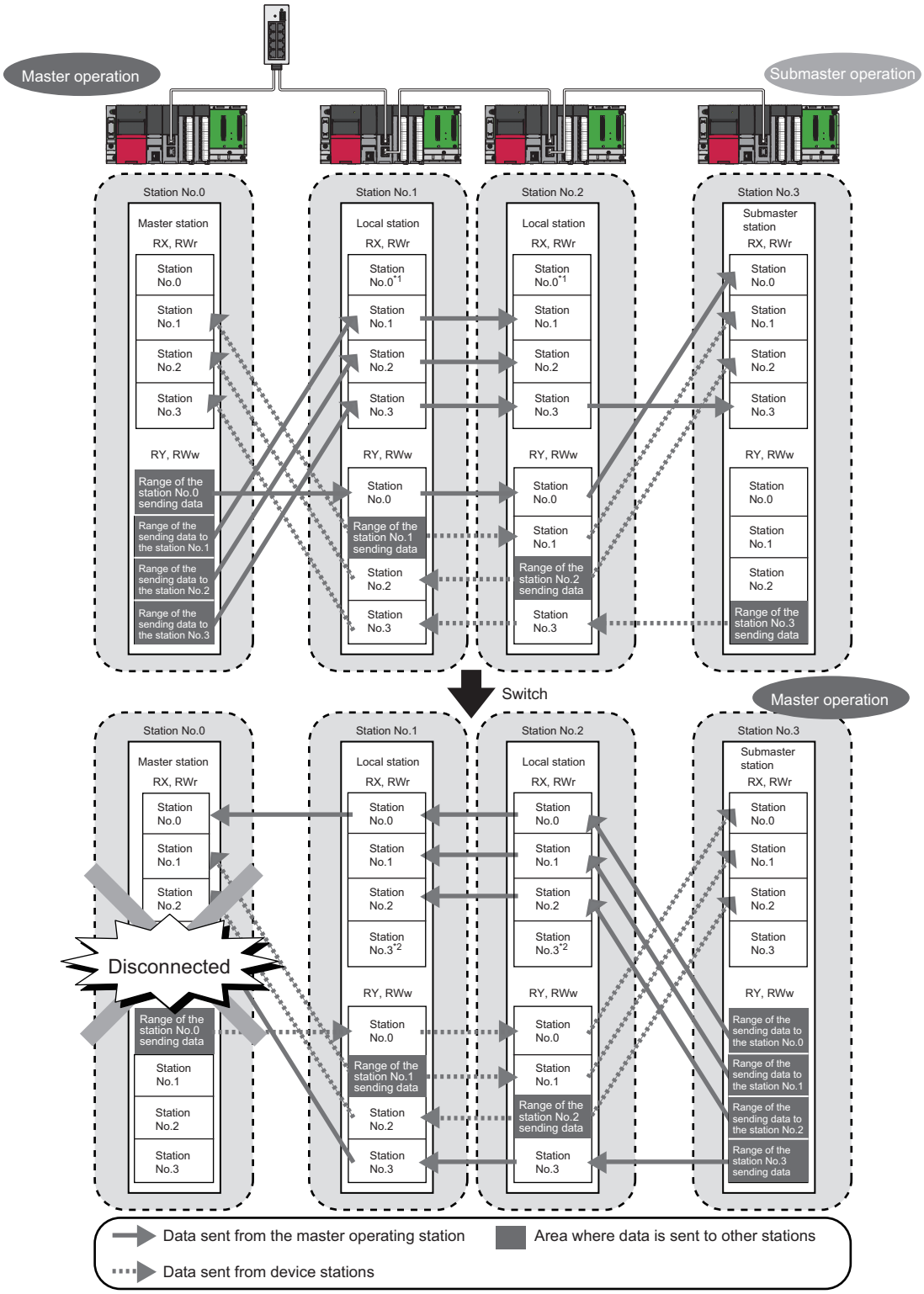
■After the control is switched

❻ Because areas of sending data to the device stations in the submaster station are assigned in the same way as the master station, the submaster station sends data to the device stations as the master station does before the control is switched.
❼ Because areas of receiving data from the device stations in the submaster station are assigned in the same way as the master station, the submaster station receives data from the device stations as the master station does before the control is switched.

Link device assignment of the master station, submaster station, and device stations

The following are assignment examples of when device stations are connected to the master station and submaster station.

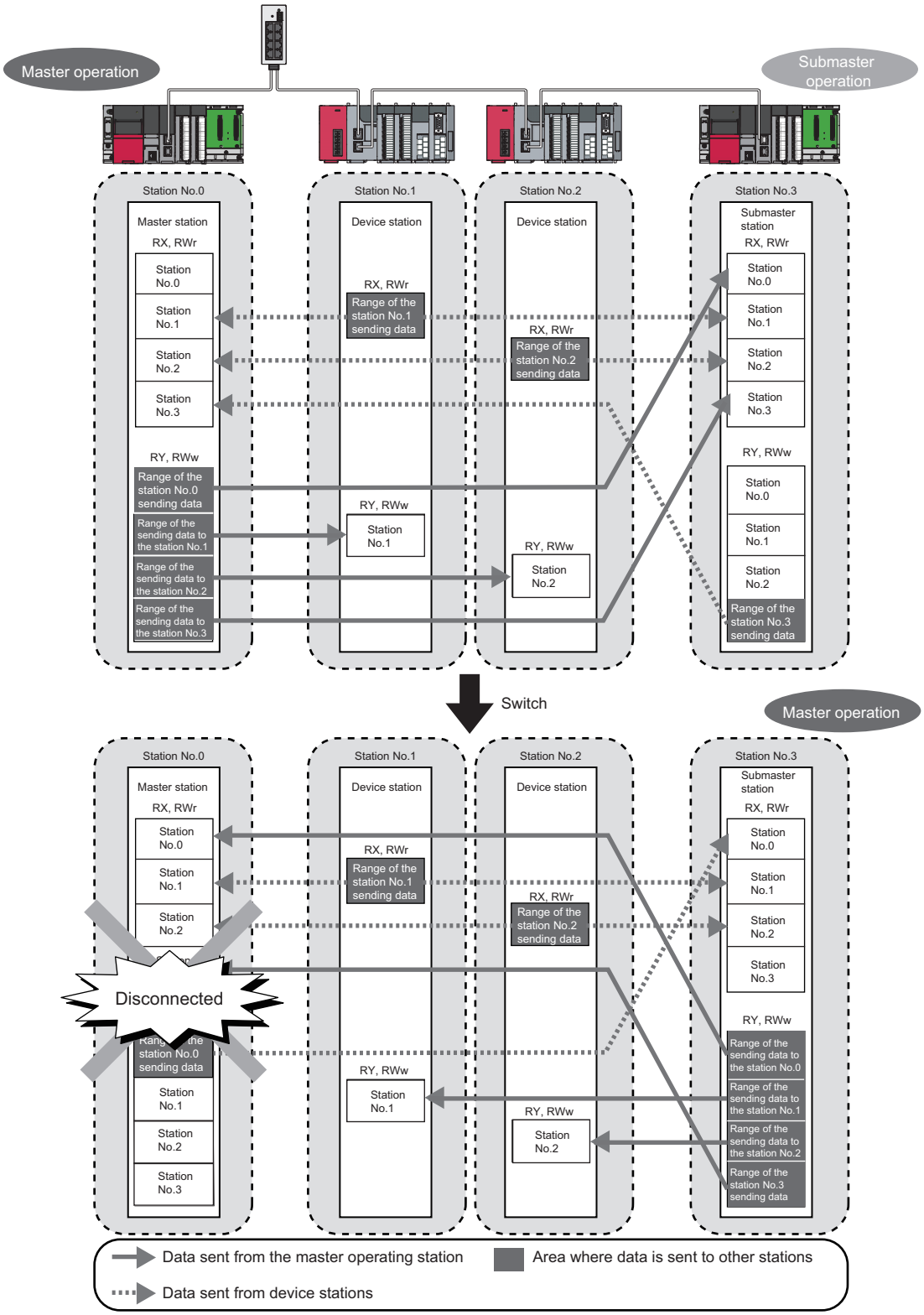
■Master station and local stations



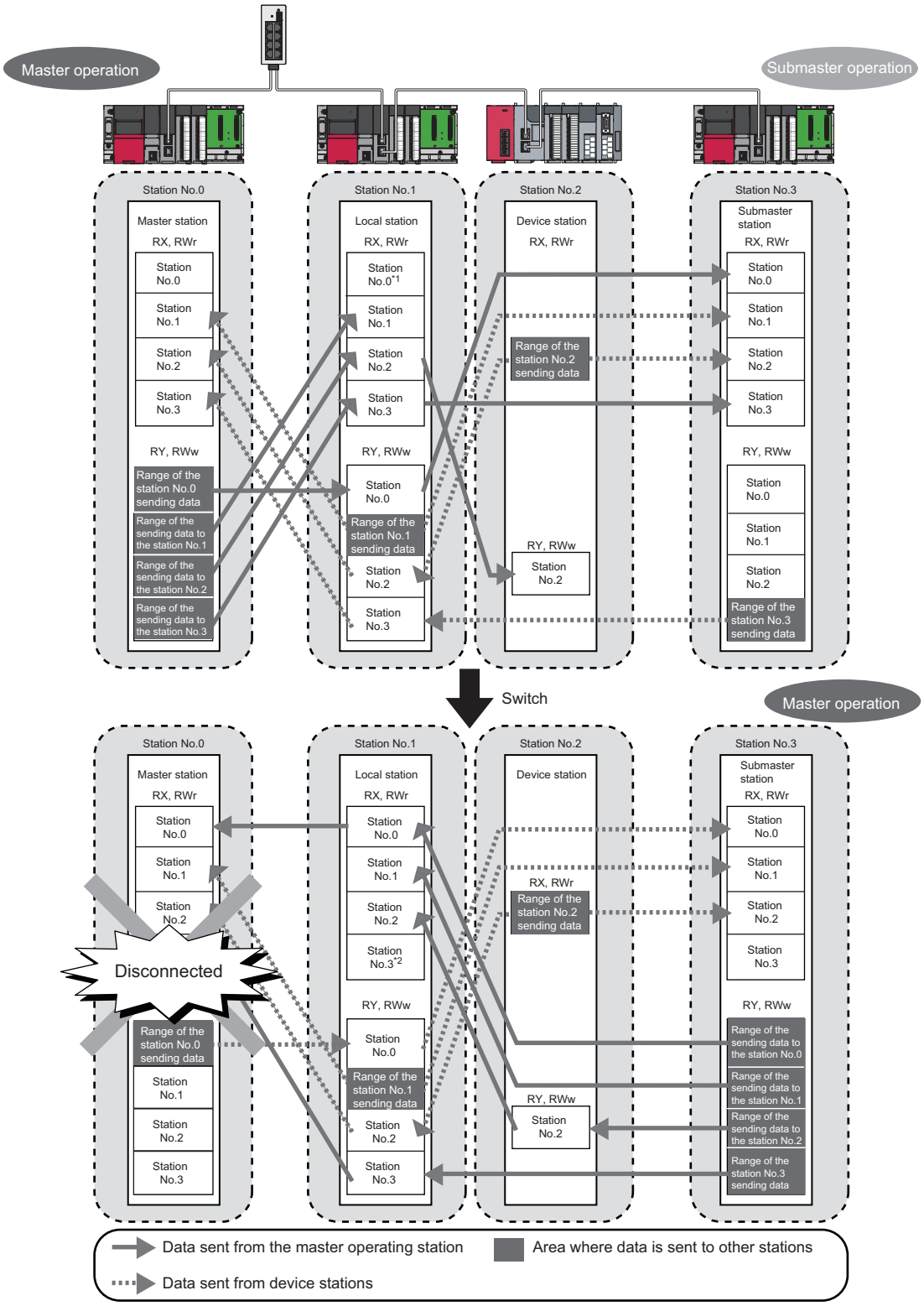
*1 Data that is sent from "Range of the station No.0 sending data" and stored in RY/RWw is stored.

*2 Data that is sent from "Range of the station No.3 sending data" and stored in RY/RWw is stored.

■Master station and device stations (except for local stations)



■Coexistence of local stations and the other device stations (other than local stations)



*1 Data that is sent from "Range of the station No.0 sending data" and stored in RY/RWw is stored.

*2 Data that is sent from "Range of the station No.3 sending data" and stored in RY/RWw is stored.

Transient transmission of when the submaster function is used

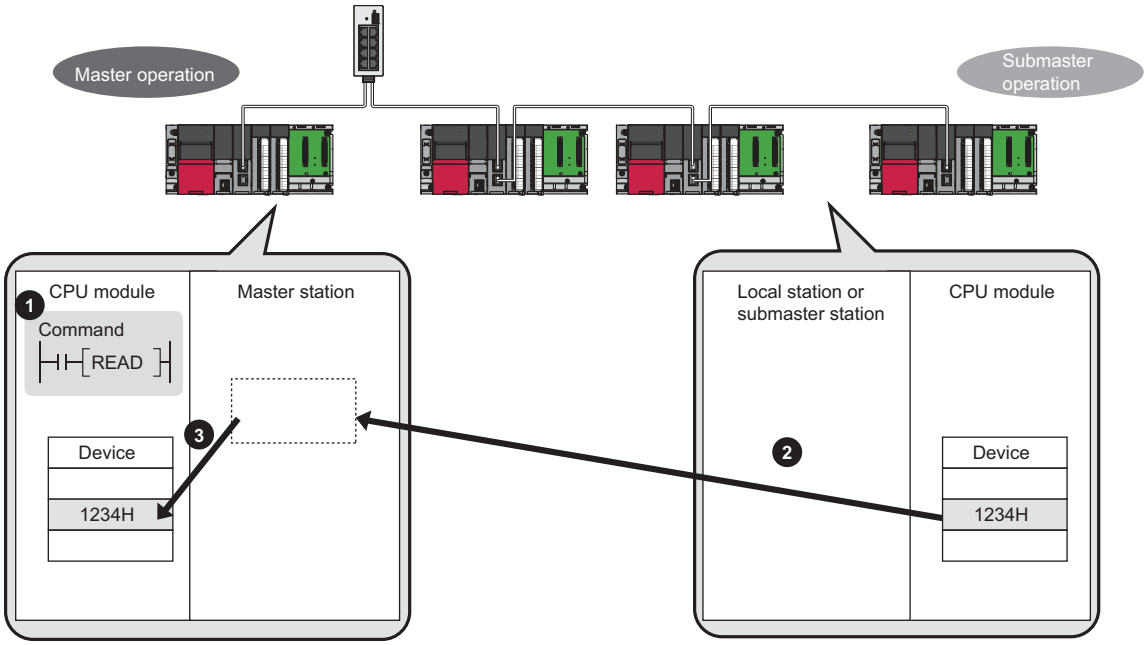
In transient transmission, communications can be performed with other stations when requests are issued using dedicated instructions. Communications with different networks is also possible. Transient transmission can be performed from either the master station or submaster station. (Note, however, that the REMFR, REMTO, REMFRD, and REMTOD instructions can be executed only from the master operating station.)

For details on dedicated instructions, refer to the following.

MELSEC iQ-R Programming Manual (Module Dedicated Instructions)

Ex.

Accessing a programmable controller of another station from a local station or submaster station using the dedicated instruction (READ instruction)



Switch from the master station to the submaster station

This section describes conditions where the master operating station is switched to the submaster operating station.

Automatic switch

The control is switched under one of the following conditions.

Condition	Description
Disconnection of the master station (master operation)	If an error occurs in the master station while the master station is operating as a master operating station and the submaster station as a submaster operating station, the submaster station starts to take in control.
Return of the disconnected master station (This applies when "Return as Master Operation Station" is selected in "Operation of Master Station after Reconnection" under "Basic Settings".)*1	The control is switched when the disconnected master station returns while the submaster station is operating as a master operating station.

*1 When "Return as Sub-master Operation Station" is selected, the submaster station continues to be in control, and the master station returns as a submaster operating station. When the submaster station (master operation) is disconnected after return, the master station operates as a master operating station.

Point

A disconnected submaster station is always returned as a submaster operating station.

When the operation is switched, a data link error is temporarily detected. To continue the control with the output of the device station being held, configure the settings of each station as follows:

- Master/local module: Set "Data Link Error Station Setting" to "Hold" under "I/O Maintenance Settings" under "Supplementary Cyclic Settings" in "Application Settings". (☞ Page 154 Supplementary Cyclic Settings)
- Modules other than a master/local module: Configure the settings where the output of the device station is held upon a data link error. (📖 Manual for the device station used)

Manual switch

While a submaster station is operating as a master operating station, the operation of the master station can be switched from the submaster operation to the master operation with the procedure described below. Note, however, that this does not apply when the master station is operating as a master operating station. Cyclic transmission is continued during switch. (The output of the device station is held during switch.)

1. In the submaster station operating as a master operating station, check that 'Forced master switching enable status' (SB0066) is on. Then turn on 'Forced master switch command' (SB0019).

Whether the submaster station is operating as a master operating station can be checked using the following signals.

- 'Master/submaster function operation status of own station' (SB004E) is off.
- 'Master station information' (SB0070) is on.

2. When the master/local module receives a switch command, 'Forced master switching acceptance status' (SB0067) is turned on, and the switch is started.

Cyclic transmission is continued during switch.

3. When the switch is completed, 'Forced master switching operation status' (SB0068) is turned on.

4. The result can be checked in 'Forced master switching command result' (SW005C).

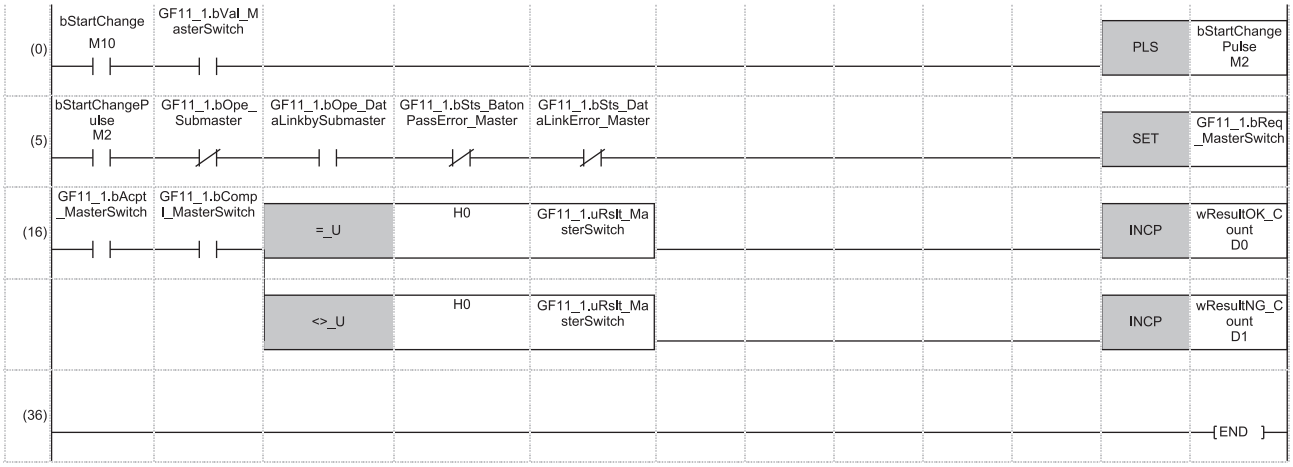
5. Turn off 'Forced master switching command' (SB0019).

'Forced master switching acceptance status' (SB0067), 'Forced master switching operation status' (SB0068), and 'Forced master switching command result' (SW005C) are turned off.

■Sample program of a manual switch

Classification	Label name	Description	Device
Module label	GF11_1.bReq_MasterSwitch	Forced master switch command	SB0019
	GF11_1.bOpe_Submaster	Master/submaster function operation status of own station	SB004E
	GF11_1.bVal_MasterSwitch	Forced master switching enable status	SB0066
	GF11_1.bAcpt_MasterSwitch	Forced master switching acceptance status	SB0067
	GF11_1.bCompl_MasterSwitch	Forced master switching operation status	SB0068
	GF11_1.bOpe_DataLinkbySubmaster	Master station information	SB0070
	GF11_1.bSts_BatonPassError_Master	Baton pass error status of master station	SB00A1
	GF11_1.bSts_DataLinkError_Master	Data link error status of master station	SB00B1
	GF11_1.uRslt_MasterSwitch	Forced master switching command result	SW005C
Label to be defined	Define global labels as shown below:		

	Label Name	Data Type		Class	Assign (Device/Label)
1	bStartChange	Bit	...	VAR_GLOBAL	M10
2	bStartChangePulse	Bit	...	VAR_GLOBAL	M2
3	wResultNG_Count	Word [Signed]	...	VAR_GLOBAL	D1
4	wResultOK_Count	Word [Signed]	...	VAR_GLOBAL	D0



(0) Pulsing the switching command
(5) Switching command
(16)Processing upon normal completion or abnormal end of the switch

Precautions

This section describes the precautions regarding the submaster function.

Support for the submaster function

All the master/local modules on a network where the submaster function is used must support the submaster function. To check the support for the submaster function, refer to the following.

📖 User's manual for the master/local module used

Parameter processing of a device station from a submaster station

To execute the parameter processing of a device station from a submaster station using the engineering tool, set the parameters of the submaster station as follows.

1. Select "Operate with Parameter of Host Station" for "Submaster Parameters" in "Basic Settings".
2. Set "Network Configuration Settings" under "Basic Settings".

Number of submaster stations

Set only one submaster station on one network. If multiple submaster stations are set, an error occurs in the submaster station. If a submaster station is added to a network with a submaster station connected, an error occurs only in the added submaster station.

Functions that can be used

Functions that can be used differ between master operating stations and submaster operating stations.

Operating station	Functions that can be used	Reference
Master operating station	Functions that can be used in master stations and submaster stations.	📖 MELSEC iQ-R Ethernet/CC-Link IE User's Manual (Startup)
Submaster operating station	Functions that can be used in local stations	

For the functions that can be used in the CC-Link IE Field Network diagnostics, refer to the following.

☞ Page 275 Checking the Network Status

Output of a device station

When the control is switched between the master station and the submaster station, the output of a device station is held.

Safety communication function (when the Safety CPU is used)

When the submaster function is used, the safety communication function cannot be used in a system using the safety CPU.

Safety communication function (when the SIL2 Process CPU is used)

When the submaster function is used, the safety communication function can be used only when the system uses the SIL2 Process CPU and the master station is redundant.

CC-Link IE Field Network diagnostics

Connecting the master operating station to the engineering tool allows that the status of the entire network can be checked. If the status of the device station or submaster station cannot be checked due to a cable disconnection and other reasons, directly connect the device station or submaster station to the engineering tool that supports these stations.

Temporary error invalid station setting in the submaster station

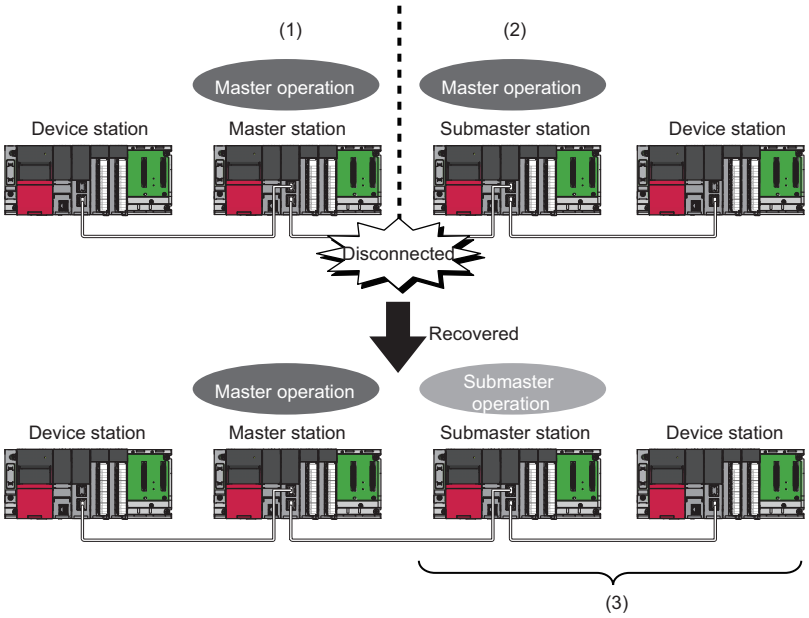
Do not set the temporary error invalid station setting in the submaster station operating as a master operating station. The setting is ignored.

Return of the master station with the submaster station being disconnected

Even if "Return as Sub-master Operation Station" is selected in "Operation of Master Station after Reconnection" under "Basic Settings", the master station returns as a master operating station.

When the redundant configuration splits into two systems due to cable disconnection

If disconnection occurs as follows, the submaster station operates as a master operating station.
When disconnection is solved (the systems are joined into one system), the system of the submaster station is absorbed into that of the master station. Continuity of output data is not guaranteed in the device station on the submaster station side.



(1) System of the master station
(2) System of the submaster station
(3) The master station starts to take in control.

Access to the specified master station and submaster station

Access to the specified master station and submaster station cannot be performed using the engineering tool or dedicated instructions in the following modules:

- A master/local module that does not support the submaster function
- A device station that does not support access specifying the master station and submaster station

Precautions when the control is switched

■During a parameter error

While a parameter error is occurring in the master station or submaster station, the submaster station does not change to the master operating station even if the master station is disconnected. (Data link cannot be performed because all the stations become faulty.)

■During a CPU module stop error in the master station

While a CPU module stop error is occurring in the master station, the submaster station does not operate as a master operating station even if the submaster station is connected. (Data link is not started.)

■If a submaster station starts to operate as a master operating station while cyclic transmission is stopped

If a submaster station starts to operate as a master operating station after cyclic transmission is stopped in the master station (during master operation), data link with the master station cannot be restarted in the submaster station. Restart data link in the master station.

■Transfer of the items set in the submaster station operating as a master operating station

The following items set in the submaster station operating as a master station are not transferred to the returned master station.

- Data link start/stop
- Temporary error invalid station setting/canceling
- Temporary cancel/enabling of the reserved station

1.6 Redundant System Function

The redundant system function improves system reliability by making the RJ71GF11-T2 or the remote head module redundant so that the new control system can continue data link even if an error occurs in the control system.

Restriction

The following modules are required to use the redundant system function in the Process CPU.

- Process CPU
- Redundant function module
- The RJ71GF11-T2 with a firmware version of "12" or later

The following modules are required to use the redundant system function in the SIL2 Process CPU.

- SIL2 Process CPU
- SIL2 function module
- Redundant function module
- RJ71GF11-T2 with a firmware version of "25" or later

When using a redundant system, check the versions of the Process CPU and the engineering tool. (MELSEC iQ-R CPU Module User's Manual (Application))

When using the safety communication function in the SIL2 Process CPU, refer to the chapter explaining the safety communication function in this manual. (☞ Page 123 System using the SIL2 Process CPU)

System configuration

This section describes the configuration of a redundant system on CC-Link IE Field Network.

A redundant system on CC-Link IE Field Network is configured as below.

System configuration	Description	Reference
Redundant master station	The master station is configured in a redundant system.	☞ Page 86 Redundant master station
Redundant device station	The device station is configured in a redundant system.	☞ Page 88 Redundant device station
Redundant line	Each of the control system and standby system is configured on a different network to make the network redundant line.	☞ Page 89 Redundant line

There are no network topology restrictions even when a redundant system is configured. However, configuring a redundant system using ring topology is recommended, because if a cable disconnection occurs or a faulty station occurs in a system other than the redundant system, system switching can be avoided by the loopback function.

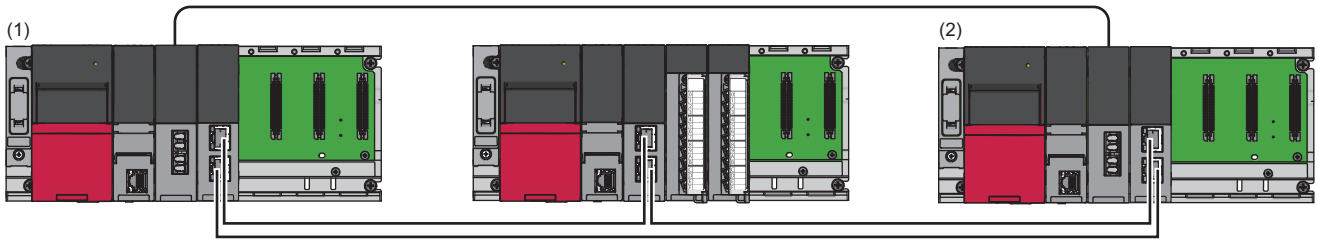
Restriction

When a system including the redundant system is configured using CC-Link IE Field Network, modules such as the MELSEC-Q/L series modules can be mixed in the system; however, the following restrictions apply.

- Use the MELSEC iQ-R series master station.
- For the master and local stations of the MELSEC iQ-R series, use master/local modules with firmware version "12" or later.
- For the local stations of the MELSEC-Q/L series, use modules with a serial number (first five digits) of "18042" or later.
- MELSEC-QS series local stations cannot be mixed in the system.
- When connecting the GOT or CC-Link IE Field Network interface board, refer to the manual for the product used.

Redundant master station

For the redundant master station, the master station (1) and the submaster station (2) are connected with a tracking cable. When an error occurs in the control system master station, the control is switched to the standby system submaster station to control the device stations and continue data link.



■Setting method

When using the module in a redundant master station configuration, select "RJ71GF11-T2 (MR)" for the module model name in the "Add New Module" window.

Set the station number of the standby system submaster station in "Network Configuration Settings" under "Basic settings." Station numbers of both systems do not need to be set consecutively.

Point

In a redundant system, since send data in the send range are transferred to the standby system (submaster station) via tracking, the same send data as those for the control system (master station) do not need to be set to the standby system (submaster station).

■Network configuration change

Only when "Program" is set for "Parameter Setting Method" in "Required Settings" in the master station, a device station can be added without stopping the redundant system by using the CCPASETR instruction. (Execute the CCPASETR instruction only on the control system, instead of both systems.)

Operating procedure

1. Write a program in which the setting data of the CCPASETR instruction has been changed to the CPU modules of both systems.
2. Turn on 'Device station addition start flag' (SB0014) of the master station.
3. Check that 'Device station addition acceptance status' (SB0081) of the master station is turned on.
4. Connect the device station to be added.
5. Power on the device station.
6. Set the parameters of the device station.

For details on how to set the parameters, refer to the manual for the device station used.

7. Execute the program on the master station to set the parameters.
8. Check that the CCPASETR instruction was completed successfully.
9. Turn off 'Device station addition start flag' (SB0014) of the master station.
10. Check with CC-Link IE Field Network diagnostics that the network is configured according to the set parameters.

Point

- If the CCPASETR instruction was completed with an error in step 8, perform troubleshooting according to the error code, then review and correct the setting data and perform the operation from step 7. (MELSEC iQ-R Programming Manual (Module Dedicated Instructions))
- If the network is not configured according to the parameters set in step 10, either perform the operation from step 4 again, or review and correct the setting data and perform the operation from step 1.
- If a moderate error or major error occurs, perform troubleshooting, reset the CPU module, and perform the operation from step 1 again. (Page 267 TROUBLESHOOTING)

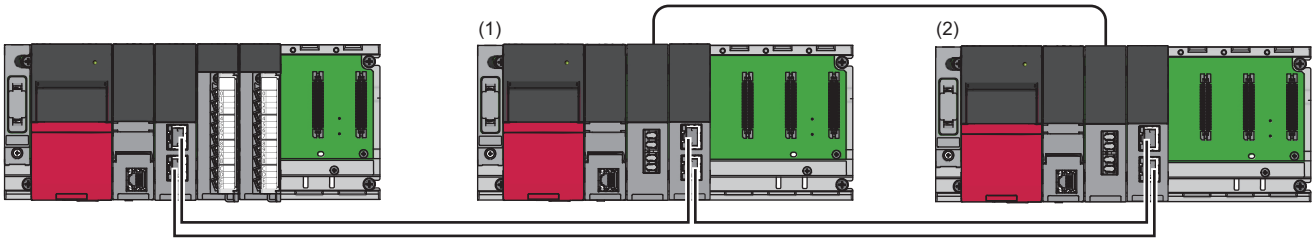
Precautions

- Build and operate the system by taking data link stop time into account. (☞ Page 437 Data link stop time when changing parameters)
- When a device station is added while 'Device station addition acceptance status' (SB0081) is turned off, a system switching cause occurs due to disconnection at the time of addition.
- For precautions on online changes, refer to the following.

📖 MELSEC iQ-R CPU Module User's Manual (Application)

Redundant device station

For the redundant device station, the device station is made redundant and connected to one network line. When an error occurs in the control system device station (1), the control is switched to the standby system device station (2) to control the device station side and continue data link.



Point

Remote head modules can be also used as device stations. For the remote head module redundant device station, refer to the following.

MELSEC iQ-R CC-Link IE Field Network Remote Head Module User's Manual (Application)

■Setting method

When using the module in a redundant device station configuration, select the following models in the project of each station. The system A and system B station numbers of the device station to be made redundant are set as consecutive station numbers.

Project	Setting items	Station Type	Model
Master station project	"Network Configuration Settings" in "Basic Settings"	Local station	RJ71GF11-T2(SR)
		Intelligent device station	RJ72GF15-T2(SR)
Device station project	"Add New Module" window	Local station	RJ71GF11-T2(SR)
	"New" window in the project	Intelligent device station	RJ72GF15-T2(SR)

By setting the above models in "Network Configuration Settings" under "Basic Settings" for the master station, both systems are set for pairing and their send ranges becomes the same.

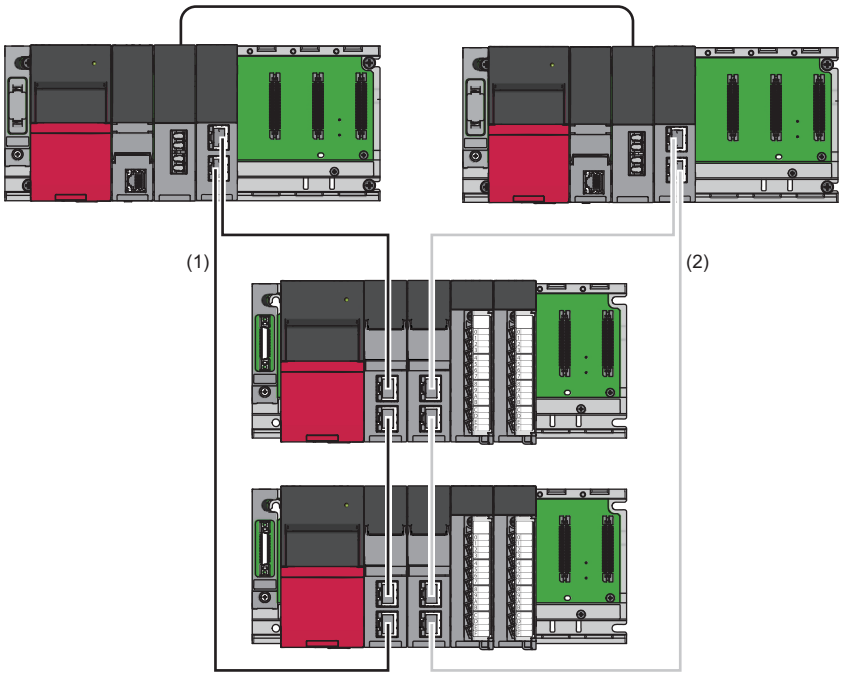
Redundant line

In redundant line configuration, two network lines are prepared and a device station (remote head module) is connected to each network line. (The RJ71GF11-T2 of both systems operate as a master station of each network.)

Restriction

For device stations, only remote head modules configured as a redundant system can be used.

When an error occurs in the control system network (1), the control is switched to the standby system network (2) to control the redundant system and continue data link.
Ensure that the configuration of the network of both systems is the same.



Point

It is recommended that the network topology and Ethernet port for connecting an Ethernet cable be made the same. Also, visually check the actual network configuration for the network configuration of both systems. The CC-Link IE Field Network diagnostics may display a configuration different from the actual system configuration.

■Setting method

When using the module in a redundant line configuration, select the following module names in the project of each station.

Project	Setting items	Station Type	Module Name
Master station project	"Add New Module" window	Master station	RJ71GF11-T2(LR)
	"Network Configuration Settings" in "Basic Settings"	Intelligent device station	RJ72GF15-T2(LR)
Device station project	"New" window in the project	Intelligent device station	RJ72GF15-T2(LR)

■Network configuration change

Only when "Program" is set for "Parameter Setting Method" in "Required Settings" in the master station, a device station can be added without stopping the redundant system by using the CCPASETR instruction. (Execute the CCPASETR instruction on both stations.)

Operating procedure

1. Write a program in which the setting data of the CCPASETR instruction has been changed to the CPU modules of both systems.
2. Turn on 'Device station addition start flag' (SB0014) of the control system.
3. Check that 'Device station addition acceptance status' (SB0081) of the control system is turned on.
4. Turn on 'Device station addition start flag' (SB0014) of the standby system.
5. Check that 'Device station addition acceptance status' (SB0081) of the standby system is turned on.
6. Connect the device station to be added.
7. Power on the device station.
8. Set the parameters of the device station.
9. Change the operation mode of the master station to separate mode.

📖 MELSEC iQ-R CPU Module User's Manual (Application)

10. Execute the program on the standby system master station to set the parameters.
11. Check that the CCPASETR instruction was completed successfully.
12. Check with CC-Link IE Field Network diagnostics that the network is configured according to the set parameters.
13. Perform system switching for the master station.
14. Execute the program on the standby system master station to set the parameters.
15. Check that the CCPASETR instruction was completed successfully.
16. Perform system switching for the master station.
17. Change the operation mode of the master station to backup mode.
18. Turn off 'Device station addition start flag' (SB0014) of the standby system.
19. Turn off 'Device station addition start flag' (SB0014) of the control system.
20. Check with CC-Link IE Field Network diagnostics that the network is configured according to the set parameters.

Point

- If the CCPASETR instruction was completed with an error in step 11 or 15, perform troubleshooting according to the error code, then review and correct the setting data and perform the operation from step 10. (📖 MELSEC iQ-R Programming Manual (Module Dedicated Instructions))
- If the network is not configured according to the parameters set in step 12 or 20, either perform the operation from step 6 again, or review and correct the setting data and perform the operation from step 1.
- If a moderate error or major error occurs, perform troubleshooting, reset the CPU module, and perform the operation from step 1 again. (☞ Page 267 TROUBLESHOOTING)

Precautions

- Build and operate the system by taking data link stop time into account. (☞ Page 437 Data link stop time when changing parameters)
- When adding a device station in a redundant line configuration, if different setting data for the CCPASETR instruction is written to the two systems, or if the CCPASETR instruction is executed only in one system while the operation mode is separate mode, the network configurations of both systems become different from each other, but an error is not detected. Check that the network configurations of both systems are the same, and change the operation mode to backup mode.
- When a device station is added while 'Device station addition acceptance status' (SB0081) is turned off, a system switching cause occurs due to disconnection at the time of addition.
- For precautions on online changes, refer to the following.

📖 MELSEC iQ-R CPU Module User's Manual (Application)

System switching operation

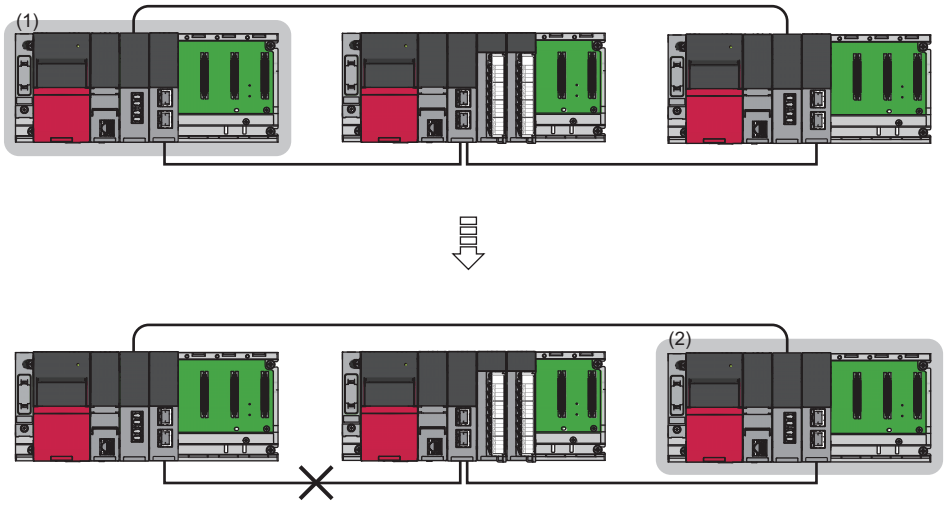
In a redundant system, if the control system fails, the control system and the standby system are switched.
In CC-Link IE Field Network, send data is transferred to the new control system after system switching to continue data link.
This section describes system switching operations for each system.

Point

While the control is switched to a station or network of the new control system, the cyclic data output is held.
For cyclic data holding time (output holding time) when system switching occurs, refer to the following.
☞ Page 410 Cyclic data holding time when system switching occurs

Redundant master station

When an error occurs in the control system, system switching occurs in the redundant system.
The master station (1) stops master operation and the submaster station (2) switched to the new control system takes over master operation to continue the control.



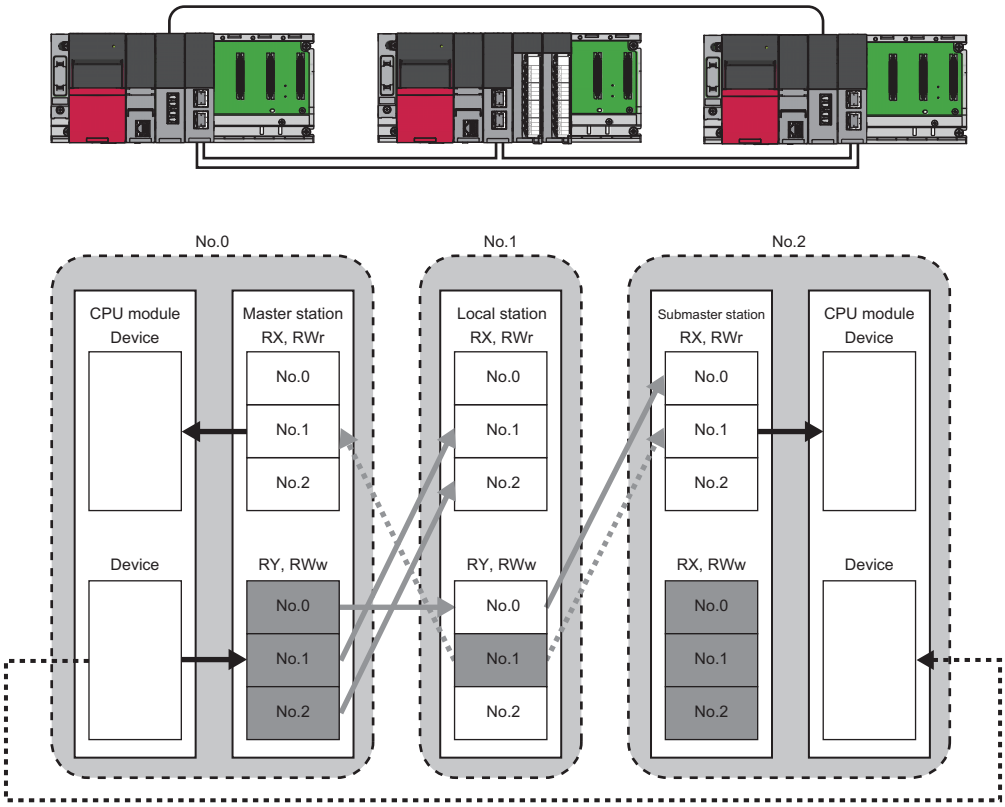
■Cyclic transmission send/receive processing

The RJ71GF11-T2 maintains cyclic transmission by the transfer of send data to the new control system when system switching occurs.

The send range of cyclic transmission of both systems is as follows:

- The own station send ranges of the link devices (RY, RWw) of both systems become the same.
- The master operating station operating as the control system sends and receives cyclic data.
- The submaster operating station operating as the standby system only receives cyclic data.

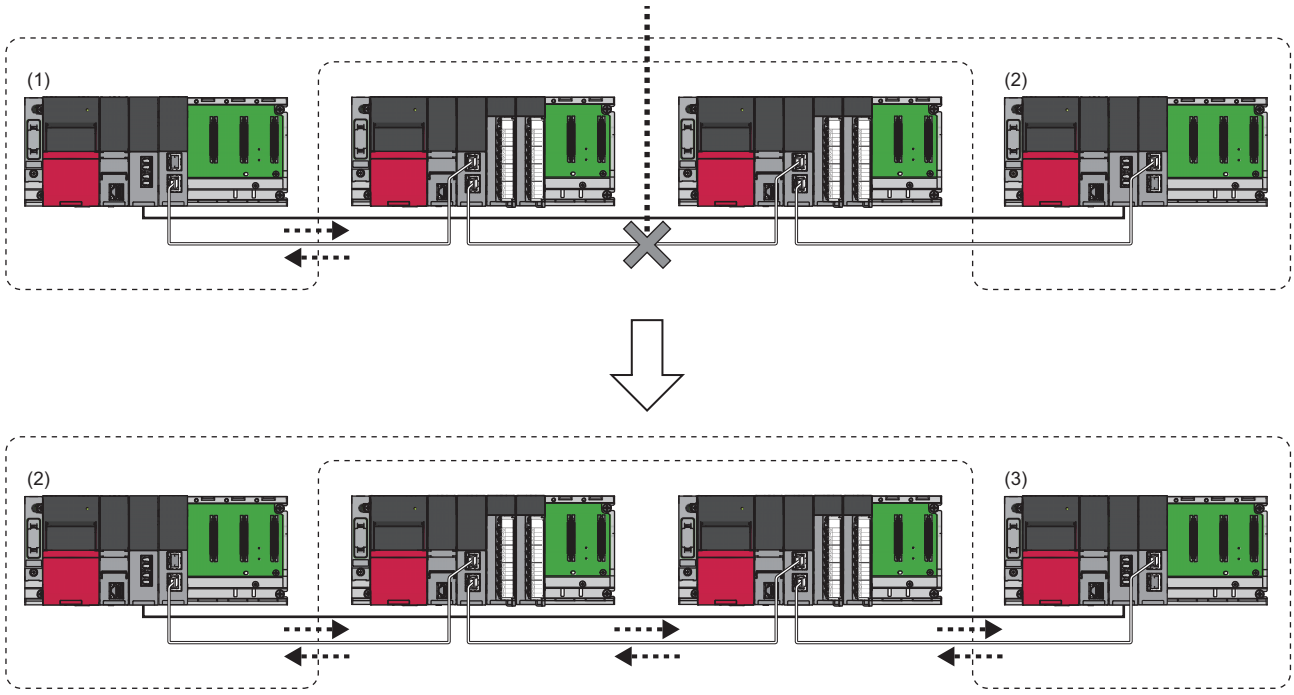
Each number in the figure, from No.0 to No.2, represents a station number.



If system switching occurs due to an error in the master station (station No.0), the cyclic data is sent from the submaster station (station No.2), which starts operating as the new control system.

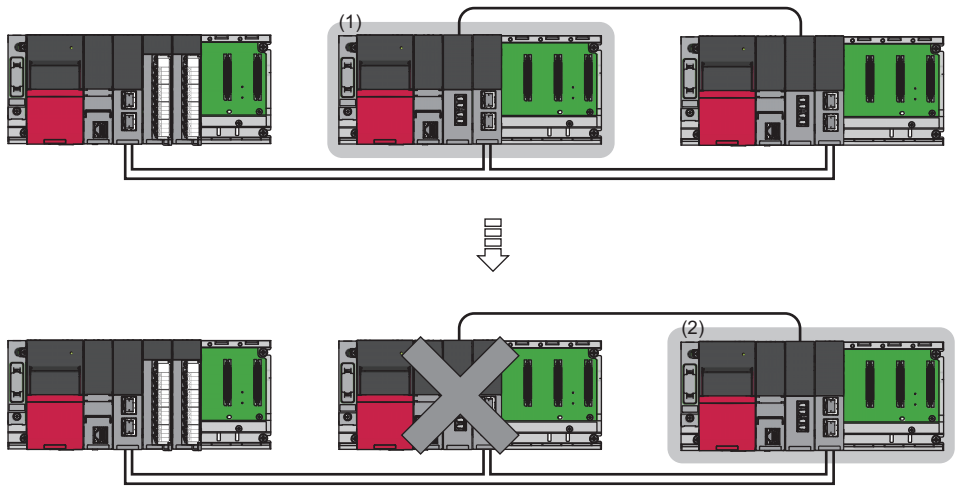
■Precautions

- When using the module in a redundant master station configuration, check the submaster function precautions before use. (☞ Page 82 Precautions)
- Manual switching cannot be performed using 'Forced master switching command' (SB0019) of the submaster function.
- As shown below, if the redundant configuration splits into two systems due to such a problem as cable disconnection between device stations, a continuation error occurs in the standby system CPU module because a network configuration mismatch occurs between the master station (1) and the submaster station. While remaining as the standby system, the submaster station becomes the master operating station (2). However, still being the standby system, it does not send cyclic data. Resolving the disconnection and returning to a single system will cause the submaster station to resume submaster operation (3). When the disconnection is resolved (the systems are combined into one system), all the stations are reconnected to a network. In this case, the system switching may occur depending on the system switching monitoring time set in "Supplementary Cyclic Settings" under "Application Settings". (☞ Page 154 Supplementary Cyclic Settings)



Redundant device station

When an error occurs in the control system, system switching occurs in the redundant system.
The control system device station (1) stops sending data and send data is transferred to the device station (2) that has switched to the new control system to continue data link.
For the system switching operation of the remote head module redundant device station, refer to the following.
📖 MELSEC iQ-R CC-Link IE Field Network Remote Head Module User's Manual (Application)



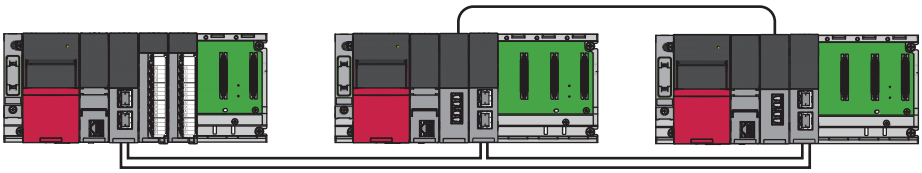
■Cyclic transmission send/receive processing

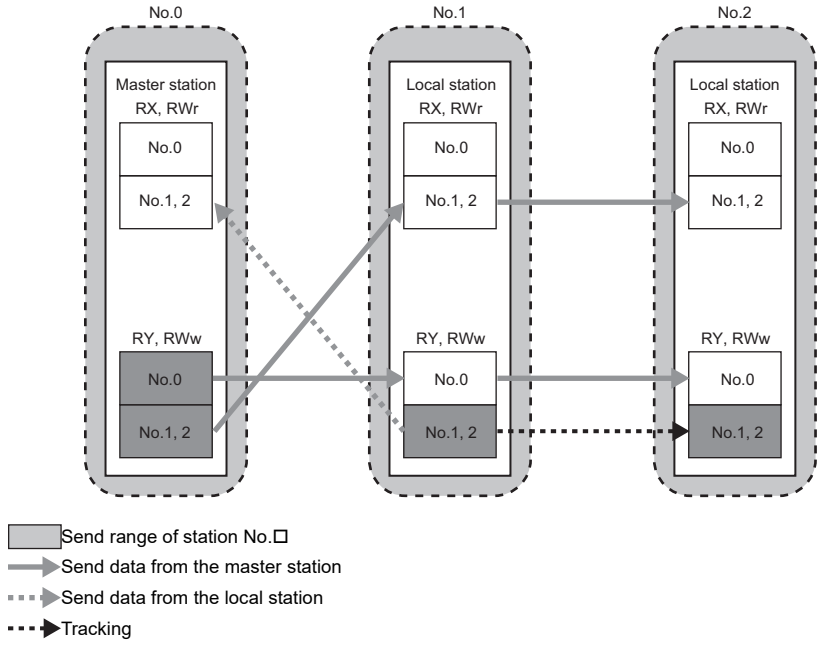
The device station maintains cyclic transmission by the transfer of send data to the new control system when system switching occurs.

The send range of cyclic transmission of both systems is as follows:

- The own station send ranges of the link devices (RY, RWw) of both systems become the same when pairing is set.
- The device station operating as the control system sends and receives cyclic data.
- The device station operating as the standby system only receives cyclic data.

Each number in the figure, from No.0 to No.2, represents a station number.

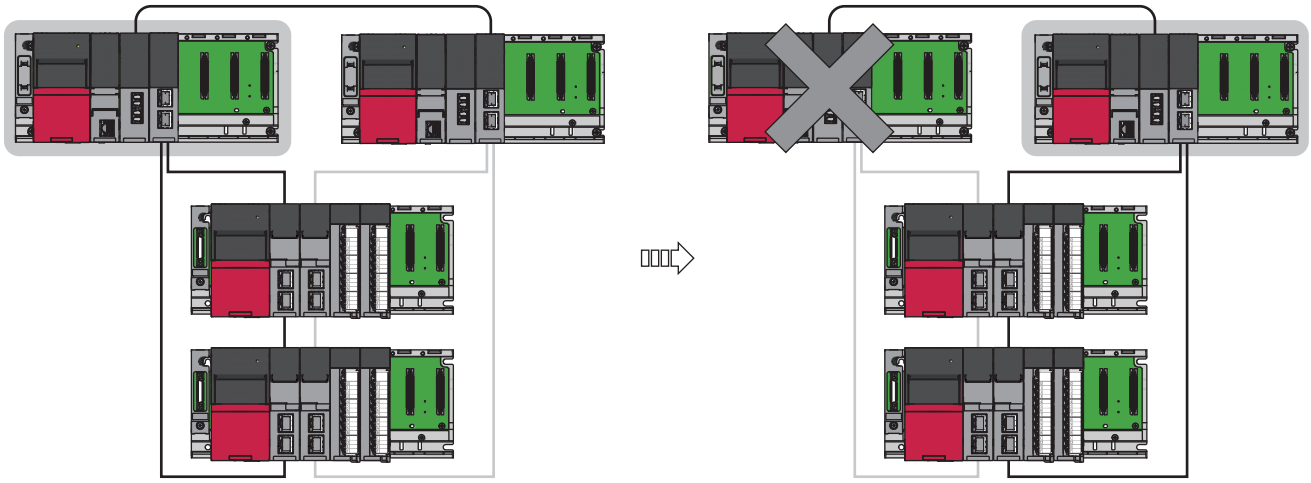




If system switching occurs due to an error in the local station (station No.1), the cyclic data is sent from the local station (station No.2), which starts operating as the new control system.

Redundant line

In redundant line configuration, two network lines are prepared and a device station (remote head module) is connected to each network line. (The RJ71GF11-T2 of both systems operate as a master station of each network.)
When an error occurs in the control system, system switching occurs in the redundant system.
The network switched to the new control system through system switching continues the control.



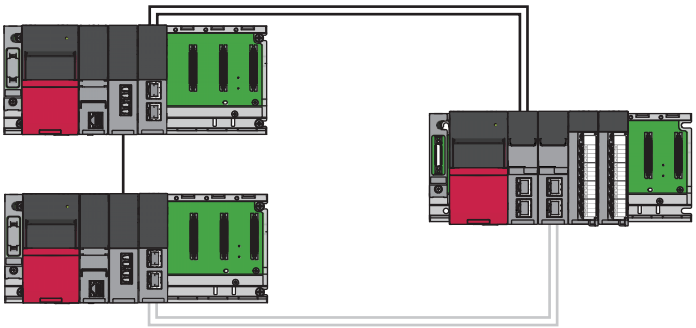
■Cyclic transmission send/receive processing

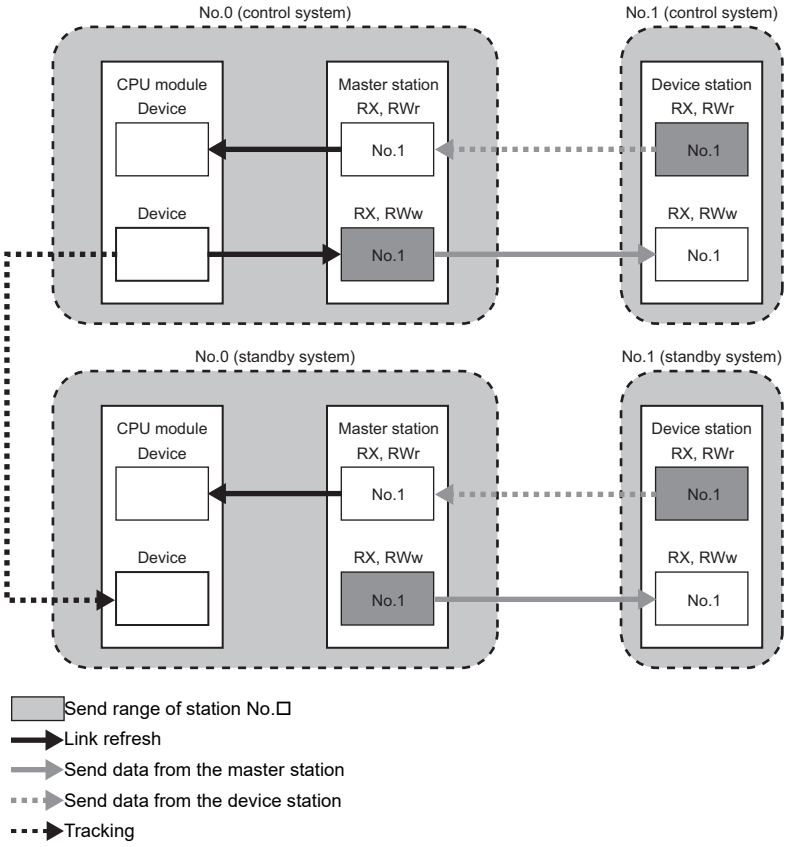
The master and device stations maintain cyclic transmission by the transfer of send data to the new control system when system switching occurs.

The send range of cyclic transmission of both systems is as follows:

- The own station send ranges of the link devices (RY, RWw) of the master stations of both systems become the same.
- The own station send ranges of the link devices (RY, RWw) of the device stations of both systems become the same.
- Networks of both systems send/receive cyclic data independently of each other.

Each number in the figure, from No.0 to No.1, represents a station number.





When system switching occurs due to an error in the control system, the control is switched to the network of the new control system.

Point

Between the networks of both systems, a maximum difference of 1 link scan time occurs in the cyclic transmission delay time.

Precautions

■Tracking

- Of all refresh target devices of link devices (RY, RWw), tracking needs to be set for the devices in the own station send range.
- Tracking cannot be set for link direct devices.
- Do not set tracking for the link special relay areas (SB0020 to SB01FF), which are turned on/off by the system, or the link special register areas (SW0020 to SW01FF), where data is stored by the system.

Point

For details on tracking, refer to the following.

MELSEC iQ-R CPU Module User's Manual (Application)

■Operation after return

When the RJ71GF11-T2 is disconnected due to a communication error, switched from the control system to the standby system through system switching, and returns, system switching does not occur and it returns as the standby system.

■Cyclic transmission

Depending on the error status of the control system CPU module, the cyclic data is not sent from the control system RJ71GF11-T2.

■System status of the device station in a redundant line configuration

Depending on the error status of the control system CPU module, the device station connected to the control system network operates in the standby system.

System switching request to the control system CPU module

When the RJ71GF11-T2 mounted on the control system detects a network error, it issues a system switching request to the control system CPU module.
However, depending on the operating status of the standby system, system switching is not executed.
For details on the operating status of the standby system and whether system switching is executable, refer to the following.
📖 MELSEC iQ-R CPU Module User's Manual (Application)
For the remote head module system switching, refer to the following.
📖 MELSEC iQ-R CC-Link IE Field Network Remote Head Module User's Manual (Application)

System switching cause

This section describes causes that make the RJ71GF11-T2 issue a system switching request.
For details on causes other than a system switching request from the RJ71GF11-T2, refer to the following.
📖 MELSEC iQ-R CPU Module User's Manual (Application)

■Moderate/major error and hardware failure

When detecting an error where the RJ71GF11-T2 cannot continue the processing, the RJ71GF11-T2 notifies the control system CPU module about the error and issues a system switching request.

■Data link error

If the data link error status continues for the system switching monitoring time set in "Supplementary Cyclic Settings" under "Application Settings" or longer, a system switching request is issued to the control system CPU module.

Point

In the following cases, a switching request will not be issued to the control system CPU module.

- When cyclic transmission is stopped by link start/stop in the CC-Link IE Field Network diagnostics (This also applies to cases in which cyclic transmission is stopped by SB or SW.)
- When the network map is updated using the [Update] button in the CC-Link IE Field Network diagnostics (☞ Page 283 Diagnostics window)
- When 'Device station addition acceptance status' (SB0081) is turned on in a redundant master station (excluding the cases of master station only and when a redundant line has a network module moderate error, major error, or hardware failure)

If a data link error occurs due to disconnection or breakage of the Ethernet cable or other causes when the master/local module is powered on or is reset, issuance of system switching request differs depending on the redundant system configuration.

- Redundant master station, redundant line: A system switching request is issued to the control system CPU module about 30 seconds after the control system and standby system of a redundant system are determined.
- Redundant device station: A switching request is not issued to the control system CPU module.

■Communication error with the system switching monitoring target station

If the communication error with the system switching monitoring target station continues for the system switching monitoring time set in "Supplementary Cyclic Settings" under "Application Settings" or longer, a system switching request is issued to the control system CPU module. (☞ Page 101 System switching monitoring target station)

Point

When the master/local module is powered on or is reset, even if the communication error with the system switching monitoring target station continues for the system switching monitoring time or longer a system switching request is not issued to the control system CPU module until communications with the system switching monitoring target station go back to normal.

■Device station error (redundant line only)

In a redundant line configuration, if an error in the device station continues for the system switching monitoring time set in "Supplementary Cyclic Settings" under "Application Settings" or longer, a system switching request is issued to the control system CPU module.

When a moderate or major error occurs or hardware failure occurs in the device station, a system switching request is issued to the control system CPU module regardless of the system switching monitoring time.

Point

When the master/local module is powered on or is reset, even if the communication error with the system switching monitoring target station continues for the system switching monitoring time or longer a system switching request is not issued to the control system CPU module until each device station goes back to normal.

System switching monitoring target station

When a system switching monitoring target station is set, if the RJ71GF11-T2 mounted on the control system detects a communication error with the monitored device station, a system switching request can be issued to the control system CPU module.

This allows communication with the system switching target station to be prioritized and continued.

A system switching monitoring target station is set when a network configuration is set as a line topology or a mixture of star and line topologies, where multiple device stations are connected, and when it is desired to give priority to continuation of communication for some device station.

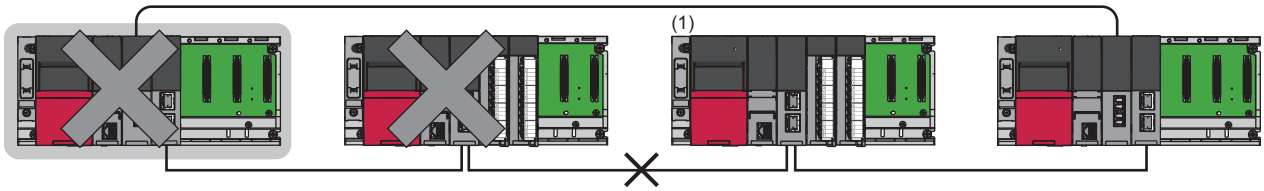
Point

A system switching monitoring target station is set in the master station module parameters. It can only be set when the module model name of the master station is "RJ71GF11-T2 (MR)".

■When a system switching monitoring target station is set

A system switching request is issued because communications between the master station and the system switching monitoring target station (1) cannot be maintained due to disconnection.

Communications with the system switching monitoring target station are continued by the submaster station operating as the new control system.



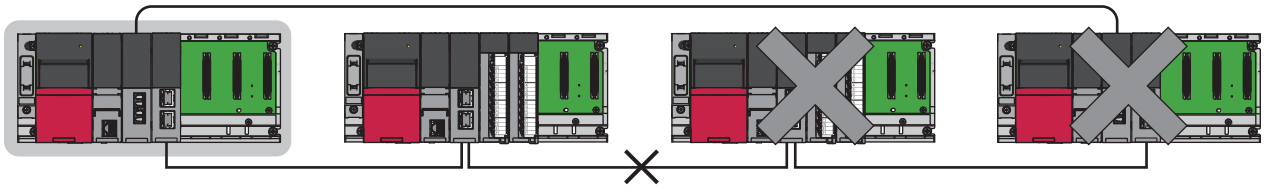
Control system

Point

When the own station data link status shows an error ('Data link error status of own station' (SB0049) is on), a system switching request is issued against a data link error regardless of the status of the system switching monitoring target station.

■When a system switching monitoring target station is not set

A system switching request is only issued when the own station data link status shows an error ('Data link error status of own station' (SB0049) is on). When one of the device stations can be communicated with, a system switching request is not issued because the own station data link status does not show an error.



Control system

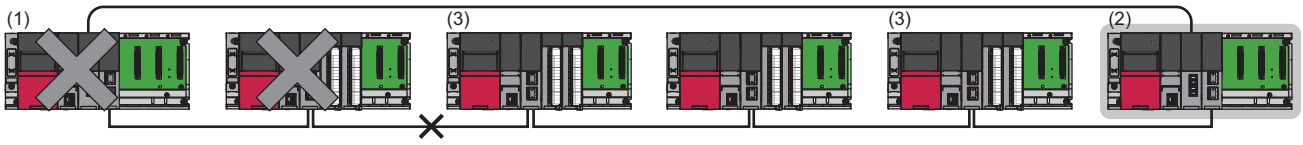
■Setting method

Set the system switching monitoring target station in "Network Configuration Settings" under "Basic Settings." (☞ Page 141 Network Configuration Settings)

The setting status of the system switching monitoring target station can be checked in 'Setting status of system switching monitoring target station' (Un\G24496 to Un\G24503).

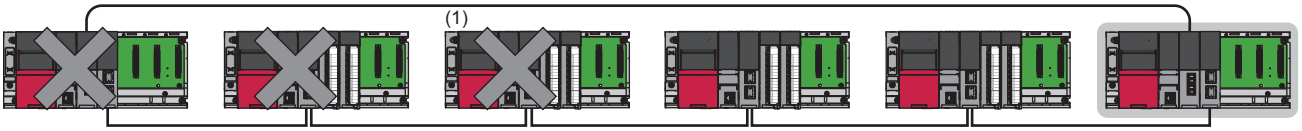
■Precautions

- When it is desired to give priority to continuation of communication for multiple device stations, set two device stations connected most closely to the master station (1) and the submaster station (2) as system switching monitoring target stations (3). In this case, when an error is detected in communication with both system switching monitoring target stations, a system switching request is issued to the control system CPU module.



Control system

- When the control system can communicate with either of the system switching monitoring target stations, a system switching request is not issued.
- When there is an error in the system switching monitoring target station (1), even after system switching, communication with the system switching monitoring target station is not possible.

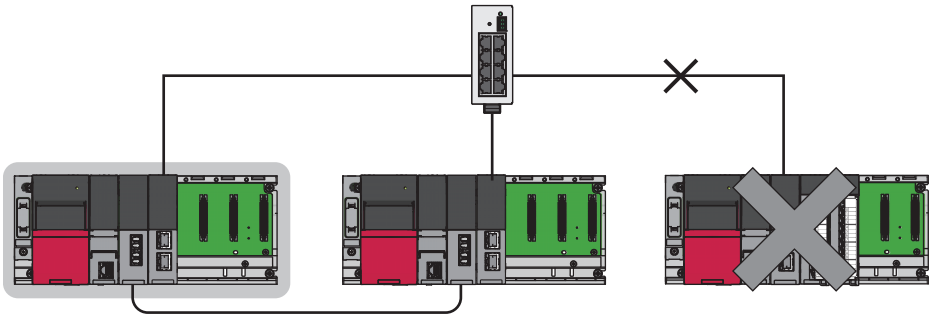


Control system

Wiring precautions

For a configuration including a star topology

- When disconnection occurs between the control system of the redundant system and the switching hub, communications can be continued by system switching. However, if disconnection occurs between the switching hub and the system switching monitoring target station, because communications with the system switching monitoring target station cannot be continued, a communication error occurs in the standby system and system switching does not occur.

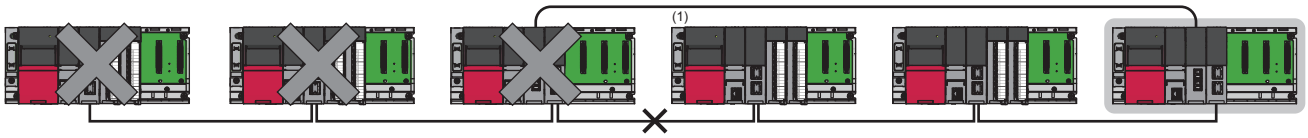


Control system

- When a star topology is configured in a redundant line configuration, the control system network and the standby system network cannot be connected to the same switching hub.

For a configuration including a line topology

Connect both systems in the redundant system so that they are at both ends. When the control system in the redundant system is connected in the middle, if a communication error occurs in the control system and the system switching monitoring target station (1), the new standby system station after system switching and the stations positioned after the new standby system station will be disconnected.



Control system

Functions restricted in a redundant system

The following table lists the functions restricted when the RJ71GF11-T2 is used in a redundant system.

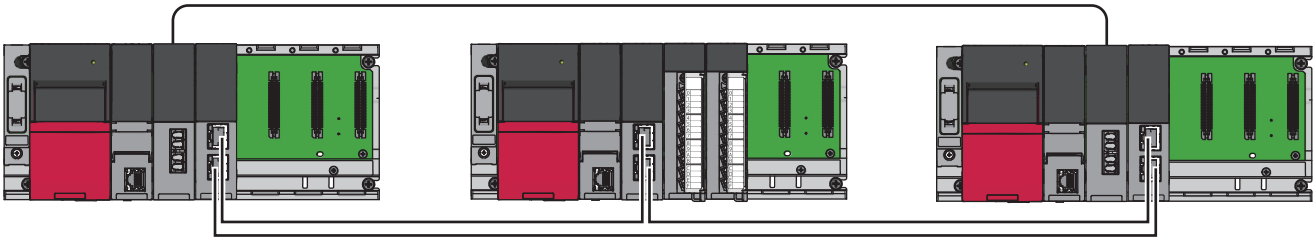
FUNCTIONS		Restrictions
Transient transmission		• To perform the transient transmission specifying the control system or standby system, acquire the current target station address (address of the control system or standby system) by using the module FB (RedundantSystem_GetAddress) and access the acquired address. (📖 MELSEC iQ-R Ethernet, CC-Link IE, and MELSECNET/H Function Block Reference) • Precautions exist for communications with different networks when the networks contain a redundant system. (☞ Page 42 When the networks contain a redundant system) • When dynamic routing is being used in a redundant line configuration, since the destinations of transient transmission with different networks are all restricted to stations on control system networks, communications with standby system networks are not possible. • Precautions exist for when the dedicated instructions are used to a redundant system. (☞ Page 394 Precautions for dedicated instructions (when used in a redundant system))
IP packet transfer function		■IP address setting of the Ethernet-equipped module Use the IP address of the control system to maintain communications when system switching occurs. (📖 MELSEC iQ-R Ethernet User's Manual (Application)) ■Communications at the time of system switching When system switching occurs in a redundant system on a communication path, communications may be interrupted or data may be lost. Also, communications may be disabled during system switching. If an error occurs in communications, resend data from the request source. ■When the Ethernet-equipped module to be connected to an Ethernet device is redundant • Execute this function via the control system when using the dynamic routing. An error occurs if transfer operation is executed via the standby system. Set "Routing Setting" of "CPU Parameter" when executing this function via the standby system. • Set "Routing Setting" of "CPU Parameter" when executing this function even when stop errors exist in the CPU modules of both systems.
Safety communication function	When the Process CPU is used	■For a redundant master station The safety communication function cannot be used. ■For a redundant device station Safety communications cannot be used for a redundant system station. Safety communications can be used for safety stations other than the redundant system. ■For redundant line The safety communication function cannot be used.
	When the SIL2 Process CPU is used	■For a redundant device station Safety communications cannot be used for a redundant system station. When using the safety communication function in the SIL2 Process CPU, refer to the following. (☞ Page 123 System using the SIL2 Process CPU)
CC-Link IE Field Network synchronous communication function		■For a redundant master station CC-Link IE Field Network synchronous communication cannot be used. ■For a redundant device station CC-Link IE Field Network synchronous communication cannot be used for redundant system stations. CC-Link IE Field Network synchronous communication can be used for stations other than the redundant system. ■For redundant line CC-Link IE Field Network synchronous communication cannot be used.
Remote device test		The value output from the remote device test is not held when system switching occurs in the redundant system.

Setting examples

Redundant master station

The following explains the settings for the master station when used in a redundant master station configuration.

■System configuration example



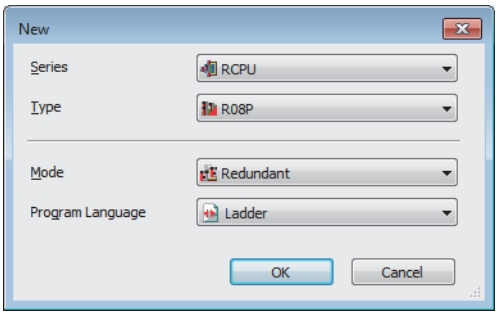
■Setting in the master station

Connect the engineering tool to the CPU module on the control system and set the parameters.

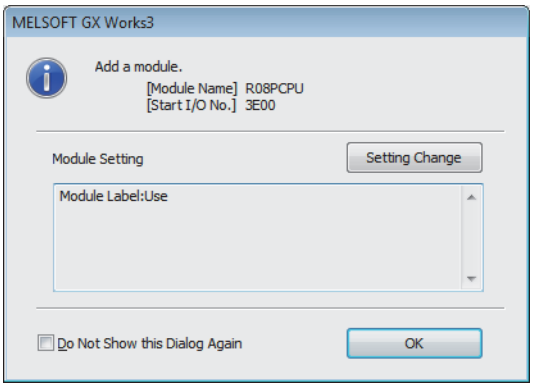
In a redundant system, the same program and parameter are written to both systems. A new project does not need to be created for the standby system.

1. Set the CPU module as follows.

[Project] ⇨ [New]



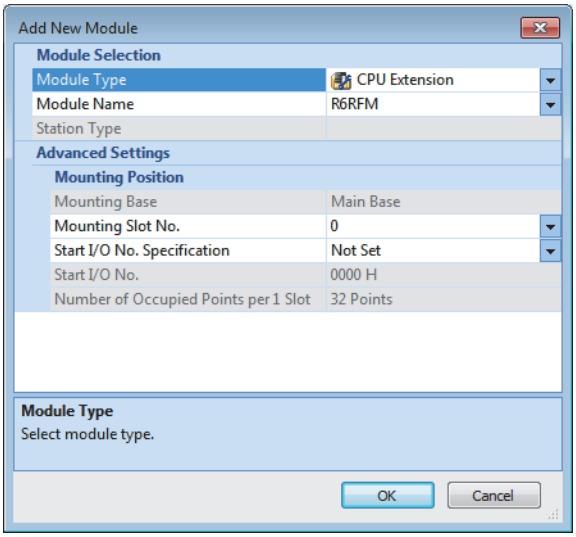
2. Click the [Setting Change] button in the following window and set the item to use module labels.



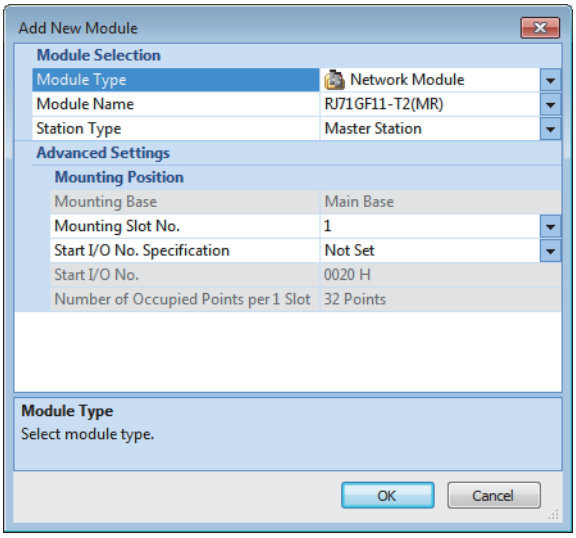
3. Click the [OK] button to add the module labels of the CPU module.

4. In the I/O assignment setting, set the redundant function module for slot No.0.

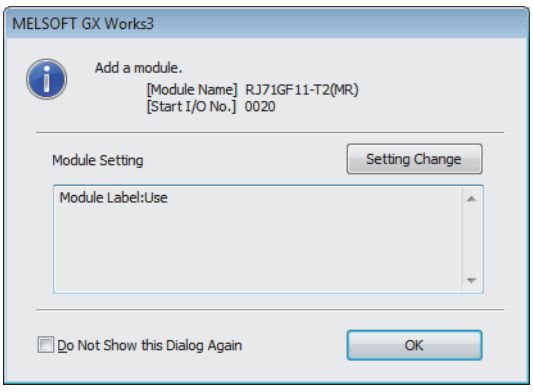
[Navigation window] ⇨ [Parameter] ⇨ [System Parameter] ⇨ [I/O Assignment] tab ⇨ [I/O Assignment Setting]



5. Set the RJ71GF11-T2 for slot No.1.



6. Click the [OK] button to add a module label of the RJ71GF11-T2.

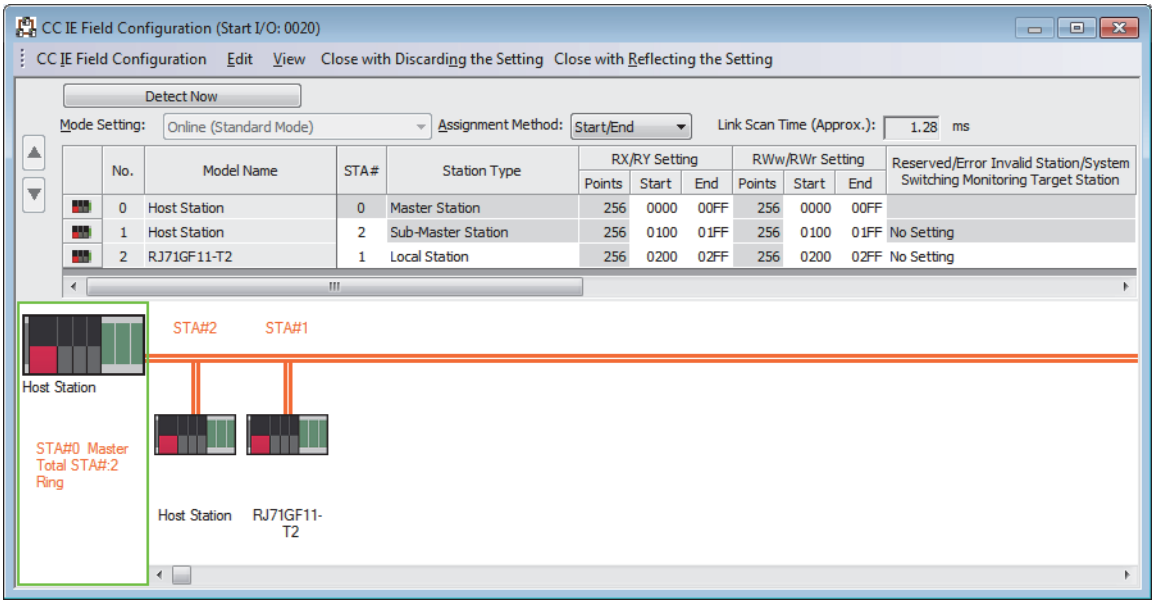


7. Set the network topology in the following item.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2(MR)] ⇨ [Basic Settings] ⇨ [Network Topology]

8. Set the network configuration as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2(MR)] ⇨ [Basic Settings] ⇨ [Network Configuration Settings]



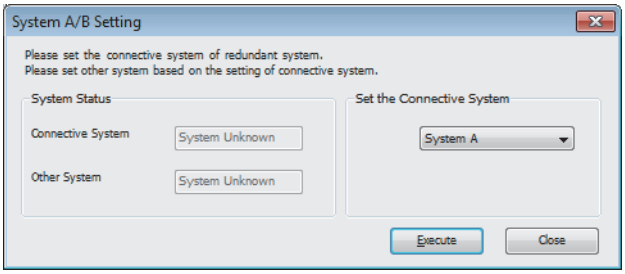
9. Set the refresh settings as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2(MR)] ⇨ [Basic Settings] ⇨ [Refresh Settings]

No.	Link Side					CPU Side				
	Device Name	Points	Start	End		Target	Device Name	Points	Start	End
-	SB	512	00000	001FF		Module Label				
-	SW	512	00000	001FF		Module Label				
1	RX	768	00000	002FF		Specify Device	X	768	01000	012FF
2	RY	768	00000	002FF		Specify Device	Y	768	01000	012FF
3	RWr	768	00000	002FF		Specify Device	W	768	01000	012FF
4	RWw	768	00000	002FF		Specify Device	W	768	00000	002FF
5										

10. Set the redundant function module of the own system as the system A in the "System A/B Setting" window, and reset the CPU modules of both systems or power off and on the both systems.

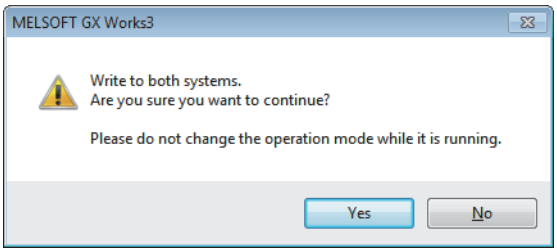
[Online] ⇨ [Redundant PLC Operation] ⇨ [System A/B Setting]



11. Write the set parameters to the system A CPU module.

[Online] ⇨ [Write to PLC]

12. Click the [Yes] button to write to the CPU modules of both systems.



13. Either reset the CPU modules of both systems or power off and on both systems.

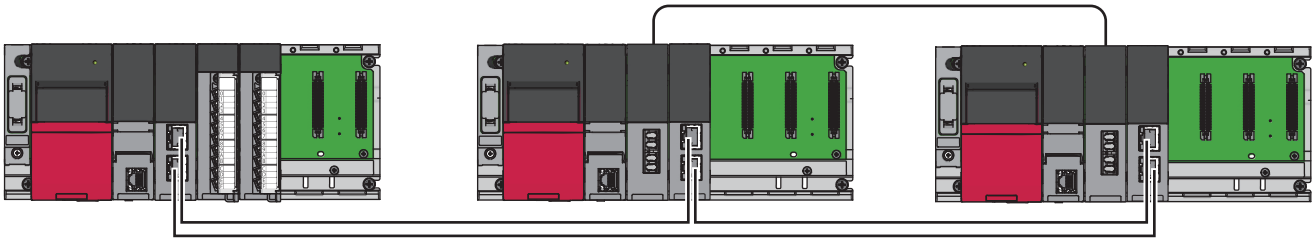
Point

In this setting example, default settings are used for the parameters other than those described. For the parameter setting, refer to the chapter explaining the parameters in this manual. (☞ Page 137 PARAMETER SETTINGS)

Redundant device station (redundant local station)

The following explains the settings for the local station when used in a redundant system configuration.

■System configuration example

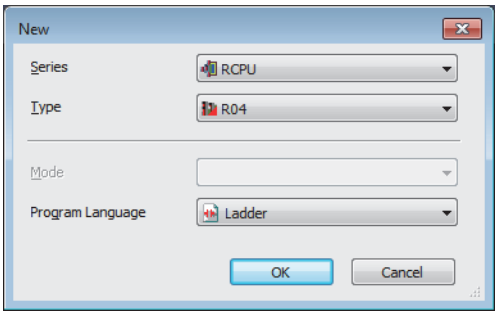


■Setting in the master station

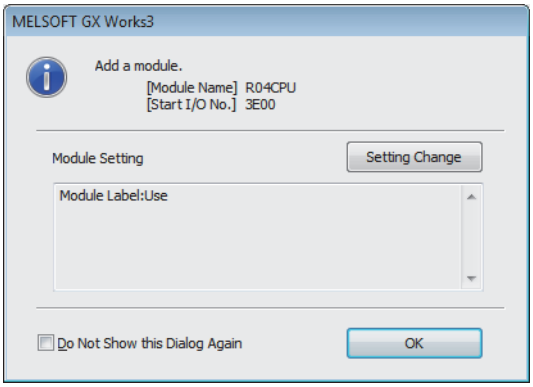
Connect the engineering tool to the CPU module of the master station and set parameters.

1. Set the CPU module as follows.

[Project] ⇨ [New]



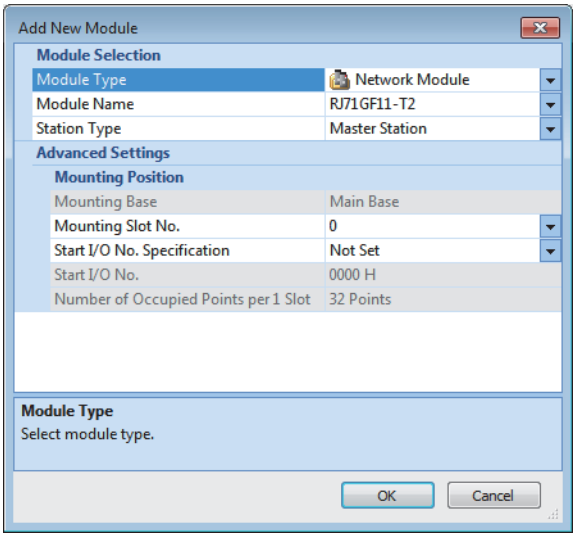
2. Click the [Setting Change] button in the following window and set the item to use module labels.



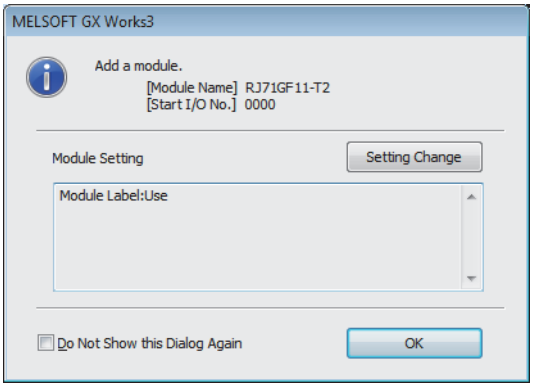
3. Click the [OK] button to add the module labels of the CPU module.

4. In the I/O assignment setting, set the RJ71GF11-T2 for slot No.0.

[Navigation window] ⇨ [Parameter] ⇨ [System Parameter] ⇨ [I/O Assignment] tab ⇨ [I/O Assignment Setting]



5. Click the [OK] button to add a module label of the RJ71GF11-T2.

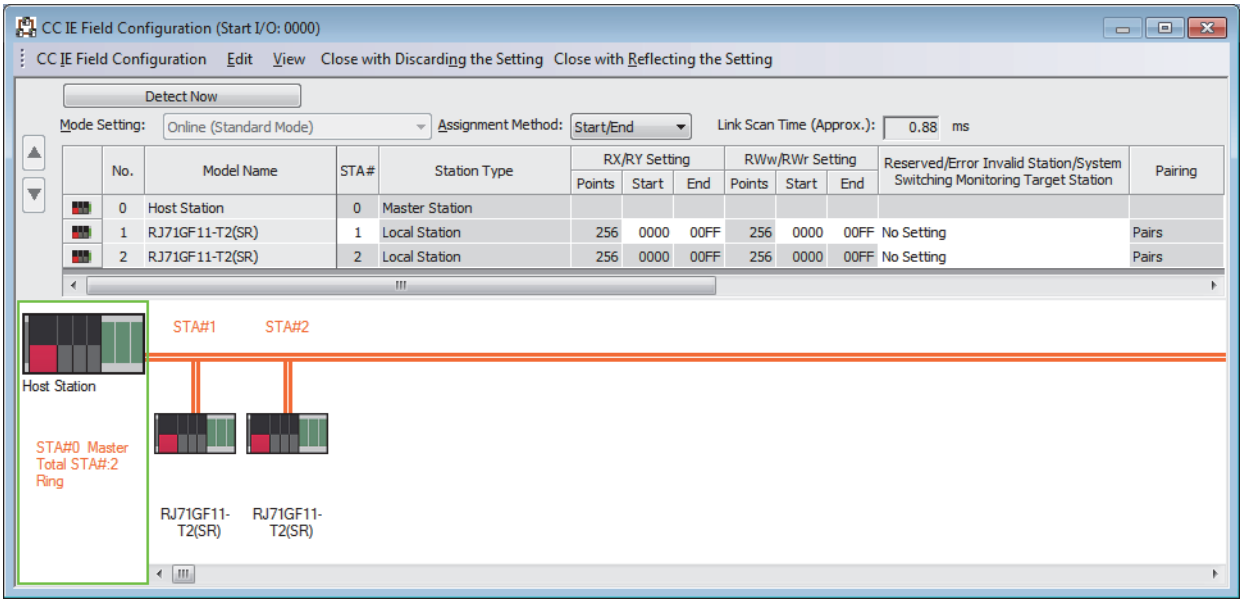


6. Set the network topology in the following item.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2] ⇨ [Basic Settings] ⇨ [Network Topology]

7. Set the network configuration as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2] ⇨ [Basic Settings] ⇨ [Network Configuration Settings]



8. Set the refresh settings as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2] ⇨ [Basic Settings] ⇨ [Refresh Settings]

No.	Link Side					CPU Side				
	Device Name	Points	Start	End		Target	Device Name	Points	Start	End
-	SB	512	00000	001FF		Module Label				
-	SW	512	00000	001FF		Module Label				
1	RX	256	00000	000FF		Specify Device	X	256	01000	010FF
2	RY	256	00000	000FF		Specify Device	Y	256	01000	010FF
3	RWr	256	00000	000FF		Specify Device	W	256	01000	010FF
4	RWw	256	00000	000FF		Specify Device	W	256	00000	000FF
5										

9. Write the set parameters to the CPU module on the master station. Then reset the CPU module or power off and on the system.

[Online] ⇨ [Write to PLC]

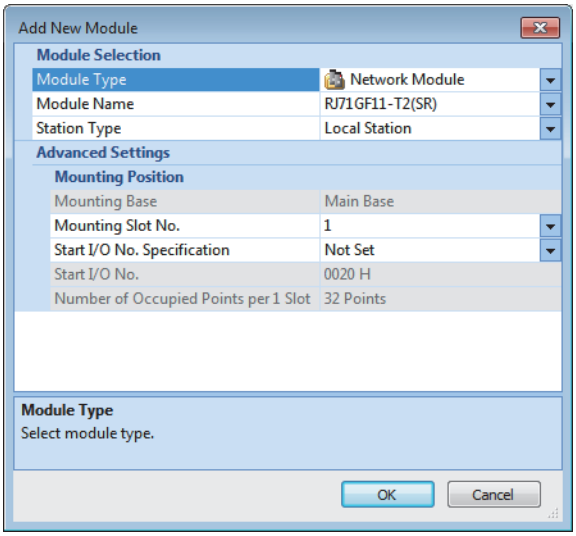
Point

In this setting example, default settings are used for the parameters other than those described. For the parameter setting, refer to the chapter explaining the parameters in this manual. (☞ Page 137 PARAMETER SETTINGS)

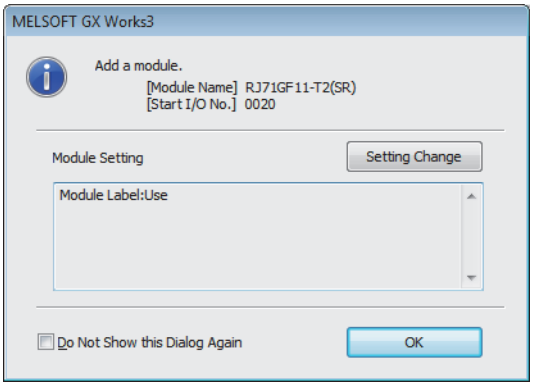
■Setting in the local station

Connect the engineering tool to the CPU module to be set as the control system and set the parameters.
In a redundant system, the same program and parameter are written to both systems. A new project does not need to be created for the standby system.

1. Set the CPU module and add the module labels of the CPU module. The setting method of the CPU module and addition method of the module label are the same as those for the redundant master station. (☞ Page 105 Redundant master station)
2. Set the redundant function module. The setting method for the redundant function module is the same as the one for the redundant master station. (☞ Page 105 Redundant master station)
3. In the I/O assignment setting, set the RJ71GF11-T2 for slot No.1.



4. Click the [OK] button to add a module label of the RJ71GF11-T2.



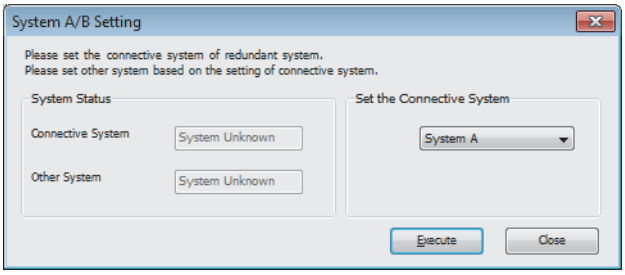
5. Set the refresh settings as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2(SR)] ⇨ [Basic Settings] ⇨ [Refresh Settings]

No.	Link Side					CPU Side				
	Device Name	Points	Start	End		Target	Device Name	Points	Start	End
-	SB	512	00000	001FF		Module Label				
-	SW	512	00000	001FF		Module Label				
1	RX	256	00000	000FF		Specify Device	X	256	01000	010FF
2	RY	256	00000	000FF		Specify Device	Y	256	01000	010FF
3	RWr	256	00000	000FF		Specify Device	W	256	01000	010FF
4	RWw	256	00000	000FF		Specify Device	W	256	00000	000FF
5										

6. Set the redundant function module of the own system as the system A in the "System A/B Setting" window, and reset the CPU modules of both systems or power off and on the both systems.

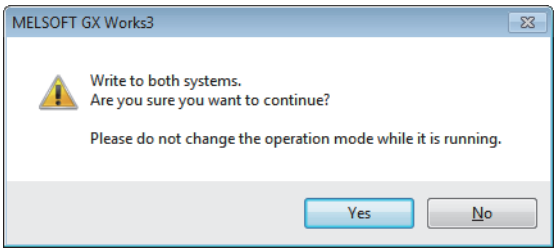
[Online] ⇨ [Redundant PLC Operation] ⇨ [System A/B Setting]



7. Write the set parameters to the system A CPU module.

[Online] ⇨ [Write to PLC]

8. Click the [Yes] button to write to the CPU modules of both systems.



9. Either reset the CPU modules of both systems or power off and on both systems.

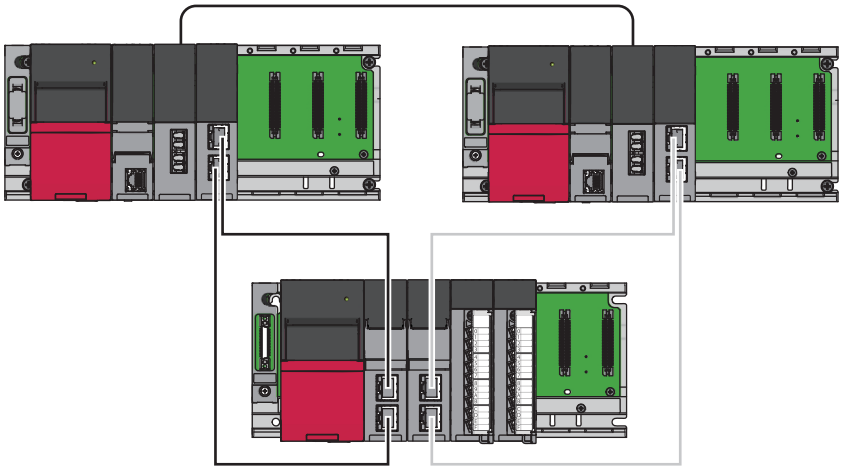
Point

In this setting example, default settings are used for the parameters other than those described. For the parameter setting, refer to the chapter explaining the parameters in this manual. (☞ Page 137 PARAMETER SETTINGS)

Redundant line

The following explains the settings for use in a redundant line configuration.

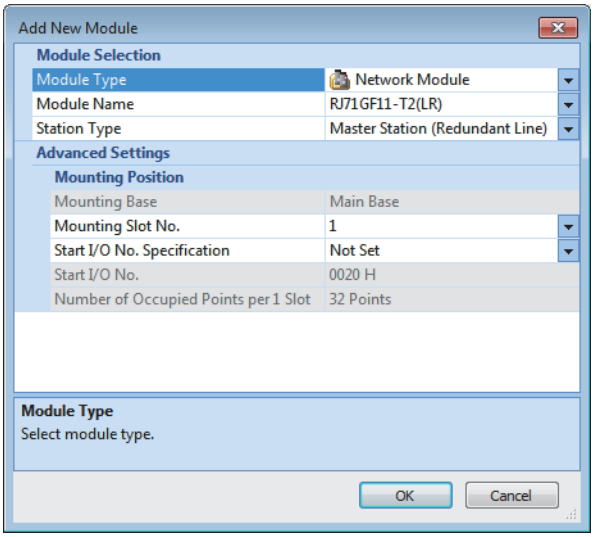
■System configuration example



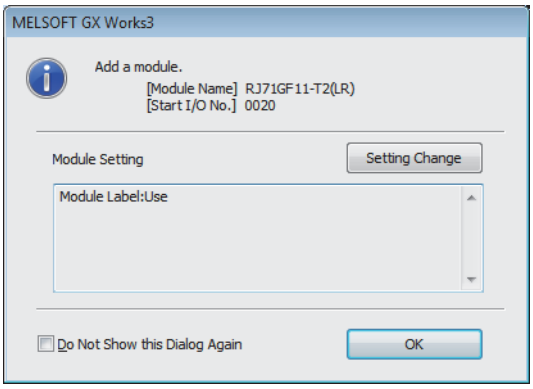
■Setting in the master station

Connect the engineering tool to the CPU module to be set as the control system and set the parameters.
In a redundant system, the same program and parameter are written to both systems. A new project does not need to be created for the standby system.

1. Set the CPU module and add the module labels of the CPU module. The setting method of the CPU module and addition method of the module label are the same as those for the redundant master station. (☞ Page 105 Redundant master station)
2. Set the redundant function module. The setting method for the redundant function module is the same as the one for the redundant master station. (☞ Page 105 Redundant master station)
3. In the I/O assignment setting, set the RJ71GF11-T2 for slot No.1.



4. Click the [OK] button to add a module label of the RJ71GF11-T2.

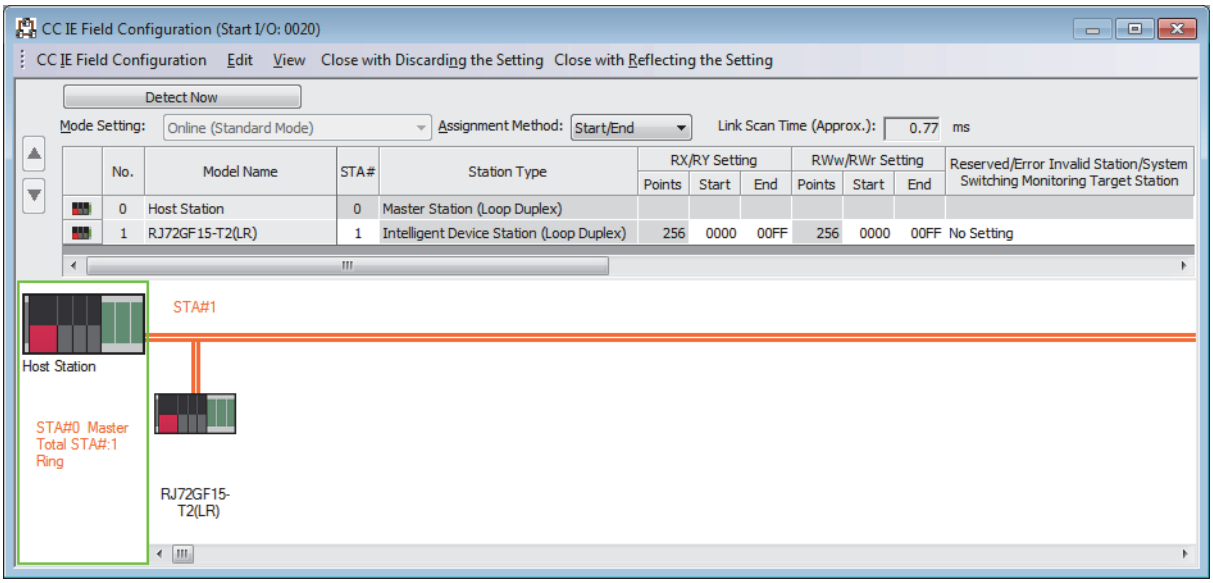


5. Set the network topology in the following item.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2(LR)] ⇨ [Basic Settings] ⇨ [Network Topology]

6. Set the network configuration as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2(LR)] ⇨ [Basic Settings] ⇨ [Network Configuration Settings]



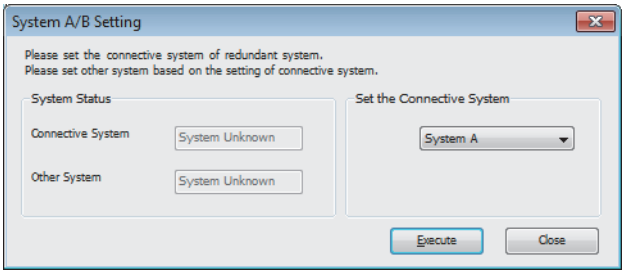
7. Set the refresh settings as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2(LR)] ⇨ [Basic Settings] ⇨ [Refresh Settings]

No.	Link Side					CPU Side				
	Device Name	Points	Start	End		Target	Device Name	Points	Start	End
-	SB	512	00000	001FF		Module Label				
-	SW	512	00000	001FF		Module Label				
1	RX	256	00000	000FF		Specify Device	X	256	01000	010FF
2	RY	256	00000	000FF		Specify Device	Y	256	01000	010FF
3	RWr	256	00000	000FF		Specify Device	W	256	01000	010FF
4	RWw	256	00000	000FF		Specify Device	W	256	00000	000FF
5										

8. Set the redundant function module of the own system as the system A in the "System A/B Setting" window, and reset the CPU modules of both systems or power off and on the both systems.

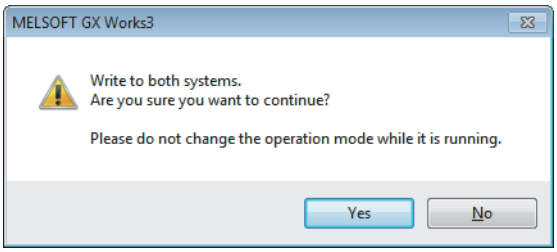
[Online] ⇨ [Redundant PLC Operation] ⇨ [System A/B Setting]



9. Write the set parameters to the system A CPU module.

[Online] ⇨ [Write to PLC]

10. Click the [Yes] button to write to the CPU modules of both systems.



11. Either reset the CPU modules of both systems or power off and on both systems.

Point

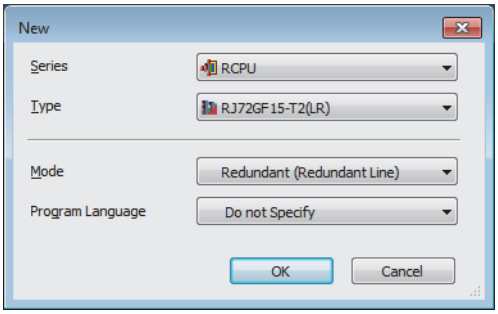
In this setting example, default settings are used for the parameters other than those described. For the parameter setting, refer to the chapter explaining the parameters in this manual. (☞ Page 137 PARAMETER SETTINGS)

■Settings of device station

Connect the engineering tool to the remote head module (CPU slot side) of the control system, and set parameters.
In a redundant system, the same parameters are written to both systems. A new project does not need to be created for the standby system.

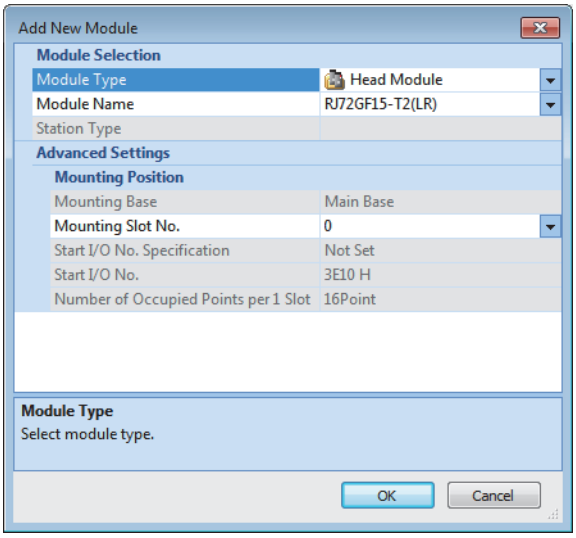
1. In the following window, set the remote head module.

[Project] ⇨ [New]



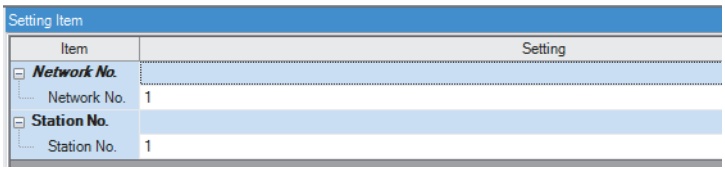
2. In the I/O assignment setting, set the remote head module of the standby system for slot No.0.

[Navigation window] ⇨ [Parameter] ⇨ [System Parameter] ⇨ [I/O Assignment] tab ⇨ [I/O Assignment Setting]



3. Set the content of "Network Required Setting" of "CPU Parameter" as follows.

[Navigation window] ⇨ [Parameter] ⇨ [RJ72GF15-T2(LR)] ⇨ [CPU parameter] ⇨ [Network Required Setting]



4. Set the module parameters for the module mounted on the remote head module. (📖 Manual for the module used)

5. Write the set parameters to the remote head module of the control system, then reset or power off and on the remote head modules of both the control system and the standby system.

[Online] ⇨ [Write to PLC]

Point

In this setting example, default settings are used for the parameters other than those described. For the parameters, refer to the following.
📖 MELSEC iQ-R CC-Link IE Field Network Remote Head Module User's Manual (Application)

1.7 Safety Communication Function

This function enables the RJ71GF11-T2 to communicate a safety data using the safety communication protocol in a safety system that stops the system safely when an error occurs.

System using the Safety CPU

This section describes safety communications performed in the system using the Safety CPU.

Restriction

The safety communication function cannot be used in a system containing a submaster station.

Safety protocol version

The Safety CPU has been certified to be compliant with IEC 61508 and ISO 13849-1 by a third party certifier. The IEC 61508 compliance certification includes compliance certification with IEC 61784-3, which is a safety communication standard.
The year of issue of the safety communication standard that the safety protocol version is compliant with differs depending on the safety protocol version.
Match the safety protocol version to that of the communication destination. For details, refer to the manual for the communication destination.
The firmware versions of each module that support the safety protocol version are shown below.

Safety protocol version	Applicable safety communications standard: Year of issue	Corresponding firmware version		
		Safety CPU	Safety function module	RJ71GF11-T2
1	IEC 61784-3:2010	"01" or later	"01" or later	"06" or later
2	IEC 61784-3:2021	"29" or later	"29" or later	"70" or later

The safety protocol version can be set by the safety communication setting of GX Works3 with version 1.095Z or later. GX Works3 with version 1.095Z or earlier does not have the safety protocol version setting. Therefore, the module operates with safety protocol version 1.
When using safety protocol version 1, there are restrictions on the combination of system configuration and safety communication settings. (☞ Page 172 Restrictions for SIL2 and SIL3)
The safety protocol version can be set by the safety communication setting of GX Works3 (version 1.095Z or later). GX Works3 with a version before 1.095Z does not have the safety protocol version setting. Therefore, the module operates with safety protocol version 1.
When using safety protocol version 1, there are restrictions on the combination of system configuration and safety communication settings. (☞ Page 172 Restrictions for SIL2 and SIL3)

Point

If the module must be compatible with IEC 61784-3:2021, use safety protocol version 2. In that case, the Safety CPU, safety function module, RJ71GF11-T2, and external device to be connected must be products supported by safety protocol version 2.

Restriction

- If the combination of the safety protocol version that supports the Safety CPU, safety function module, RJ71GF11-T2, and external device to be connected and those safety communication settings is not correct, the safety communications will not be started. Use the correct combination for performing safety communications. (☞ Page 441 Combination when the Safety Communication Function Is Used (For a System Using the Safety CPU))
- The safety communication setting cannot be written to the Safety CPU not supported by safety protocol version 2.

Communications with safety stations

This function establishes a safety connection and enables one-on-one safety communications periodically between safety stations in the same network.

The safety device of the Safety CPU is used for data communication.

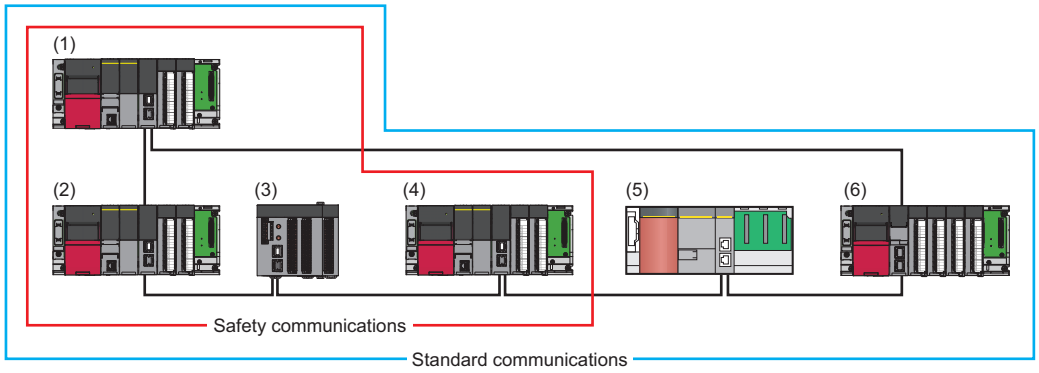
Whether a safety connection is established or not can be checked in 'Safety refresh communication status of each safety connection (1st module)' (SA\SD1008 to SA\SD1015) of the Safety CPU.*1

*1 Safety special register areas for the first RJ71GF11-T2. For safety special register areas for the second or later RJ71GF11-T2, refer to the following.
MELSEC iQ-R CPU Module User's Manual (Application)

■Stations supporting safety communications

Safety communications can be performed between the following stations (safety stations).

- Master station (safety station) (1) ↔ local station (safety station) (2) (4)
- Master station (safety station) (1) ↔ remote device station (safety station) (3)
- Local station (safety station) (2) ↔ local station (safety station) (4)



Point

When safety communications with the intelligent device station are performed, configure a system using the SIL2 Process CPU. (☞ Page 123 System using the SIL2 Process CPU)

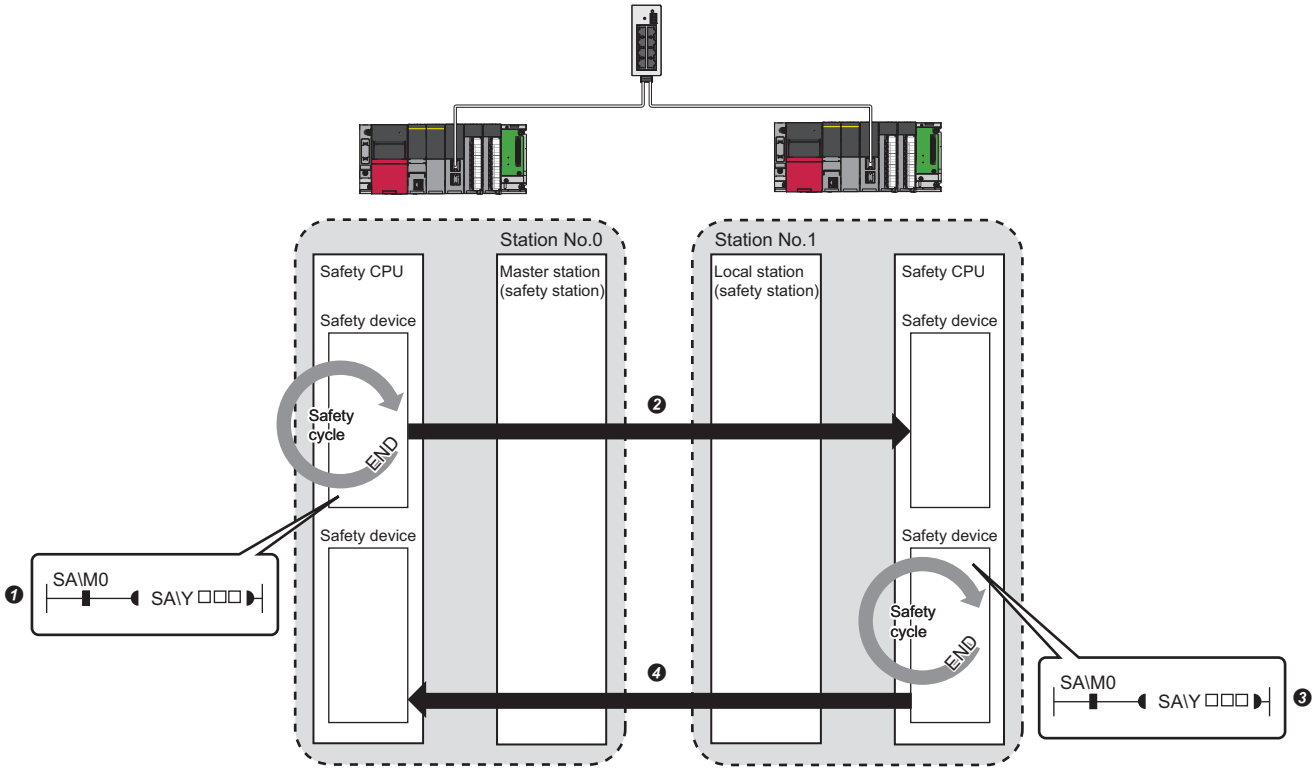
Restriction

A system can be configured in combination with MELSEC-QS series modules (5) and standard stations (6) in one network. However, safety communications cannot be performed. Only standard communications can be performed.

■Safety communications between the master station (safety station) and local station (safety station)

The safety device status of the sending station is stored in a safety device of the receiving station.

Safety communications between local stations (safety stations) is also the same.



Output from the master station (safety station)

❶ The safety device of the Safety CPU on the master station (safety station) turns on.

❷ The safety device status of the Safety CPU on the master station (safety station) is stored in the Safety CPU on the local station (safety station) by safety data transfer.

Output from the local station (safety station)

❸ The safety device of the Safety CPU on the local station (safety station) turns on.

❹ The safety device status of the Safety CPU on the local station (safety station) is stored in the Safety CPU on the master station (safety station) by safety data transfer.

■Safety communications between the master station (safety station) and remote device station (safety station)

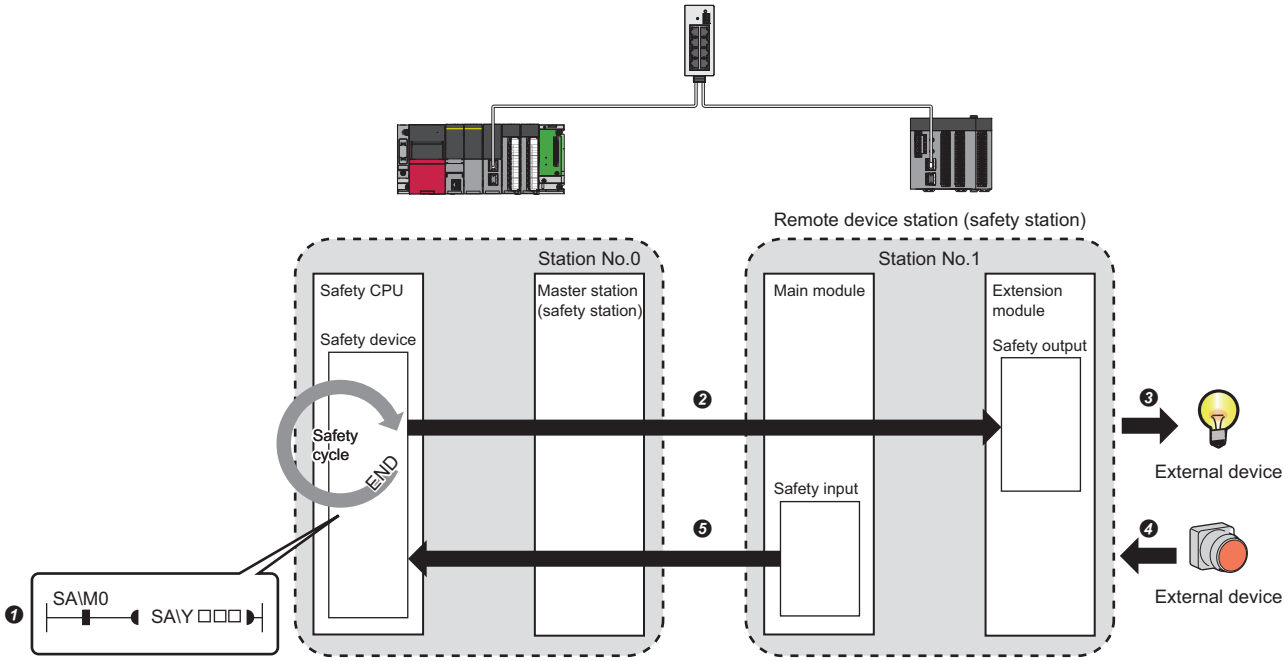
The safety device status of the Safety CPU on the master station (safety station) is reflected to the safety output of the remote device station (safety station).

The safety input status of the remote device station (safety station) is stored in the Safety CPU on the master station (safety station).

For communications with the remote device station (safety station), RWw and RWr are used by the system.

Set "RWw/RWr Setting" in "Network Configuration Settings" of "Basic Settings" as shown below in accordance with the safety protocol version. (☞ Page 141 Network Configuration Settings)

Safety protocol version	"RWw/RWr Setting"
1	Set 16 points or more. The number of RWw/RWr points used varies depending on the device. For details, check the specifications of the external device.
2	



Output from the master station (safety station)

❶ The safety device of the Safety CPU on the master station (safety station) turns on.

❷ The safety device status of the Safety CPU on the master station (safety station) is stored in the Safety CPU on the local station (safety station) by safety data transfer.

❸ The safety output status of the remote device station (safety station) is output to an external device.

Input from the remote device station (safety station)

❹ The status of the external device is stored in the safety input of the remote device station (safety station).

❺ The safety device status of the Safety CPU on the local station (safety station) is stored in the Safety CPU on the master station (safety station) by safety data transfer.

Restriction

- Do not write any data to the area (RWw and RWr) used by the system. Doing so may cause malfunction of the programmable controller system.
- When the "RWw/RWr Setting" of the remote device station (safety station) is less than the number of points used in the system, an error is detected and safety communications are not performed.

■Setting method

Set safety communications in "Safety Communication Setting" under "Application Settings". (☞ Page 166 Safety Communication Setting)

■How to count the number of safety connections

The maximum number of safety connections per network is 1814. If exceeding this limit, safety communications are not guaranteed. The number of safety connections can be calculated using the following formulas:

Number of safety connections = M + (L ÷ 2)

M: Number of all the safety connections set in the master station (safety station)

L: Number of all the safety connections set in the local station (safety station) that perform safety communications with local stations (safety stations)

■Precautions

- This function may detect an error and stop safety communications if reconnection processing for the network occurs during safety communications.
- If an error occurs in safety communications, safety data from the station with an error is cleared.
- A safety connection between the master station (safety station) and local station (safety station) or between local stations (safety stations) can be established only while baton bass is performed after configuring "Safety Communication Setting" under "Application Settings" of both stations (sending side and receiving side). The baton pass status can be checked in 'Baton pass status of own station' (SB0047).
- A safety connection with the remote device station (safety station) can be established only while data link is performed after configuring the "Safety Communication Setting" under "Application Settings" of the master station. The data link status can be checked in 'Data link status of each station' (SW00B0 to SW00B7).
- Note that stations not set in "Network Configuration Settings" under "Basic Settings" of the master station (safety station) and reserved stations cannot establish a safety connection.
- Safety communications cannot be performed among the RJ71GF11-T2 set in the same control CPU.
- This function may detect an error and stop safety communications if a parameter is written to the control CPU of the RJ71GF11-T2 during safety communications.

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 faulty station. Safety communications between the stations becomes safety station interlock state, and it does not resume until the safety interlock is released.

Create a program which releases the interlock by using Interlock release request for each safety connection to release the safety station interlock state.

Note that standard communication automatically resumes even in the safety station interlock state 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.

■Checking method

Check the status with the safety special register 'Interlock status of each safety connection (1st module)' (SA\SD1232 to SA\SD1239).

For the safety special register for the second or later modules and its operation details, refer to the following.

📖 MELSEC iQ-R CPU Module User's Manual (Application)

■Release method

Release the interlock using the safety special register 'Interlock release request for each safety connection (1st module)' (SA\SD1240 to SA\SD1247).

For the safety special register for the second or later modules and its operation details, refer to the following.

📖 MELSEC iQ-R CPU Module User's Manual (Application)

System using the SIL2 Process CPU

This section describes safety communications performed in the system using the SIL2 Process CPU.

Restriction

These modules can be used in a system containing a submaster station only when the master station is redundant.

Safety protocol version

The SIL2 Process CPU has been certified to be compliant with IEC 61508 by a third party certifier. The IEC 61508 compliance certification includes compliance certification with IEC 61784-3, which is a safety communication standard.
The year of issue of the safety communication standard that the safety protocol version is compliant with differs depending on the safety protocol version.
Match the safety protocol version to that of the communication destination. For details, refer to the manual for the communication destination.
The firmware versions of each module that support the safety protocol version are shown below.

Safety protocol version	Applicable safety communications standard: Year of issue	Corresponding firmware version			
		SIL2 Process CPU	SIL2 function module	RJ71GF11-T2	RJ72GF15-T2
1	IEC 61784-3:2010	"01" or later	"01" or later	"25" or later	"05" or later
2	IEC 61784-3:2021	"14" or later	"14" or later	"80" or later	"14" or later

The safety protocol version can be set by the safety communication setting of GX Works3 (version 1.110Q or later). GX Works3 with a version before 1.110Q does not have the safety protocol version setting. Therefore, the module operates with safety protocol version 1.
When using safety protocol version 1, there are restrictions on the combination of system configuration and safety communication settings. (☞ Page 172 Restrictions for SIL2 and SIL3)

Point

If the module must be compatible with IEC 61784-3:2021, use safety protocol version 2. In that case, the SIL2 Process CPU, SIL2 function module, RJ71GF11-T2, RJ72GF15-T2, and external device to be connected must be products supported by safety protocol version 2.

Restriction

- If the combination of the safety protocol version that supports the SIL2 Process CPU, SIL2 function module, RJ71GF11-T2, RJ72GF15-T2, and external device to be connected and those safety communication settings is not correct, the safety communications will not be started. Use the correct combination for performing safety communications. (☞ Page 446 Combination when the Safety Communication Function Is Used (For a System Using the SIL2 Process CPU))
- The safety communication setting cannot be written to the SIL2 Process CPU not supported by safety protocol version 2.
- When safety communications with safety protocol version 2 are performed, set the number of safety connections to 16 or less for an external device to be communicating with the same RJ72GF15-T2.

System configuration

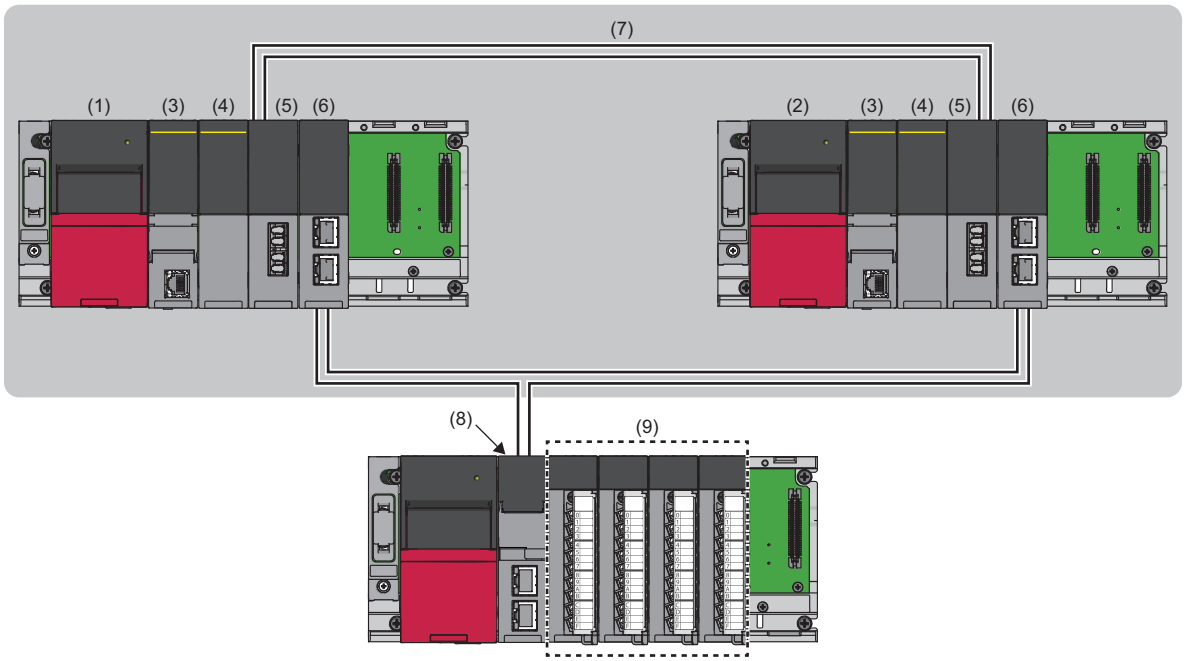
A system using the SIL2 Process CPU is configured as described below.

System configuration	Description
Redundant master station	The master station is configured in a redundant system.
Redundant line	Each of the control system and standby system is configured on a different network to make the network redundant line.

There are no network topology restrictions even when a system using the SIL2 Process CPU is configured. However, configuring a system using ring topology is recommended, because if a cable disconnection occurs or a faulty station occurs in a system other than the systems using the SIL2 Process CPU, system switching can be avoided by the loopback function.

■Redundant master station

For the redundant master station, the master station and the submaster station are connected with a tracking cable. When an error occurs in the control system master station (safety station) (1), the control is switched to the standby system submaster station (safety station) (2) to continue safety communications.



(3)SIL2 Process CPU
(4)SIL2 function module
(5)Redundant function module
(6)RJ71GF11-T2
(7)Tracking cable
(8)Remote head module
(9)Module set to the SIL2 mode

• Setting method

When using the module in a redundant master station configuration, select the following models in the project of each station.

Project	Setting items	Station Type	Model
Master station project	"Add New Module" window	Master station	RJ71GF11-T2 (MR)
	"Network Configuration Settings" in "Basic Settings"	Intelligent device station	RJ72GF15-T2
Intelligent device station project	"New" window of the project	Intelligent device station	RJ72GF15-T2

Set the station number of the standby system submaster station in "Network Configuration Settings" under "Basic settings." Station numbers of both systems do not need to be set consecutively.

Point

In a system using the SIL2 Process CPU, since send data in the send range are transferred to the standby system (submaster station) via tracking, the same send data as those for the control system (master station) do not need to be set to the standby system (submaster station).

■Redundant line

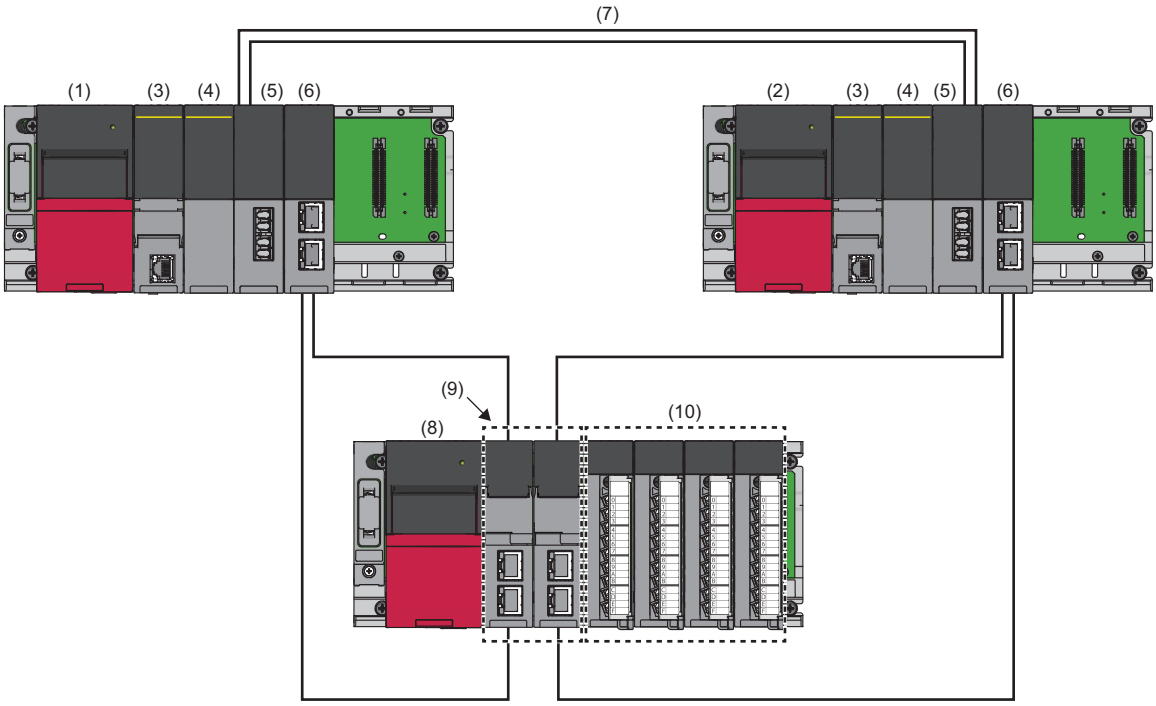
In redundant line configuration, two network lines are prepared and an intelligent device station (safety station) (remote head module) (8) is connected to each network line. (The RJ71GF11-T2 of both systems operate as a master station of each network.)

Restriction

For intelligent device stations (safety stations), only redundant remote head modules can be used.

When an error occurs in the control system network (1), the control is switched to the standby system network (2) to continue safety communications.

Ensure that the configurations of the network of both systems are the same.



(3)SIL2 Process CPU
(4)SIL2 function module
(5)Redundant function module
(6)RJ71GF11-T2
(7)Tracking cable
(8)Remote head module
(9)Module set to the SIL2 mode

Point

It is recommended that the network topology and Ethernet port for connecting an Ethernet cable be made the same. Also, visually check the actual network configuration for the network configuration of both systems. The CC-Link IE Field Network diagnostics may display a configuration different from the actual system configuration.

- Setting method

When using the module in a redundant line configuration, select the following module names in the project of each station.

Project	Setting items	Station Type	Module Name
Master station project	"Add New Module" window	Master station	RJ71GF11-T2(LR)
	"Network Configuration Settings" in "Basic Settings"	Intelligent device station	RJ72GF15-T2(LR)
Intelligent device station project	"New" window of the project	Intelligent device station	RJ72GF15-T2(LR)

Communications with safety stations

This function establishes a safety connection and enables one-on-one safety communications periodically between safety stations in the same network.

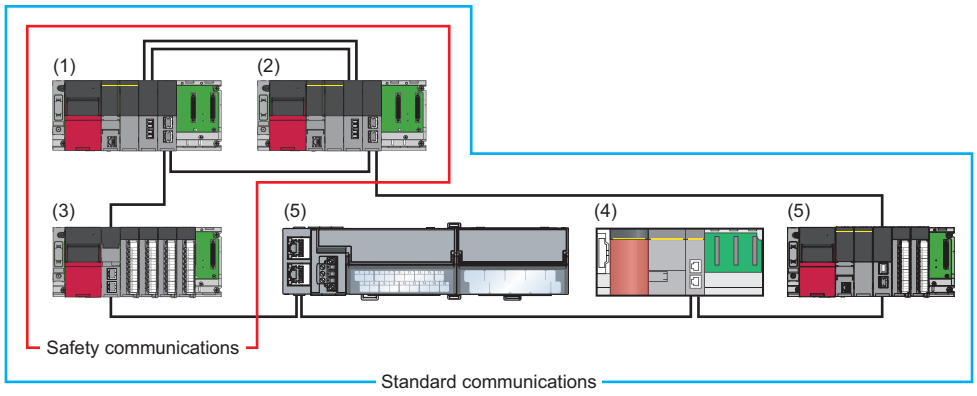
The safety device of the SIL2 Process CPU is used for data communication.

Whether a safety connection is established or not can be checked in 'Safety refresh communication status of each safety connection (1st module)' (SA\SD1008 to SA\SD1015) of the SIL2 Process CPU.

■Stations supporting safety communications (for a redundant master station)

Safety communications can be performed between the following stations (safety stations).

- Control system master station (safety station) (1) ↔ Intelligent device station (safety station) (3)
- Control system submaster station (safety station) (2) ↔ Intelligent device station (safety station) (3)



Point

When safety communications with remote device stations and the local stations, configure a system using the Safety CPU. (☞ Page 118 System using the Safety CPU)

For the remote device station which performs safety communications, refer to the user's manual for the module used.

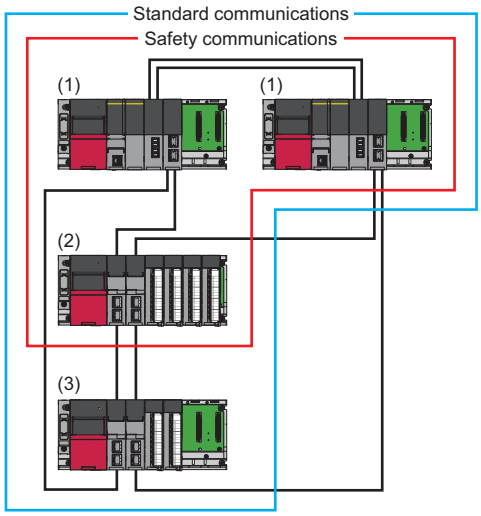
Restriction

A system can be configured in combination with MELSEC-QS series modules (4) and standard stations (5) in one network. However, safety communications cannot be performed. Only standard communications can be performed.

■Stations supporting safety communications (for redundant line)

Safety communications can be performed between the following stations (safety stations).

Control system master station (safety station) (1) ↔ Intelligent device station (safety station) (2)



Restriction

Standard station (3) can be mixed in one network for system configuration. However, safety communications cannot be performed. Only standard communications can be performed.

■How to count the number of safety connections

The maximum number of safety connections per network is 120. If exceeding this limit, safety communications are not guaranteed. The number of safety connections can be calculated using the following:

• For a redundant master station

Number of safety connections = Sum of the number of safety connections set in each intelligent device station

Point

The number of safety connections with intelligent device stations varies depending on the combination of modules set to the SIL2 mode. For details, refer to the following.

MELSEC iQ-R Module Configuration Manual

• For redundant line

Number of safety connections = Sum of the number of safety connections set in each intelligent device station

Point

The number of safety connections includes those for the control system network only. The number of safety connections with intelligent device stations varies depending on the combination of modules set to the SIL2 mode. For details, refer to the following.

MELSEC iQ-R Module Configuration Manual

■Precautions

- This function may detect an error and stop safety communications if the network is reconnected in all the stations during safety communications. For reconnection of the network, refer to the section explaining the redundant system function. (☞ Page 85 Redundant System Function)
- A safety connection with the intelligent device station (safety station) can be established only while data link is performed after configuring the "Safety Communication Setting" under "Application Settings" of the master station. The data link status can be checked in 'Redundant system data link status of each station' (SW01B0 to SW01B7).
- Note that stations not set in "Network Configuration Settings" under "Basic Settings" of the master station (safety station) and reserved stations cannot establish a safety connection.
- When the momentary power failure occurs on the intelligent device station (safety station) during safety communications, safety communications may stop. (📖 MELSEC iQ-R CC-Link IE Field Network Remote Head Module User's Manual (Application))
- If the master station detects a communication error with the system switching monitoring target station, system switching occurs. In such a case, depending on the system configuration, even a safety communication error with a station other than the system switching monitoring target station may cause a stop of the safety communication if the error is detected by a new master station that has taken over the control after system switching. (☞ Page 101 System switching monitoring target station)

Procedures before operation

This section describes the procedures for operating the system using the SIL2 Process CPU.

■Mounting procedures

1. Installation of batteries

Install batteries to the SIL2 Process CPU of both systems. (📖 MELSEC iQ-R CPU Module User's Manual (Startup))

2. Installation of an extended SRAM cassette or an SD memory card

Install an extended SRAM cassette or an SD memory card to the SIL2 Process CPU of both systems as necessary. (📖 MELSEC iQ-R CPU Module User's Manual (Startup))

Do not power off or reset the system or eject the SD memory card during access to the SD memory card. (📖 MELSEC iQ-R CPU Module User's Manual (Application))

3. Mounting of the module

Mount each module on the base unit. (📖 MELSEC iQ-R Module Configuration Manual)

■Wiring procedures

1. Wiring

Connect each module and external devices.

Wiring location	Reference
Wiring for the power supply module	📖 MELSEC iQ-R Module Configuration Manual
Wiring for the redundant function module	📖 MELSEC iQ-R CPU Module User's Manual (Application)
Wiring from the RJ71GF11-T2 to the remote head module	• 📖 MELSEC iQ-R Ethernet/CC-Link IE User's Manual (Startup) • 📖 MELSEC iQ-R CC-Link IE Field Network Remote Head Module User's Manual (Startup)
Wiring for the I/O module	📖 Manual for the I/O module used

■Procedures for the remote head module

1. Power-on of the system

Before turning on the power, check the following items.

- The power supply is connected properly.
- The power supply voltage meets the specifications.
- The remote head module is in the STOP state.

2. Creation of a project

Start the engineering tool and create a project. (📖 MELSEC iQ-R CC-Link IE Field Network Remote Head Module User's Manual (Startup))

3. Connection between a personal computer and the remote head module

Connect a personal computer with the engineering tool installed to the remote head module. (📖 MELSEC iQ-R CC-Link IE Field Network Remote Head Module User's Manual (Startup))

4. Initialization of the remote head module

Initialize the remote head module using the engineering tool. (📖 MELSEC iQ-R CC-Link IE Field Network Remote Head Module User's Manual (Startup))

5. Parameter setting of the remote head module

Set the system parameters, CPU parameters, and module parameters of each module. (📖 MELSEC iQ-R CC-Link IE Field Network Remote Head Module User's Manual (Application))

- Setting of the system parameters and the CPU parameters
- Setting of the module parameters of each module

6. Writing to the remote head module

Write the parameters set by the engineering tool to the remote head module. (📖 MELSEC iQ-R CC-Link IE Field Network Remote Head Module User's Manual (Startup))

7. Reset of the remote head module

Restart the system of the remote head module using either of the following methods.

- Turning off and on the power.
- Resetting the remote head module (MELSEC iQ-R CC-Link IE Field Network Remote Head Module User's Manual (Startup))

■Procedures for the SIL2 Process CPU

1. Power-on of the system

Before turning on the power, check the following items for both systems.

- The power supply is connected properly.
- The power supply voltage meets the specifications.
- The SIL2 Process CPU is in the STOP state.

After turning on the power, check that the following LEDs are turned on.

- Power supply module: POWER LED
- SIL2 Process CPU: READY LED
- SIL2 function module: READY LED
- Redundant function module: RUN LED
- RJ71GF11-T2: RUN LED

Although the LED on each module will be in the following state in step 1, proceed to the next step.

- SIL2 Process CPU: ERROR LED flashes.
- SIL2 function module: ERROR LED flashes.
- Redundant function module: ERR LED turns on.
- RJ71GF11-T2: ERR LED turns on.

2. Creation of a project

Start the engineering tool and create a project. (MELSEC iQ-R CPU Module User's Manual (Application))

3. Connection between a personal computer and the SIL2 Process CPU

Connect a personal computer with the engineering tool installed to the SIL2 Process CPU. (MELSEC iQ-R CPU Module User's Manual (Application))

4. Initialization of the SIL2 Process CPU

Initialize the SIL2 Process CPU using the engineering tool.

After initializing one SIL2 Process CPU, connect the other SIL2 Process CPU to the personal computer. After the connection, initialize the SIL2 Process CPU using the engineering tool.

5. Parameter setting for the SIL2 Process CPU

Set the system parameters, CPU parameters, and module parameters of each module. (Page 137 PARAMETER SETTINGS)

Point

The system parameters can be set by loading the actual system configuration into the module configuration diagram using the engineering tool.

6. Safety communication setting

Set the safety communication. (Page 166 Safety Communication Setting)

7. Writing of the system A/B setting

Set the system A/B setting using the engineering tool. (MELSEC iQ-R CPU Module User's Manual (Application))

8. User information setting

Set the user information for the SIL2 Process CPU and the project of both systems. (GX Works3 Operating Manual)

9. Creation of a program

Create a safety program and a standard program.

10. Writing of data to the programmable controller

Write the parameters set by the engineering tool and the programs created above to both systems. (📖 MELSEC iQ-R CPU Module User's Manual (Application))

11. Reset of the SIL2 Process CPU

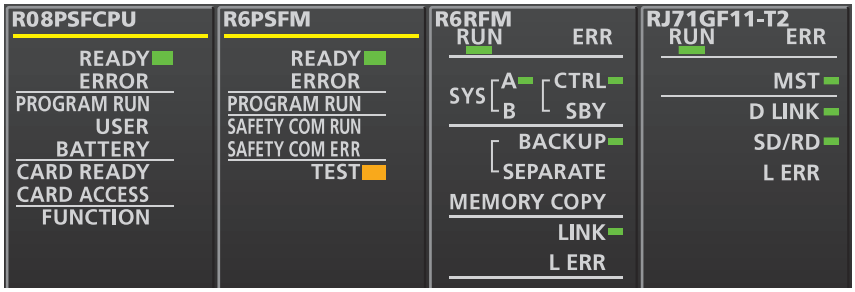
Restart both systems by either of the following methods.

- Turning off and on the power.
- Resetting the SIL2 Process CPU (📖 MELSEC iQ-R CPU Module User's Manual (Application))

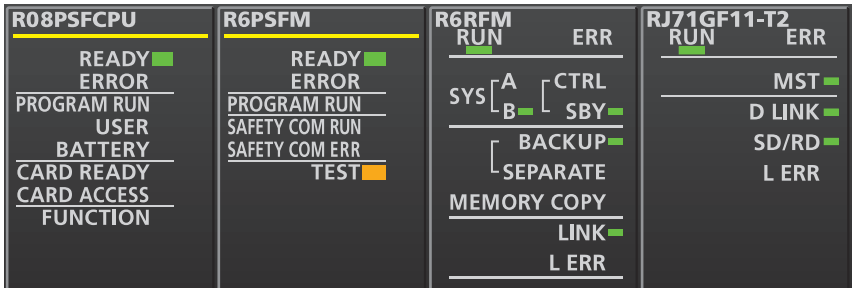
12. Check of the LED on the SIL2 Process CPU

Check that the LED on each module is in the following state. The CARD READY LED turns on or off according to whether an SD memory card has been installed or not.

- Control system



- Standby system*1



*1 The MST LED on the standby system RJ71GF11-T2 flashes in a redundant master station system.

The following LEDs turn on in the event of an error. Check the details of the error using the engineering tool, and eliminate the error cause.

- SIL2 Process CPU: ERROR LED (📖 MELSEC iQ-R CPU Module User's Manual (Startup))
- SIL2 function module: ERROR LED (📖 MELSEC iQ-R CPU Module User's Manual (Startup))
- Redundant function module: ERR LED, L ERR LED (📖 MELSEC iQ-R CPU Module User's Manual (Startup))
- RJ71GF11-T2: ERR LED, L ERR LED (📖 MELSEC iQ-R Ethernet/CC-Link IE User's Manual (Startup))

■Validation of the module

1. Safety module operation

Check that systems of the SIL2 Process CPU and the remote head module are powered on, and validate the module set to the SIL2 mode by the "safety module operation" of the engineering tool. (📖 User's manual for the module used)

2. Power-off of the system

After validation, power off the systems for the SIL2 Process CPU and the remote head module.

3. Restart of the SIL2 Process CPU and the remote head module

Set the RUN/STOP/RESET switch on the SIL2 Process CPU and the remote head module of both systems to the RUN position, and turn on the power.

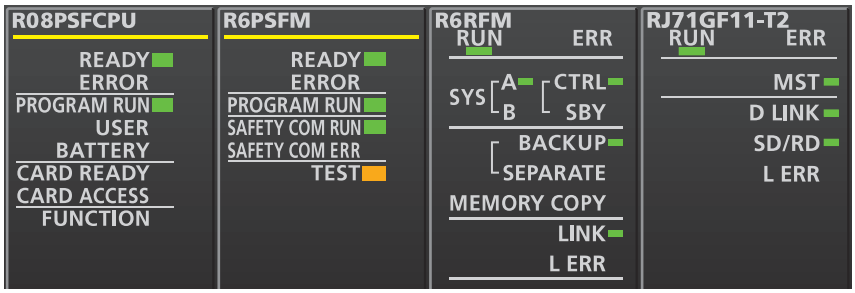
■Procedures for operation check

1. Various check

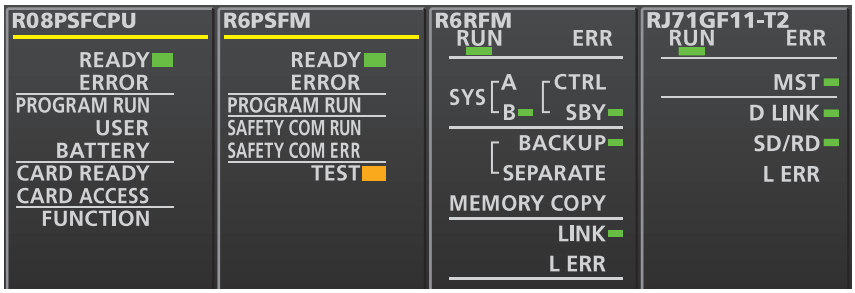
Check the status of the modules and the operation of the programs used in the system.

- Check that no errors have occurred in each module.
- Check that the status of the LED on each module is as follows.

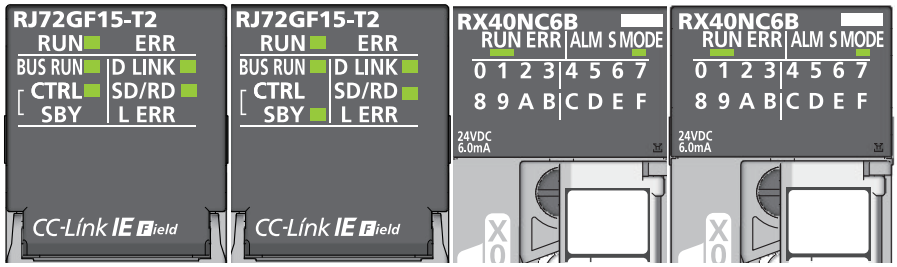
• Control system



• Standby system*1



• Remote head module*2*3



*1 The MST LED on the standby system RJ71GF11-T2 flashes in a redundant master station system.

*2 In the redundant master station system, these LEDs are always off because the remote head module is not redundant.
- · CTRL LED
- · SBY LED

*3 The above illustrations show an example of the input module with diagnostic functions. For LEDs on other modules, refer to the manual for the module used.

- Is an error detected in the CC-Link IE Field Network diagnostics? (☞ Page 275 Checking the Network Status)
- Check that the safety program and the standard program operate properly.

2. Switching of the safety operation mode

Switch the safety operation mode to the SAFETY MODE to operate the system using the SIL2 Process CPU normally. (📖 MELSEC iQ-R CPU Module User's Manual (Application))

Point

When the SIL2 Process CPU is set to the STOP state, the continuation error of the operating status mismatch is detected in the standby system.

3. Execution of the program

Power off the SIL2 Process CPU and the remote head module of both systems. Then, set the RUN/STOP/RESET switch on the SIL2 Process CPU and the remote head module of both systems to the RUN position, and turn on the power. Check that the PROGRAM RUN LED on the control system SIL2 Process CPU turns on.

Point

When the RUN/STOP/RESET switch is set to the RUN position while the power is turned on, the continuation error of the operating status mismatch is detected in the standby system.

4. Monitoring of the program

Check that the program is operating properly using the engineering tool.

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 faulty station. Safety communications between the stations becomes safety station interlock state, and it does not resume until the safety interlock is released.

Note that standard communication automatically resumes even in the safety station interlock state 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.

■Checking method

Check the status with the safety special register 'Interlock status of each safety connection (1st module)' (SA\SD1232 to SA\SD1239).

For the safety special register for the second or later modules and its operation details, refer to the following.

📖 MELSEC iQ-R CPU Module User's Manual (Application)

■Release method

Release the interlock using the safety special register 'Interlock release request for each safety connection (1st module)' (SA\SD1240 to SA\SD1247).

For the safety special register for the second or later modules and its operation details, refer to the following.

📖 MELSEC iQ-R CPU Module User's Manual (Application)

Wiring precautions

Refer to the following for the wiring precautions.

☞ Page 130 Wiring procedures

1.8 Others

Reserved station

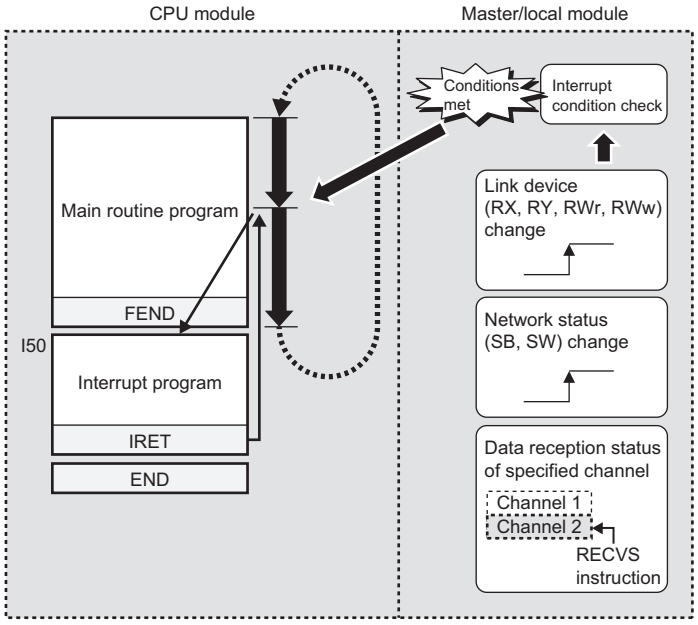
Reserved stations, which are set in the parameters and included as stations in the network when the number is counted, are device stations reserved for network extension in the future. These stations are not connected to actual networks, and are not regarded as faulty stations despite being not connected. (☞ Page 141 Network Configuration Settings)
The reserved states of multiple device stations can be temporarily canceled (in other words, these device stations can be temporarily connected to the network) without changing the parameters. (☞ Page 297 Reserved Station Function Enable)
When a reserved station is set, link device setting will not change even if the device station is added (or the reservation is cleared). Therefore, modification of the program is not required.

Error invalid station

The error invalid stations are device stations that are set to be not detected as faulty stations by the master station even if they are disconnected during data link. This setting is also useful when a device station is to be replaced during data link.
(☞ Page 141 Network Configuration Settings)
Multiple device stations can be temporarily set to error invalid stations without changing the parameters. (☞ Page 299 Enable/Disable Ignore Station Errors)

Interrupt Request to CPU Module

This function checks interrupt conditions in every link scan, and makes an interrupt request to the CPU module to start the interrupt program if the interrupt conditions are met.



Setting method

Set the interrupt request to the CPU module in "Interrupt Settings" under "Application Settings". (☞ Page 156 Interrupt Settings)

2 PARAMETER SETTINGS

This chapter describes the parameter settings required for communications between the master/local module and other stations.

2.1 Setting Parameters

1. Add the master/local module in the engineering tool.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Right-click ⇨ [Add New Module]

2. The required settings, basic settings, and application settings are included in the parameter settings. Select one of the settings from the tree on the window shown below.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Target Module

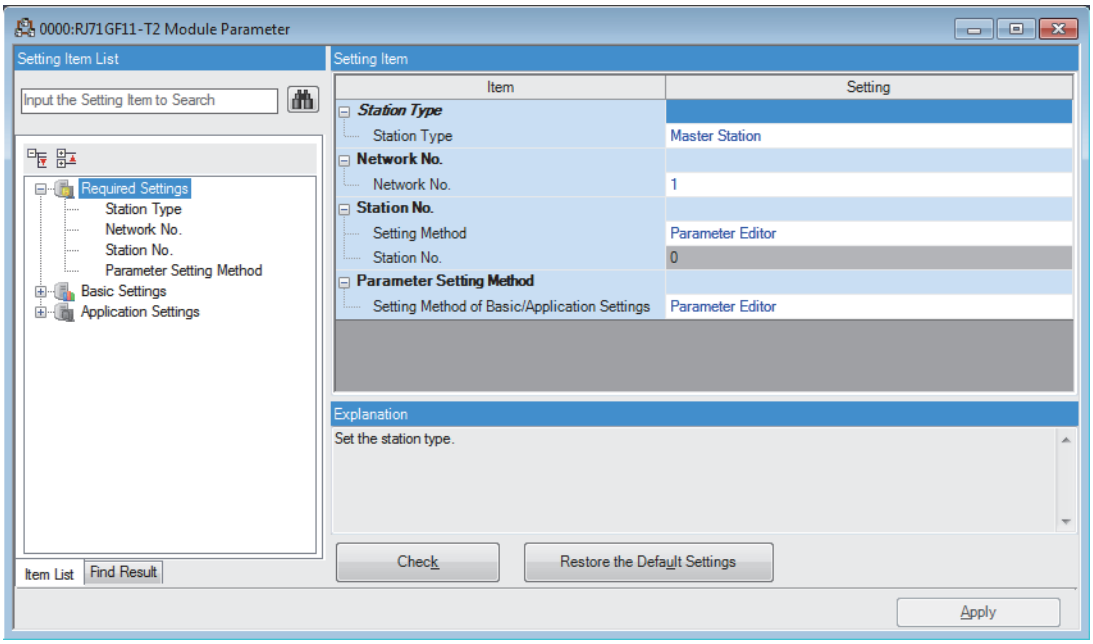
3. After setting parameters, click the [Apply] button.
4. Write the settings to the CPU module using the engineering tool.

[Online] ⇨ [Write to PLC]

5. The settings are reflected by resetting the CPU module or powering off and on the system.

2.2 Required Settings

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



○: Can be set, ×: Cannot be set

Item	Description	Availability			Reference
		Master station	Local station	Submaster station	
Station Type*3	Set the station type of the master/local module.	○	○	○	Page 138 Station Type
Network No.	Set the network number of the master/local module.	○	○	○*2	Page 138 Network No.
Station No.	Set the station number of the master/local module.	×	○*1	○	Page 138 Station No.
Parameter Setting Method*3	Select whether to set "Basic Settings" and "Application Settings" items of the master/local module in parameter editor or in program.	○	○	○	Page 139 Parameter Setting Method

*1 This item can be set when "Setting Method" is set to "Parameter Editor".
*2 The parameter settings must be the same as those for the master station.
*3 When "RJ71GF11-T2 (MR)", "RJ71GF11-T2 (SR)", or "RJ71GF11-T2 (LR)" is selected for the module model name, the value is fixed and a new value cannot be set.

Point

When the parameters of required settings are not set, the module operates as a local station of network No.1 and station No.1.
However, baton pass and data link are not performed.

Station Type

Set the station type of the master/local module.

Item	Description	Setting range
Station Type	Select whether to use the master/local module as a master station, local station, or submaster station. One master station and one submaster station can be set in a network.	• Master Station • Local Station • Submaster Station • Master Station (Redundant Line) (Default: Station type set in the "Add New Module" window.)

Network No.

Set the network number of the master/local module.

Item	Description	Setting range
Network No.	Set the network number of the master/local module. Set a network number that does not overlap any other network numbers on other networks.	1 to 239 (Default: 1)

Station No.

Set the station number of the master/local module.

Item	Description	Setting range
Setting Method*1	Select whether to set the station number in parameter editor or in program (UINI instruction). This item can be set only for a local station. When selecting "Program", use the UINI instruction to set the number. (MELSEC iQ-R Programming Manual (Module Dedicated Instructions))	• Parameter Editor • Program (Default: Parameter Editor)
Station No.	Set the station number of the master/local module. Set a station number different from those used in the same network. The station number of the master station is fixed to "0". To set the station number of a local station in this setting, set "Setting Method" to "Parameter Editor". When "Submaster Station" is selected for "Station Type" of "Required Settings" and the following is set, the setting value set in "Network Configuration Settings" of "Basic Settings" is displayed. • When "Operate with Parameter of Host Station" is selected in "Submaster Parameters" in "Basic Settings"	• Master Station: Fixed to "0" • Local Station: 1 to 120*2 • Submaster Station: 1 to 120 (Default: 1)

*1 When "RJ71GF11-T2 (MR)", "RJ71GF11-T2 (SR)", or "RJ71GF11-T2 (LR)" is selected for the module model name, the setting is fixed to "Parameter Editor".
*2 When "RJ71GF11-T2 (SR)" is selected for the module model name, the setting range is from 1 to 119.

Parameter Setting Method

Select whether to set "Basic Settings" and "Application Settings" items of the master/local module in parameter editor or in program.

Item	Description	Setting range
Setting Method of Basic/ Application Settings*2	■Parameter Editor Select this item to set the parameter using the engineering tool. The following are advantages. • Parameters can be easily set in the window without creating a program for setting. • The data will be automatically transferred between SB, SW, or the link devices of the master/local module and the module labels or devices of the CPU module. (☞ Page 148 Refresh Settings) ■Program Select this item to set the parameter using a dedicated instruction (CCPASET instruction or CCPASETR instruction). The following are advantages. • Parameters can be changed and device stations can be added without resetting the CPU module. • More master/local modules than the number of modules that can be set using the engineering tool can be mounted.	• Parameter Editor • Program*1 (Default: Parameter Editor)

*1 When "Program" is selected, some parameters cannot be set using a dedicated instruction (CCPASET instruction or CCPASETR instruction).
For parameters that can be set using a dedicated instruction (CCPASET instruction or CCPASETR instruction), refer to the following.
📖 MELSEC iQ-R Programming Manual (Module Dedicated Instructions)

*2 When "RJ71GF11-T2 (MR)", "RJ71GF11-T2 (SR)", or "RJ71GF11-T2 (LR)" is selected for the module model name, the setting is fixed to "Parameter Editor".
For engineering tools of version 1.080J or later, "Program" can be selected. However, when the firmware version of the master/local module is "58" or earlier or the firmware version of the CPU module is "03" or earlier, the setting is fixed to "Parameter Editor".

Station number setting of a local station

The station number of a local station can be also set using the UINI instruction. This allows project data items other than the station number to be the same. (📖 MELSEC iQ-R Programming Manual (Module Dedicated Instructions))

■When using the engineering tool for the parameter setting

The procedure for setting the station number of a local station is shown below.

1. Set "Setting Method" under "Station Number" in "Required Settings" to "Program".
2. Set "Setting Method of Basic/Application Settings" under "Parameter Setting Method" in "Required Settings" to "Parameter Editor".
3. Set the station number using the UINI instruction.

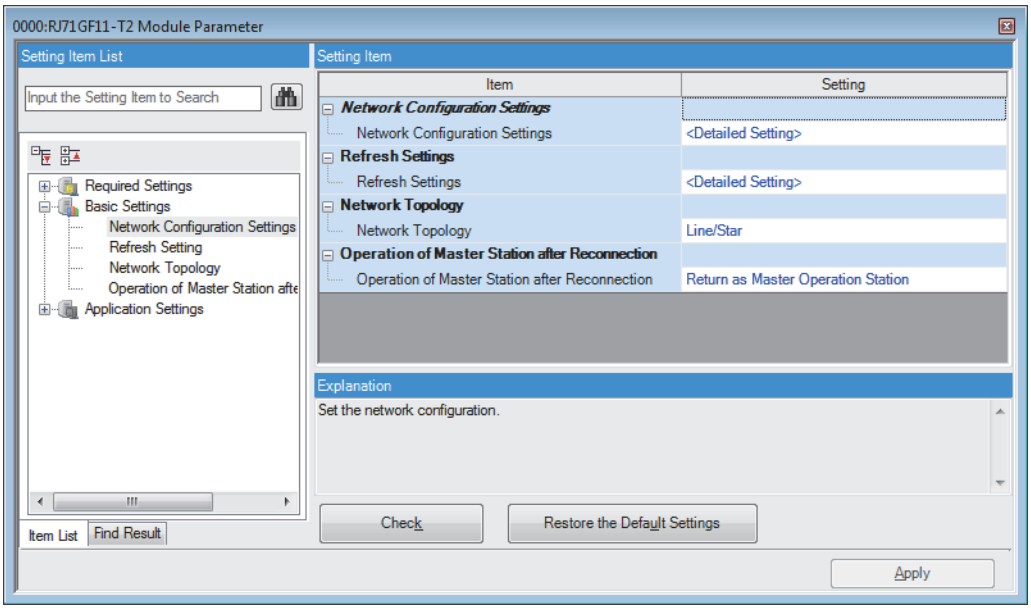
■When using the CCPASET instruction for the parameter setting

The procedure for setting the station number of a local station is shown below.

1. Set "Station Type" and "Network No." in "Required Settings".
2. Set "Setting Method" under "Station No." in "Required Settings" to "Program".
3. Set "Setting Method of Basic/Application Settings" under "Parameter Setting Method" in "Required Settings" to "Program".
4. Set the network parameters using the CCPASET instruction.
5. Set the station number using the UINI instruction.

2.3 Basic Settings

Set the network configurations, refresh settings, or other parameters for the master/local module.



○: Can be set, ×: Cannot be set

Item	Description	Availability			Reference
		Master station	Local station	Submaster station	
Network Configuration Settings	Set parameters of device stations (the number of points and assignment of link devices) in the master station and submaster station.	○	×	○*1	Page 141 Network Configuration Settings
Refresh Settings	Set ranges of link refresh between the following devices. • SB or SW of the master/local module ↔ Module label of the CPU module • SB, SW, or link device of the master/local module ↔ Devices of the CPU module	○	○	○	Page 148 Refresh Settings
Network Topology	Select the topology type according to the actual network configuration.	○	×	○*1	Page 151 Network Topology
Submaster Parameters	Configure the setting for the submaster station. Select whether to set "Network Configuration Settings" in "Basic Settings" or other parameters for the submaster station, or to read parameters of the master station.	×	×	○	Page 151 Submaster Parameters
Operation of Master Station after Reconnection	When using the submaster function, select the operation of the master station for when it returned after disconnection.	○	×	×	Page 151 Operation of Master Station after Reconnection

*1 These items can be set when "Submaster Parameters" is set to "Operate with Parameter of Host Station". Configure the same settings as those of the master station.

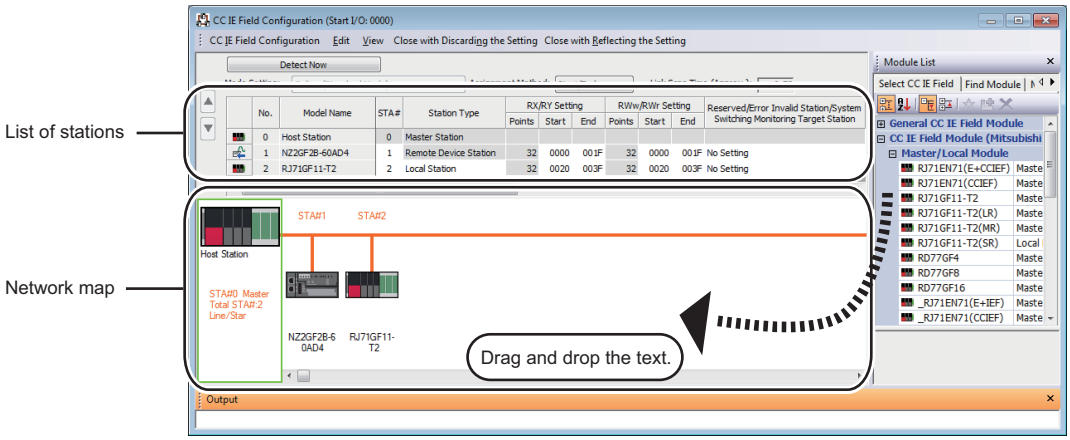
Network Configuration Settings

Set parameters of device stations (the number of points and assignment of link devices) in the master station and submaster station.

Setting procedure

The procedure for the network configuration settings is shown below.

1. Select the module in "Module List" and drag it to the list of stations or the network map.



2. Set the required items.

3. Check the system configuration.

[CC IE Field Configuration] ⇨ [Check] ⇨ [System Configuration]

If an error or a warning message appears on the output window, refer to the following.

MELSOFT Navigator MessageNo.

4. Select [Close with Reflecting the Setting] to finish the network configuration settings.

Point

- When changing the network configuration settings after setting "Safety Communication Setting" under "Application Settings", correct the safety communication setting.
- When creating the list of stations using an external application (Excel), refer to the following.

Page 145 Reflecting the device configuration created by an external application (Excel)

Setting items

Item	Description	Setting range
[Detect Now] button	Automatically reads the information of device stations. For details, refer to the following. iQ Sensor Solution Reference Manual	—
Mode Setting	The mode of the master station is displayed.	—
Assignment Method	Select a link device assignment method. • Point/Start: Enter the points and start numbers of link devices. • Start/End: Enter the start and end numbers of link devices.	• Point/Start • Start/End (Default: Start/End)
Link Scan Time (Approx.)	The approximate link scan time is displayed. For the approximate link scan time, refer to the following. Page 396 Link scan time	—
No.	The total number of device stations and submaster stations set in "Network Configuration Settings" is displayed.	—
Model Name	The module model name is displayed. To set a module where the profile is not registered, select it from the "General CC IE Field Module" list or register the profile before setting the model name. For how to register a profile, refer to the following. GX Works3 Operating Manual	—

Item	Description	Setting range
STA#	Enter the station number of each device station or the submaster station connected to the network. Station numbers do not need to be set consecutively, but must be unique. The station number of the master station is fixed at "0".	1 to 120 (Default: Blank)
Station Type	Select the station type (excluding the master station). Select the station type same as that of the modules connected to the network.	• Remote I/O Station • Remote Device Station • Intelligent Device Station • Local Station • Sub-Master Station • Intelligent Device Station (Loop Duplex) (Default: Varies depending on the set module)
RX/RY Setting	Assign RX/RY points. (☞ Page 21 Communications using RX, RY, RWr, and RWw) Points can be assigned in increments of 16 (Start: □□□0H, End: □□□FH). When "Station Type" is set to "Submaster Station", points can also be assigned for the master station. (☞ Page 74 Submaster Function) To equally assign points or the same points, go to [Equal Assignment] or [Identical Point Assignment] on the [CC IE Field Configuration] menu.	Points • Master Station, Local Station, Intelligent Device Station, Sub-Master Station: 16 to 2048 • Remote Device Station: 16 to 128 • Remote I/O Station: 16 to 64 Device number • 0H to 3FFFH (Default: Varies depending on the set module)
RWw/RWr Setting	Assign RWw/RWr points in increments of 4. (☞ Page 21 Communications using RX, RY, RWr, and RWw) When "Station Type" is set to "Submaster Station", points can also be assigned for the master station. (☞ Page 74 Submaster Function) To equally assign points or the same points, go to [Equal Assignment] or [Identical Point Assignment] on the [CC IE Field Configuration] menu.	Points • Master Station, Local Station, Intelligent Device Station, Sub-Master Station: 4 to 1024 • Remote Device Station: 4 to 64 • Remote I/O Station: Cannot be set. Device number • 0H to 1FFFH (Default: Varies depending on the set module)
Reserved/Error Invalid Station/System Switching Monitoring Target Station	Set this item to set the device station as a reserved station, error invalid station, or system switching monitoring target station. However, the item cannot be set for the submaster station. • No Setting: The device station is connected to the network. • Reserved Station: The device station is reserved for future expansion. By reserving a device station, link device assignment will not change even if the device station is added or the reservation is canceled. Therefore, the program needs not to be modified. Physical connection of the device station is not required. • Error Invalid Station: Even if a device station is disconnected during data link, the master station will not detect the device station as a faulty station. • System Switching Monitoring Target Station: Select this item for the device station whose continuous communication is desired first in case of a communication error. A maximum of two devices can be set on one network only when "RJ71GF11-T2 (MR)" is selected for the module name of the master station.	• No Setting • Reserved Station • Error Invalid Station • System Switching Monitoring Target Station (Default: No Setting)
Pairing	When "RJ71GF11-T2 (SR)" or "RJ72GF15-T2 (SR)" is set on the network configuration, stations set for pairing are displayed.	—
Network Synchronous Communication	Select whether to synchronize the device station using the CC-Link IE Field Network synchronous communication function. When "Synchronous" is selected and the master station is not set as a target module of the inter-module synchronization in "Inter-module Synchronization Setting" in the [Inter-module Synchronization Setting] tab of the "System Parameter" window, an error will occur in the master/local module.	• Asynchronous • Synchronous (Default: Asynchronous)
Alias	Enter the name of a device if required. The name entered is displayed in "Network Status" of the CC-Link IE Field diagnostics. For the extension module of the remote device station, the name is not displayed in the CC-Link IE Field Network diagnostics even if entered.	Up to 8 one-byte characters (Default: Blank)
Comment	Information entered in "Comment1" on the "Properties" window displayed by right-clicking the module in the list of stations or the network map is displayed.	Up to 32 one-byte characters (Default: Blank)
Station-specific mode setting	Set the station-specific mode of the device station. This setting is available only when the device station supports the station-specific mode.	The setting varies depending on the set module.
Module List	The device stations are listed. Drag the modules from "Module List" to the list of stations or the network map to set the information of the device stations into the master station.	—

■Parameter processing of a device station

Select the module in the list of stations. ⇨ [CC IE Field Configuration] ⇨ [Online] ⇨ [Parameter Processing of Device Station]

The parameters of a device station can be read or written. This setting can be executed only when the device station supports "Parameter Processing of Device Station". The setting range varies depending on the target module. For details, refer to the manual for the device station used.

■Parameter processing of the same device station

Select the module in the list of stations. ⇨ [CC IE Field Configuration] ⇨ [Online] ⇨ [The Parameter Processing of Same Device Station]

The parameters of multiple device stations with the same model or same device version can be batch read or written at once. This setting can be executed only when the device station supports "The Parameter Processing of Same Device Station". The setting range varies depending on the target module. For details, refer to the manual for the device station used.

■Command execution of a device station

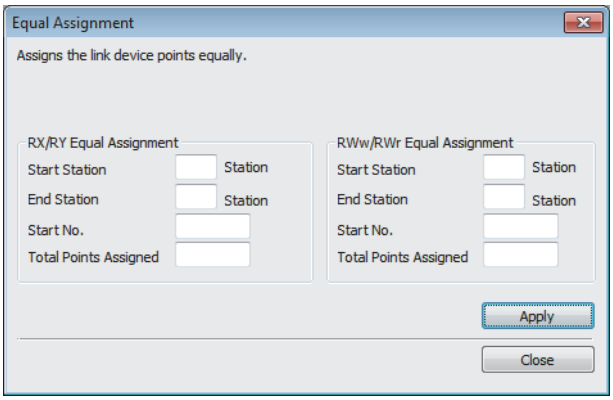
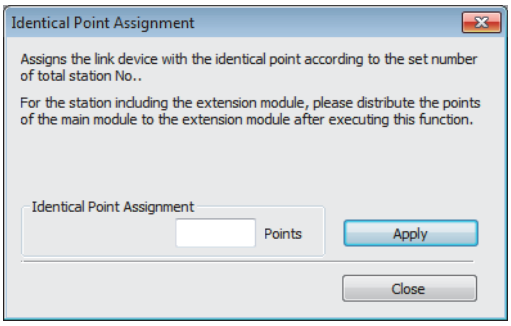
Select the module in the list of stations. ⇨ [CC IE Field Configuration] ⇨ [Online] ⇨ [Command Execution of Device Station]

The command of a device station is executed. This setting can be executed only when the device station supports the command execution. The setting range varies depending on the target module. For details, refer to the manual for the device station used.

■Equal assignment and identical point assignment of link points

Equal assignment and identical point assignment can be set as follows.

[CC IE Field Configuration] ⇨ [Equal Assignment] or [Identical Point Assignment]

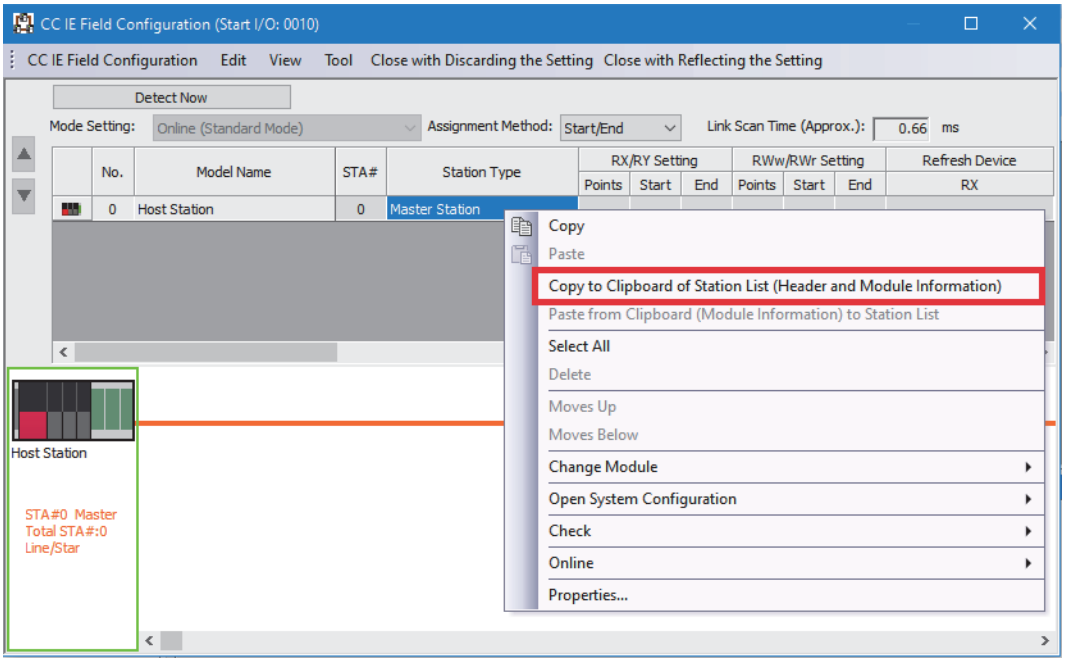
Item	Description	Setting range
Equal Assignment	Specify the start station and end station, and equally assign link devices to stations.  • Start Station: Enter the start station number of stations for which link devices are equally assigned. • End Station: Enter the end station number of stations for 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.	• Start Station: 0 to the end station number • End Station: Number set to "Start Station" to the end station number • Start No.: Same values set in "RX/RY Setting" and "RWw/RWr Setting" • Total Points Assigned: Same values set in "RX/RY Setting" and "RWw/RWr Setting" (Default: Blank)
Identical Point Assignment	Assign the same link device points to all stations.  • Points entered in this field will be reflected to the "Points" of "RX/RY Setting". • Half of the points entered in this field will be reflected to the "Points" of "RWw/RWr Setting".	—

Reflecting the device configuration created by an external application (Excel)

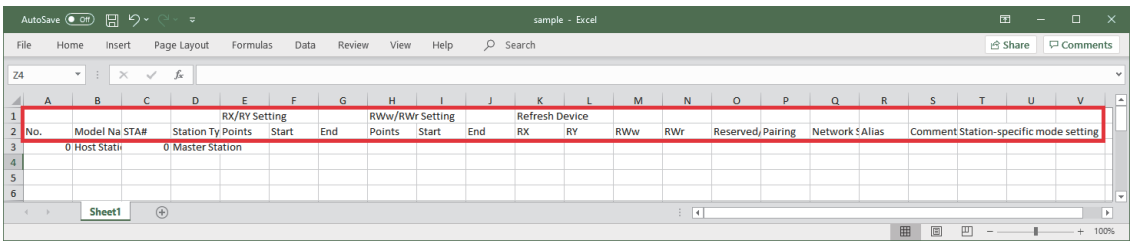
Copy and paste the list of stations in "CC IE Field Configuration" to an external application (such as Excel), and the list can be edited in the external application. The edited data can be copied and pasted from the external application to the list of stations in "CC IE Field Configuration".

■Creating the device configuration

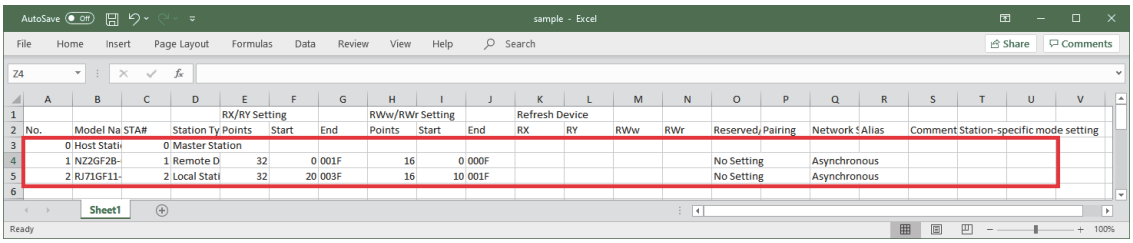
1. Right-click on the list of stations (except for header section) and select "Copy to Clipboard of Station List (Header and Module Information)".



2. Paste the list to the external application (Excel).



3. Enter the device configuration data.

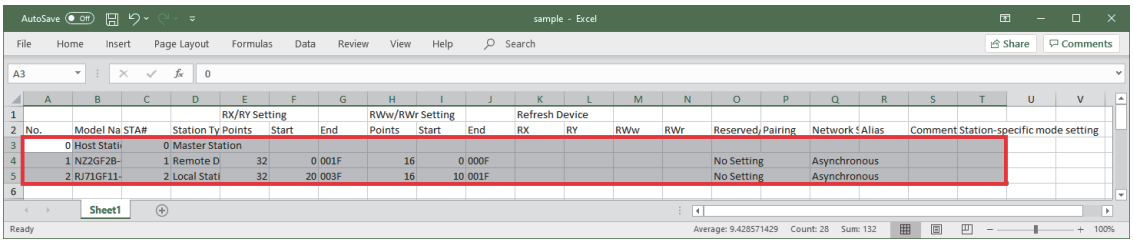


Point

- When the list is pasted to Excel, set the display format of Excel cells to "Text" to display the copied character strings unchanged.
- Enter data which can be set in the list of stations of the engineering tool. Enter values in places that will be grayed out after the device configuration data is pasted to the list of stations as well.

■Example of pasting the device configuration data to the list of stations

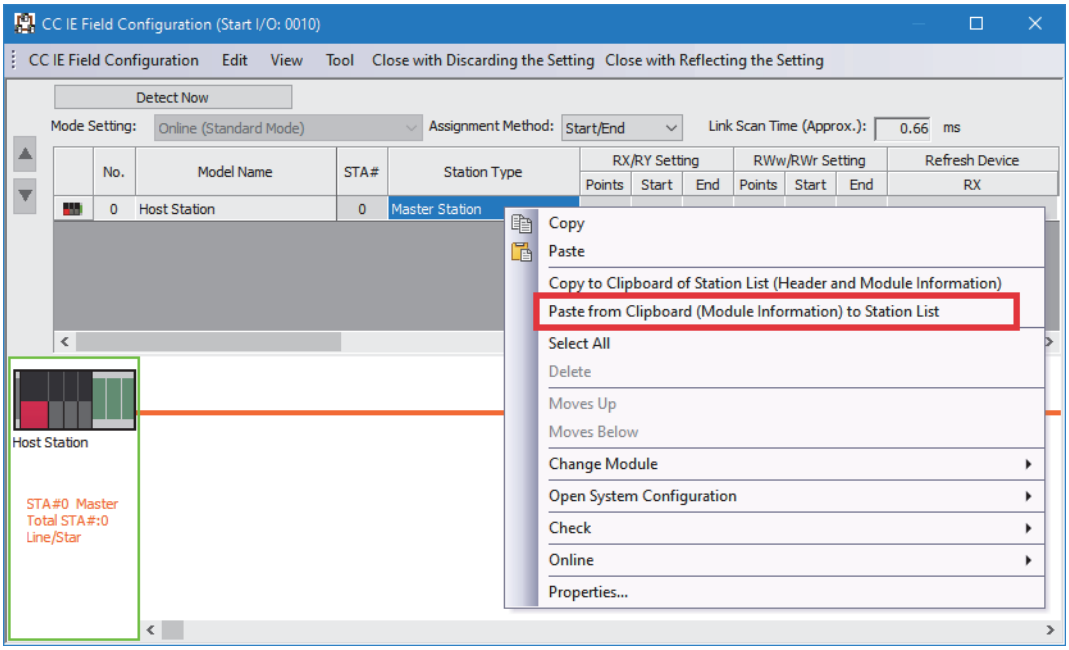
1. Select and copy data as below. (Do not select the header section.)



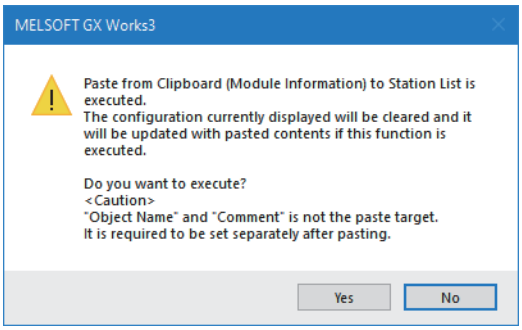
Point

Select all of the data as above regardless of whether the data are pasted to the list of station or not. Otherwise, an error will occur when the data are being pasted.

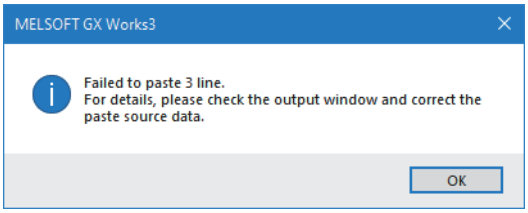
2. Right-click on the list of stations (except for header section) and select "Paste from Clipboard (Module Information) to Station List".

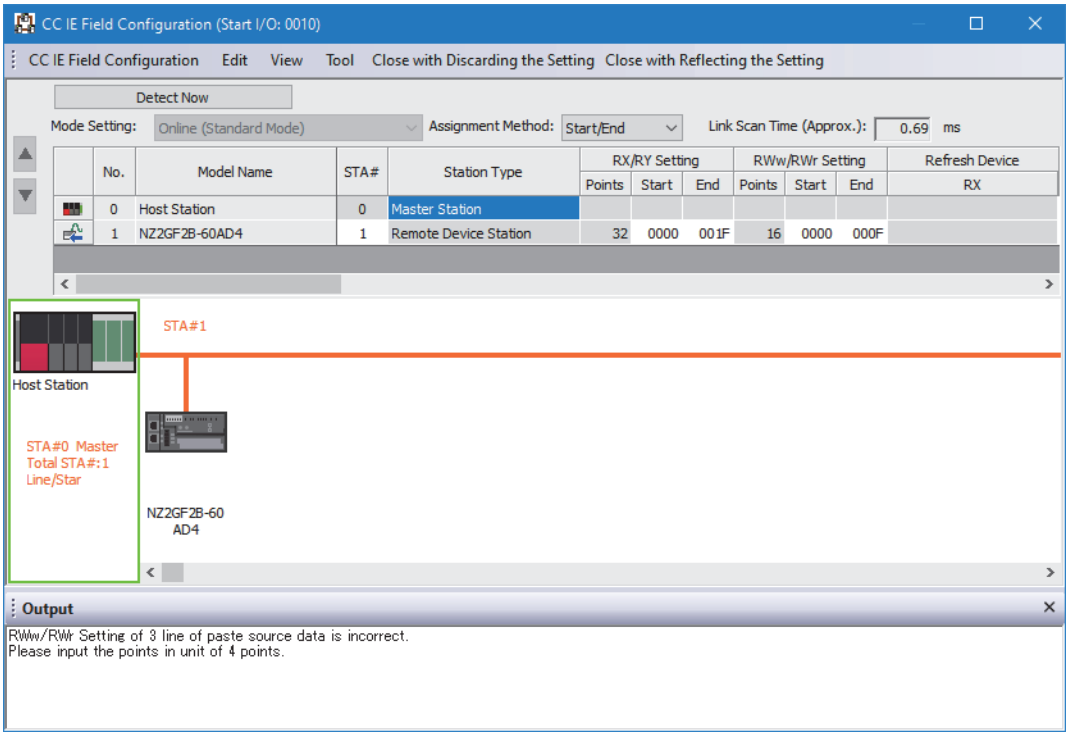


3. If the device configuration data is already set before pasting Excel data, the data of the list of stations will be cleared. However, since information on "Object Name", "Refresh Device", and "Comment" are not pasted, set them again if necessary.

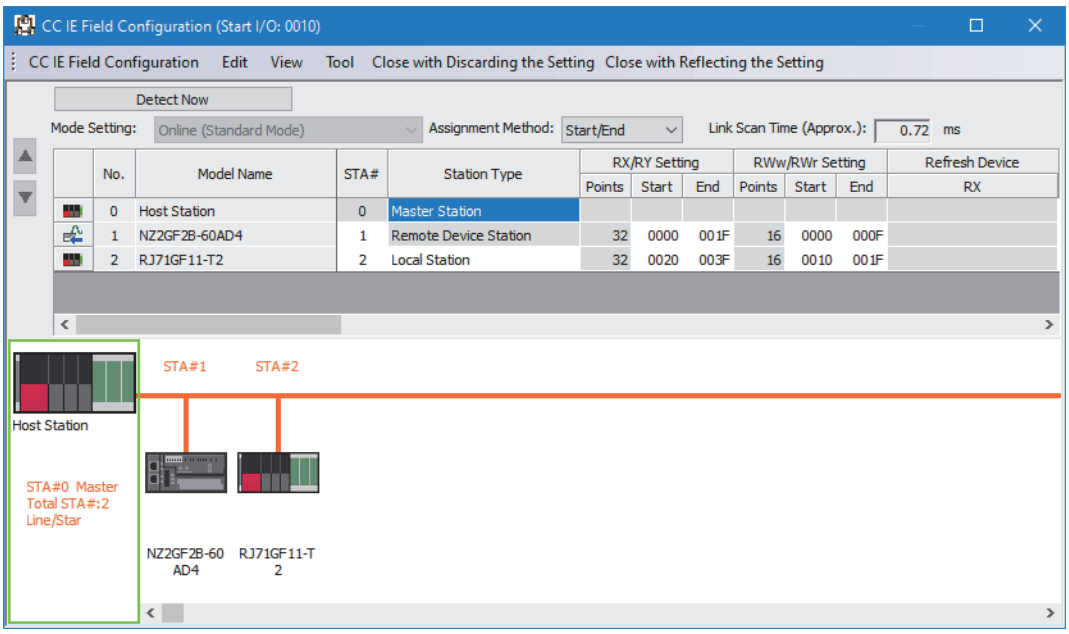


4. If the following message appears, pasting has failed. The error message is displayed in "Output" in the bottom of the "CC IE Field Configuration" window, so take corrective action according to the message. Then, paste the data again.





When the pasting data is correct, the data are reflected to the device configuration as below.



Refresh Settings

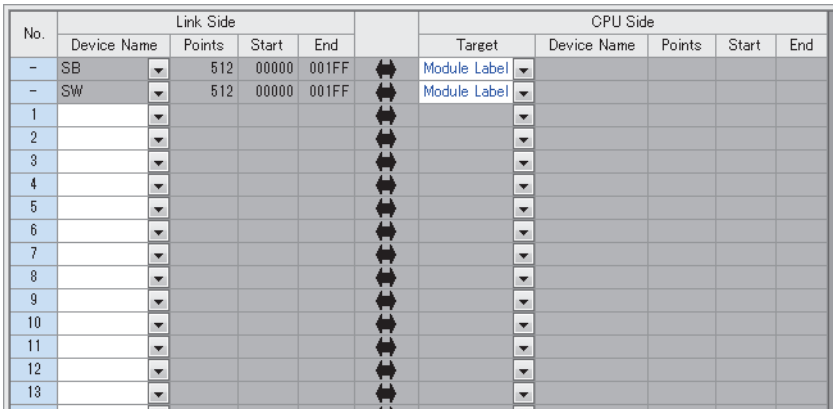
Set ranges of link refresh between the following devices.

- SB or SW of the master/local module ↔ Module label of the CPU module
- SB, SW, or link device of the master/local module ↔ Devices of the CPU module

Setting procedure

The procedure for the refresh settings is shown below.

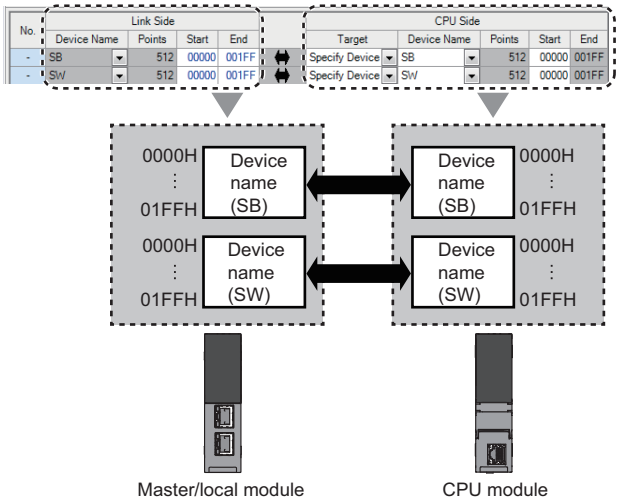
1. Set the required items.

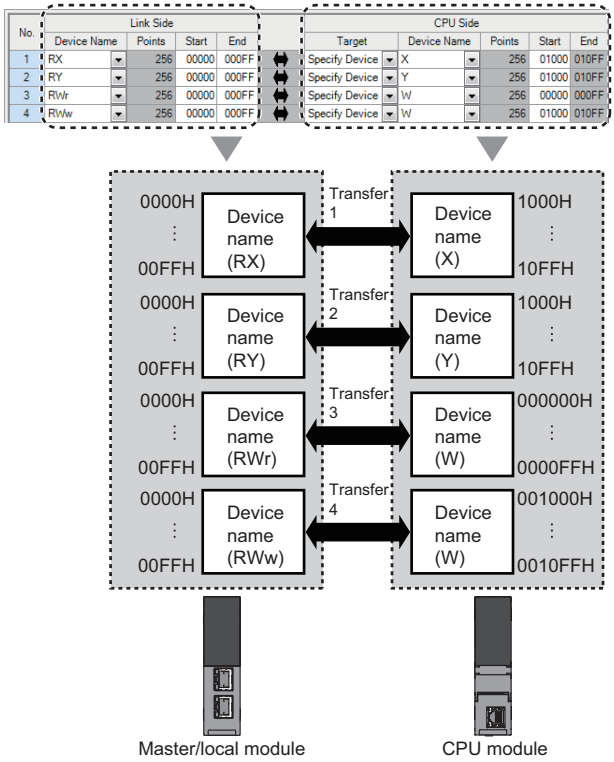


No.	Link Side					CPU Side				
	Device Name	Points	Start	End		Target	Device Name	Points	Start	End
-	SB	512	00000	001FF		Module Label				
-	SW	512	00000	001FF		Module Label				
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										

2. Click the [Apply] button to finish the refresh settings.

Setting items

Item		Description	Setting range
Device Assignment Method		Right-click in the setting window and select a link device assignment method from the "Device Assignment Method" menu. • Start/End: Enter the start and end numbers of link devices. • Points/Start: Enter the points and start numbers of link devices.	• Start/End • Points/Start (Default: Start/End)
—	Link Side	Set the link refresh ranges of SB and SW. One range can be set for each SB and SW. (☞ Page 24 Link refresh) Ex. 	Device Name • SB (fixed) • SW (fixed) Points • SB (fixed): 16 to 512 • SW (fixed): 1 to 512 (Default: 512) Start • SB (fixed): 0H to 1F0H (set in increments of 16 points) • SW (fixed): 0H to 1FFH (set in increments of 1 point) (Default: 0H) End • SB (fixed): FH to 1FFH (set in increments of 16 points) • SW (fixed): 0H to 1FFH (set in increments of 1 point) (Default: 1FFH)
	CPU Side		Target • Module Label • Specify Device (Default: Module Label) Device Name • Module label: — • Specify Device (when link side is SB): SB, M, L, B, D, R, ZR, RD • Specify Device (when link side is SW): SW, M, L, B, D, R, ZR, RD (Default: Blank) Points, Start, End • Range of the device in the CPU module • Set bit devices in increments of 16 points and word devices in increments of 4 points. (Default: Blank)

Item		Description	Setting range
1 to 256	Link Side	Set the link refresh ranges of RX, RY, RWr, and RWw. Up to 256 ranges can be set. (☞ Page 24 Link refresh) Ex.  	Device Name • RX, RY, RWr, RWw (Default: Blank) Points • RX, RY: 16 to 16384 • RWr, RWw: 4 to 8192 (Default: Blank) Start • RX, RY: 0H to 3FF0H (set in increments of 16 points) • RWr, RWw: 0 to 1FFCH (set in increments of 4 points) (Default: Blank) End • RX, RY: 0H to 3FFFH (set in increments of 16 points) • RWr, RWw: 0 to 1FFFH (set in increments of 4 points) (Default: Blank)
	CPU Side		Target • Specify Device (Default: Blank) Device Name • Specify Device (when link side is RX): X, M, L, B, D, W, R, ZR, RD • Specify Device (when link side is RY): Y, M, L, B, D, W, R, ZR, RD • Specify Device (when link side is RWr): M, L, B, D, W, R, ZR, RD • Specify Device (when link side is RWw): M, L, B, D, W, R, ZR, RD (Default: Blank) Points, Start, End • Range of the device in the CPU module • Set bit devices in increments of 16 points and word devices in increments of 4 points. (Default: Blank)

Point

The link devices of the master/local module can be accessed from a program. (☞ Page 26 Direct access to link devices)

Precautions

■Device set to "CPU Side"

Set a device range not to overlap the one used for the following:

- "Refresh Settings" in "Basic Settings" of other network modules
- "Link Refresh Settings" in "Basic Settings" of a CC-Link master/local module
- I/O numbers used for I/O modules and intelligent function modules
- "Refresh settings" of intelligent function modules
- "Refresh Setting between Multiple CPUs" of "CPU Parameter" for a multiple CPU system

■Link refresh range

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

■Changing link device assignment in "Network Configuration Settings" of "Basic Settings"

Correct the set range in "Refresh Settings" of "Basic Settings".

■Setting parameters using the CCPASETX instruction

The module operates without refresh settings. Since the link refresh cannot be performed, use the direct access to access directly to the device.

Network Topology

Select the topology type according to the actual network configuration.

Item	Description	Setting range
Network Topology	Select the topology type according to the actual network configuration. To use the loopback function, select "Ring". (☞ Page 69 RAS)	• Line/Star • Ring (Default: Line/Star)

Submaster Parameters

Configure the setting for the submaster station. Select whether to set the network configuration or other parameters for the submaster station, or to read parameters of the master station.

Item	Description	Setting range
Submaster Parameters	When the submaster station will be powered on earlier than the master station, select "Operate with Parameter of Host Station" and set the following parameters. Configure the same settings as those of the master station. • "Network Configuration Settings" in "Basic Settings" • "Network Topology" in "Basic Settings" • "Link Scan Mode" under "Supplementary Cyclic Settings" in "Application Settings" • "Station-based Block Data Assurance" under "Supplementary Cyclic Settings" in "Application Settings" • "IP Address" in "Application Settings" When "Read Parameters of the Master Station" is selected, the submaster station operates according to the parameters set for the master station.	• Read Parameters of the Master Station • Operate with Parameter of Host Station (Default: Read Parameters of the Master Station)

Operation of Master Station after Reconnection

When using the submaster function, select the operation of the master station for when it returned after disconnection.

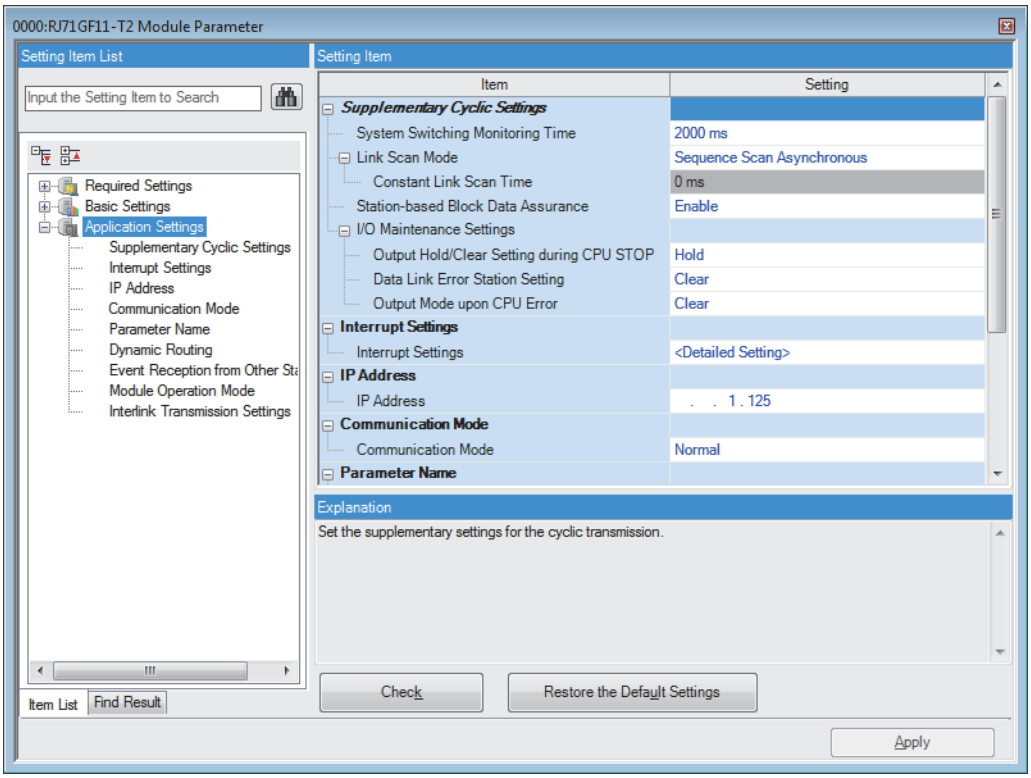
Item	Description	Setting range
Operation of Master Station after Reconnection	When using the submaster function, select the operation of the master station for when it returned after disconnection.	• Return as Master Operation Station*1 • Return as Submaster Operation Station*2 (Default: Return as Master Operation Station)

*1 When "RJ71GF11-T2 (LR)" is selected for the module model name of the master station, the setting is fixed to "Return as Master Operation Station".

*2 When "RJ71GF11-T2 (MR)" is selected for the module model name of the master station, the setting is fixed to "Return as Sub-master Operation Station".

2.4 Application Settings

Set the supplementary cyclic settings, interrupt settings, or other parameters for the master/local module.



○: Can be set, ×: Cannot be set

Item	Description	Availability			Reference
		Master station	Local station	Submaster station	
Supplementary Cyclic Settings	Set the system switching monitoring time, link scan mode, station-based block data assurance, and I/O maintenance setting.	○	○	○*1	Page 154 Supplementary Cyclic Settings
Interrupt Settings	Set conditions for sending an interrupt request to the CPU module.	○	○	○	Page 156 Interrupt Settings
IP Address	Set the IP address of the master station and submaster station to communicate with Ethernet device over CC-Link IE Field Network.	○	×	○*1	Page 159 IP Address
Communication Mode	Set the communication mode of the own station.	○	×	○	Page 159 Communication Mode
Parameter Name	Set a name for the module parameter if desired.	○	○	○	Page 160 Parameter Name
Dynamic Routing	Select whether to enable the dynamic routing function.	○	○	○	Page 160 Dynamic Routing
Event Reception from Other Stations	Select whether to obtain the events occurring in the other stations.	○	○	○	Page 160 Event Reception from Other Stations
Module Operation Mode	Set the mode of the master/local module.	○	○	○	Page 161 Module Operation Mode
Interlink Transmission Settings	Set link device ranges when cyclic data are transferred from a station in the own network to a station in another network.	○	×	○	Page 161 Interlink Transmission Settings
Safety Communication Setting	Set whether to use the safety communication function or not and set the safety connections and transfer ranges of safety devices. This item can be set only in a project of the SIL2 Process CPU or the Safety CPU.	○*2	○*3	×	Page 166 Safety Communication Setting

Item	Description	Availability			Reference
		Master station	Local station	Submaster station	
Redundant System Settings	Set the redundant system function. This setting is available only when "RJ71GF11-T2 (MR)", "RJ71GF11-T2 (SR)", or "RJ71GF11-T2 (LR)" is selected for the module model name.	○	○	×	Page 173 Redundant System Settings

*1 These items can be set when "Submaster Parameters" of "Basic Settings" is set to "Operate with Parameter of Host Station". Configure the same settings as those of the master station.

*2 For a project of the SIL2 Process CPU, this setting is available only when "RJ71GF11-T2 (MR)" or "RJ71GF11-T2 (LR)" is selected for the module model name.

*3 This item can be set only in a project of the Safety CPU.

Supplementary Cyclic Settings

Set the link scan mode, station-based block data assurance, and I/O maintenance setting.

Item		Description	Setting range
System Switching Monitoring Time		When the network contains a redundant system, set the time (in increments of 5ms) from when any of the system switching causes below arises until a system switching request is issued. This setting is available only for the master station and submaster station. • Data link stop ('Data link error status of own station' (SB0049) is on.) • Detection of error in communication with system switching monitoring target station (for redundant master station configuration only) • Detection of error in device station (only in redundant line configuration)	5 to 5000ms (Default: 2000ms)
Link Scan Mode	Link Scan Mode	Select a link scan mode. ■Sequence Scan Asynchronous Link scan is performed asynchronously with the sequence scan of the CPU module. Select this item to shorten input transmission delay time when sequence scan takes much more time than link scan. Note that output transmission delay time will become longer. ■Constant Link Scan Cyclic transmission is performed punctually. Link scan time will be the constant link scan time specified in "Constant Link Scan Time". However, when the actual link scan time is longer than the specified link scan time, cyclic transmission is performed by actual link scan time. ■Sequence Scan Synchronous Setting Link scan is performed synchronously with the sequence scan of the CPU module. Select this item to shorten output transmission delay time or to keep transmission delay time constant.*1*2	• Sequence Scan Asynchronous • Constant Link Scan • Sequence Scan Synchronous Setting (Default: Sequence Scan Asynchronous)
	Constant Link Scan Time	Set the constant link scan time when "Link Scan Mode" is set to "Constant Link Scan".	1ms to 200ms (Default: 0ms*3)
Station-based Block Data Assurance		Select whether to ensure a data integrity of the data blocks being refreshed between the master/local module and the CPU module. (☞ Page 28 Cyclic data integrity assurance)	• Enable • Disable (Default: Enable)
I/O Maintenance Settings	Output Hold/Clear Setting during CPU STOP	Set whether to hold or clear output when the status of the CPU module changes from RUN to STOP. Set it on the sending side. (☞ Page 37 Output hold/clear setting during CPU STOP)	• Hold • Clear (Default: Hold)
	Data Link Error Station Setting	Set whether to hold or clear input from a disconnected station. Set it on the receiving side. (☞ Page 36 I/O maintenance settings)	• Clear • Hold (Default: Clear)
	Output Mode upon CPU Error	Set whether to hold or clear output when a stop error occurs in the CPU module. Set it on the sending side. (☞ Page 36 I/O maintenance settings)	• Clear • Hold (Default: Clear)

*1 When sequence scan takes much time than link scan, input transmission delay time will become longer.

*2 The sequence scan must be constant as well. Set "Constant Scan Setting" in "RAS setting" of "CPU Parameter".

*3 When "Link Scan Mode" is set to "Constant Link Scan", enter values within the ranges.

Precautions

■For a redundant master station

When the value of "System Switching Monitoring Time" is set less than 550ms, a system switching may occur by the following operation. To prevent the system switching, the value of "System Switching Monitoring Time" is set to 550ms or more.

- When the redundant configuration splits into two systems due to cable disconnection or other problem and returns to a single system by resolving the disconnection

■When "Link Scan Mode" is set to "Sequence Scan Synchronous Setting"

Modify the program so that the sequence scan time of the CPU module will be within 200ms. If 200ms is exceeded, device stations may be disconnected.

Interrupt Settings

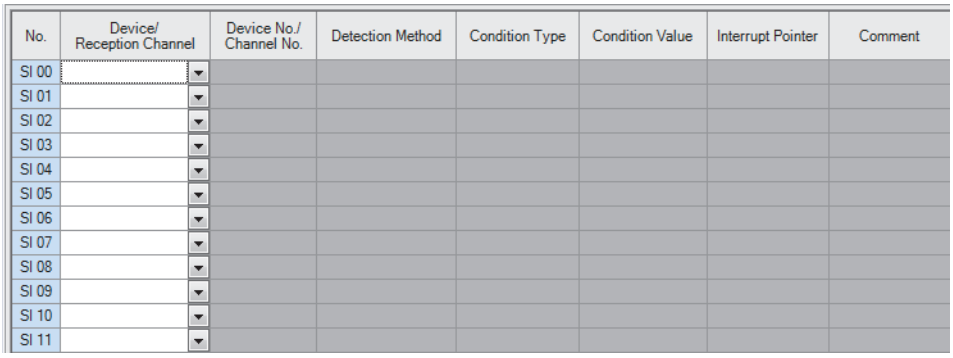
Set conditions for sending an interrupt request to the CPU module.

Setting procedure

The procedure for the interrupt settings is shown below.

1. Set the interrupt conditions.

Up to 16 interrupt conditions can be set.



No.	Device/ Reception Channel	Device No./ Channel No.	Detection Method	Condition Type	Condition Value	Interrupt Pointer	Comment
SI 00							
SI 01							
SI 02							
SI 03							
SI 04							
SI 05							
SI 06							
SI 07							
SI 08							
SI 09							
SI 10							
SI 11							

2. Click the [Apply] button to finish the interrupt settings.

Setting items

Item	Description	Setting range
Word Device Setting Value Input Format	Right click in the setting window and select from the "Word Device Setting Value Input Format" menu.	• Decimal • Hexadecimal (Default: Decimal)
Device/Reception Channel	Set an interrupt condition device. Set the channel number when "Device/Reception Channel" is set to "Reception Channel".	Refer to the following table.
Device No./Channel No.		
Detection Method	Select the detection timing of an interrupt generated by the device set in "Device/Reception Channel" and "Device No./Channel No.".	
Condition Type		
Condition Value	When "RWw", "RWr", or "SW" is selected in "Device/Reception Channel", enter a word device value that triggers an interrupt.	
Interrupt Pointer	Set an interrupt pointer (I) to be used for an interrupt program.	
Comment	Set a comment for the interrupt pointer used.	—

(Setting range)

Device/Reception Channel	Device No./ Channel No.	Detection Method	Condition Type	Condition Value	Interrupt Pointer
RX	0H to 3FFFH	Level + ON: Interrupt occurs by turning on the device. Level + OFF: Interrupt occurs by turning off the device. Edge + ON: Interrupt occurs at the rising edge of the device. Edge + OFF: Interrupt occurs at the falling edge of the device.		—	Device: I0 to I15, I50 to I1023
RY	0H to 3FFFH				
SB	0H to 1FFH				
RWr	0H to 1FFFH	Level + Values Match: Interrupt occurs when values match. Level + Values Mismatch: Interrupt occurs when values do not match. Edge + Values Match: Interrupt occurs when values match (first time only). Edge + Values Mismatch: Interrupt occurs when values do not match (first time only).		0 to 65535 (0H to FFFFH)	
RWw	0H to 1FFFH				
SW	0H to 1FFH				
Reception Channel	1 to 8	Edge (fixed)	Reception Completed (fixed)*1	—	

*1 An interrupt occurs when the channel specified in "Device No./Channel No." receives data.

Point

Using an interrupt program will eliminate the need for describing a start condition in a program. This leads to reduction in the number of steps and sequence scan time.

Precautions

■When "Detection Method" is set to "Level" and the interrupt condition is always met

If the sequence scan takes much longer than the link scan, since interrupt processing is activated in each link scan, sequence scan time may greatly increase, resulting in a watchdog timer error of the CPU module.
When "Detection Method" is set to "Level" and the interrupt condition is always met, do not use interrupt settings and correct the interrupt condition in the program.

■Before executing an interrupt program

Execute the EI instruction in a main routine program and enable an interrupt. (MELSEC iQ-R CPU Module User's Manual (Application))

■When multiple interrupts have simultaneously occurred

The operation may delay.

■When the mode of the master/local module is "Module Communication Test" or "Offline"

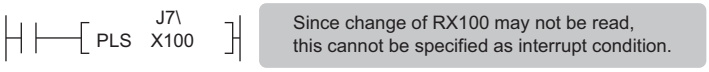
The master/local module can send an interrupt request to the CPU module when the mode is "Online". The module cannot send the request when the mode is "Module Communication Test" and "Offline".

■Starting an interrupt program by the rising/falling edge of the specified device

Do not start an interrupt program using instructions, such as PLS and PLF, that depend on the rising/falling edge of the specified devices because changes in devices might not be read.

Ex.

Sending an interrupt request by turning on RX100 in a station in network No.7



■An interrupt cannot be generated

Changes in the interrupt condition device cannot be detected if the change is shorter than the transmission delay time.

■Using cyclic data in an interrupt program

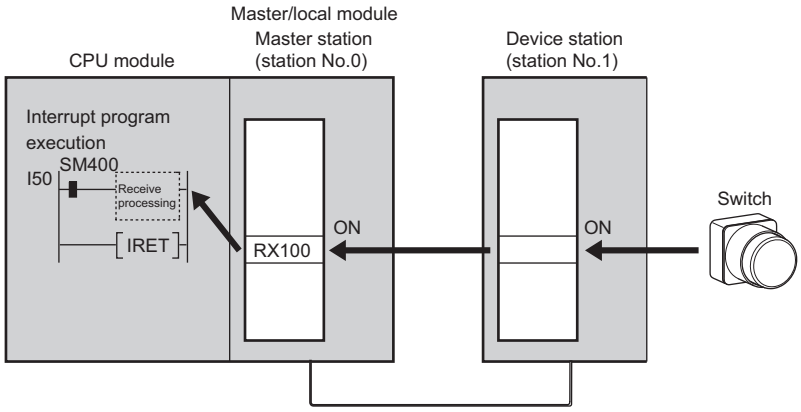
When an interrupt program is executed, link refresh is not performed to CPU module devices. Directly access the link devices of the master/local module by direct access.

Setting examples

■Starting the interrupt program of the master station (station No.0) when RX100 turns on

Ex.

The following is a setting example to execute the interrupt program corresponding to the interrupt pointer I50 when RX100 turns on by turning on the corresponding switch on the device station side.



1. Set the interrupt setting parameters for the master/local module (station No.0) as shown below.

No.	Device/ Reception Channel	Device No./ Channel No.	Detection Method	Condition Type	Condition Value	Interrupt Pointer	Comment
SI 00	RX	00100	Edge	ON		I50	
SI 01							

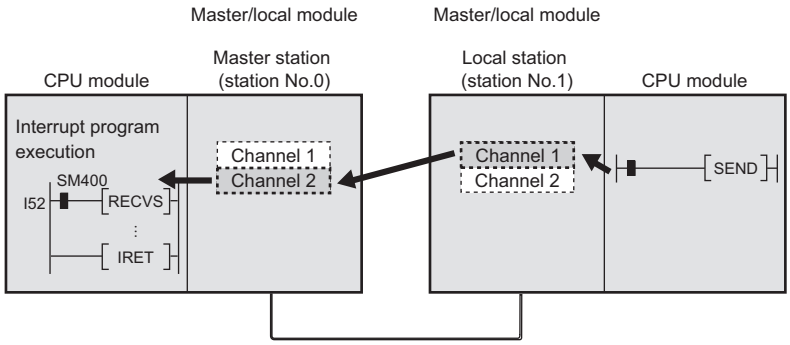
Point

By using SB or SW as an interrupt condition device, an interrupt program can be started if data link error occurs. (☞ Page 348 List of SB, Page 369 List of SW).

■Starting the interrupt program of the master station (station No.0) when the master station receives data sent from another station using the SEND instruction

Ex.

The following is a setting example to execute the interrupt program corresponding to the interrupt pointer I52 when the master station (station No.0) receives data sent from the local station (station No.1) using the SEND instruction in channel 2.



1. Set the interrupt setting parameters for the master/local module (station No.0) as shown below.

No.	Device/ Reception Channel	Device No./ Channel No.	Detection Method	Condition Type	Condition Value	Interrupt Pointer	Comment
SI 00	Reception Channel	2	Edge	Reception Con		I52	
SI 01							

IP Address

Set the IP address of the master station and submaster station to communicate with Ethernet device over CC-Link IE Field Network. (☞ Page 48 Rules for the IP address setting)

Item	Description	Setting range
IP Address	Only the network address part (first and second octets) of the IP address needs to be set. The network number part (third octet) and the station number part (fourth octet) are automatically set. • Set an IP address for the master station and submaster station only. • Use the same network address for the request source device, request destination device, and modules among them. • Whether the network address of the master station matches with that of the submaster station can be checked with 'Mismatch status of the master operating station IP address' (SB0080) • Since automatically assigned, an IP address needs not to be set for local stations. (The network address same as that of the master station is automatically set.)	First octet: 0 to 223 Second octet: 0 to 255

Communication Mode

Set the communication mode of the own station. Select the communication mode from "Normal", "High-Speed", or "High-Speed Remote Net".

Item	Description	Setting range
Communication Mode	Normal • Cyclic and transient transmission are performed without losing their inherent speed performance. This mode is suitable for a system that transmits large amount of data for management, monitoring, and diagnostics by transient transmission along with I/O control or analog control. (☞ Page 438 Differences in Cyclic Transmission Modes) Use this mode for general application. High-Speed • Cyclic transmission has a priority over transient transmission. This mode is suitable for applications requiring lower cycle times such as I/O control, analog control, and digital I/O. (☞ Page 438 Differences in Cyclic Transmission Modes) High-Speed Remote Net • This mode restricts the connectable station type to the intelligent device station, remote device station, and remote I/O station and further speeds up the link scan time of high-speed mode. This mode is effective when the total number of stations or points of link device used in a network is large. (☞ Page 438 Differences in Cyclic Transmission Modes)	• Normal • High-Speed • High-Speed Remote Net (Default: Normal)

Restriction

- In "High-Speed" mode, the maximum number of points assigned to RWw/RWr is 256 points per local station.
- In "High-Speed" and "High-Speed Remote Net" mode, the priority of transient transmission is lower and its processing speed is slower than in "Normal" mode.
- The "High-Speed Remote Net" mode can be set only for the master station.
- When "To Use or Not to Use the Safety Communication Setting" in "Application Settings" is set to "Use", the "High-Speed Remote Net" mode cannot be selected.
- When "RJ71GF11-T2 (MR)", "RJ71GF11-T2 (SR)", or "RJ71GF11-T2 (LR)" is selected for the module name, the "High-Speed Remote Net" mode cannot be selected.
- For RJ71EN71 and RnENCPU, when the "Port 1 Network Type" is set to "Ethernet" and "Port 2 Network Type" is set to "CC-Link IE Field", the "High-Speed Remote Net" mode cannot be selected.
- When the "High-Speed Remote Net" mode is selected, the CC-Link IE Field Network communication unit (GT15-J71GF13-T2) cannot be connected. Therefore, the GOT on which the CC-Link IE Field Network communication unit (GT15-J71GF13-T2) is mounted cannot be connected.
- When "High-Speed Remote Net" is selected, the safety communication function cannot be used.

Parameter Name

Set a name for the module parameter if desired.

Item	Description	Setting range
Parameter Name	Set a name for the module parameter if desired.	Up to 8 one-byte or two-byte characters (Default: Blank)

Dynamic Routing

Select whether to enable the dynamic routing function.

Item	Description	Setting range
Dynamic Routing	When communicating with different networks, select whether to enable the dynamic routing function.	• Enable • Disable (Default: Enable)

For details, refer to the following.

☞ Page 41 Communications with different networks

Event Reception from Other Stations

Select whether to obtain the events occurring in the other stations.

Item	Description	Setting range
Event Reception from Other Stations	Select whether to obtain the events occurring in the other stations.	• Enable • Disable (Default: Enable)

Module Operation Mode

Set the mode of the master/local module.

For the RJ71EN71 and RnENCPU, when the "Port 1 Network Type" is set to "Ethernet" and "Port 2 Network Type" is set to "CC-Link IE Field", set both of the P1 and P2 to the same mode.

For a redundant system, select the module operation mode of system A.

Item	Description	Setting range
Module Operation Mode	Online • Select this mode to connect the master/local module to the network for performing 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. Module Communication Test • Select this mode to check the hardware of the master/local module. Select this mode to check the module hardware when communication is unstable. (☞ Page 273 Module communication test)	• Online • Offline • Module Communication Test (Default: Online)

Restriction

The following functions are disabled when "Module Operation Mode" is set to "Offline" or "Module Communication Test". (☞ Page 21 FUNCTIONS)

- Cyclic transmission
- Transient transmission
- RAS (device station disconnection, automatic return, loopback function, submaster function)
- CC-Link IE Field Network synchronous communication function
- Interrupt request to CPU module
- IP packet transfer function
- Safety communication function

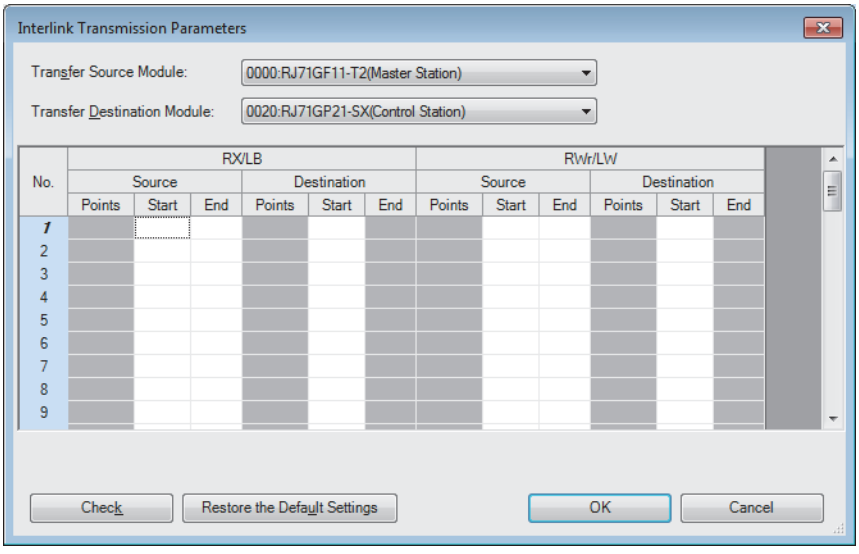
Interlink Transmission Settings

Set link device ranges when cyclic data are transferred from a station in the own network to a station in another network.

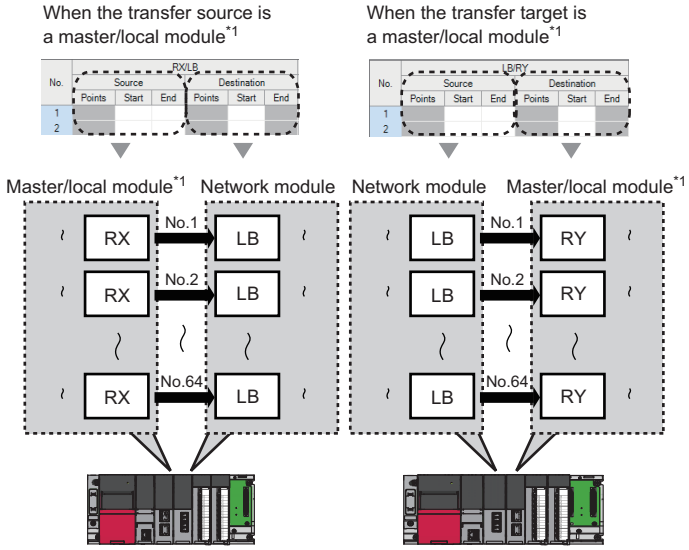
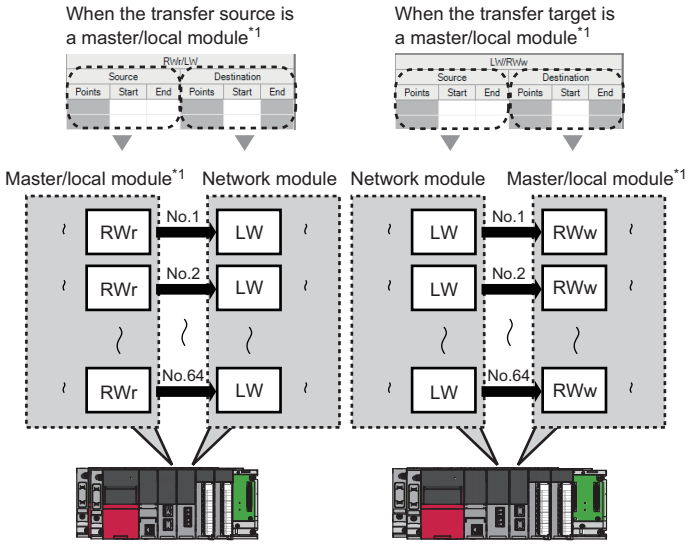
Setting procedure

The procedure for the interlink transmission settings is shown below.

1. Select combination of modules in the "Transfer Source Module" and "Transfer Destination Module" boxes and enter setting values.



2. Click the [OK] button to finish the interlink transmission settings.

Item		Description	Setting range
Setting Method		Right-click in the "Interlink Transmission Parameters" window and select a link device setting method from the "Setting Method" menu. • Start/End: Enter the start and end numbers of link devices. • Points/Start: Enter the points and start numbers of link devices.	• Start/End • Points/Start (Default: Start/End)
Transfer Source Module Transfer Destination Module		Select the combination of transfer source and target modules.	The setting varies depending on the set module.
RX/LB LB/RY	Source Destination	Enter the link device range of the transfer source and destination modules. Up to 64 ranges can be set. RX and RY points can be assigned in increments of 16 (Start: □□□0H, End: □□□FH). When the transfer source is a master/local module*1 / When the transfer target is a master/local module*1 	RX: 0H to 3FFFH RY: 0H to 3FFFH (Default: Blank)
RWr/LW LW/RWw	Source Destination	Enter the link device range of the transfer source and destination modules. Up to 64 ranges can be set. RWr and RWw points can be assigned in increments of 4. When the transfer source is a master/local module*1 / When the transfer target is a master/local module*1 	RWr: 0H to 1FFFH RWw: 0H to 1FFFH (Default: Blank)

*1 The ranges can be set for the master station and submaster station.

Point

Link devices set for "Source" can be overlapped. Doing so will allow transfer of the same link devices to multiple network modules.

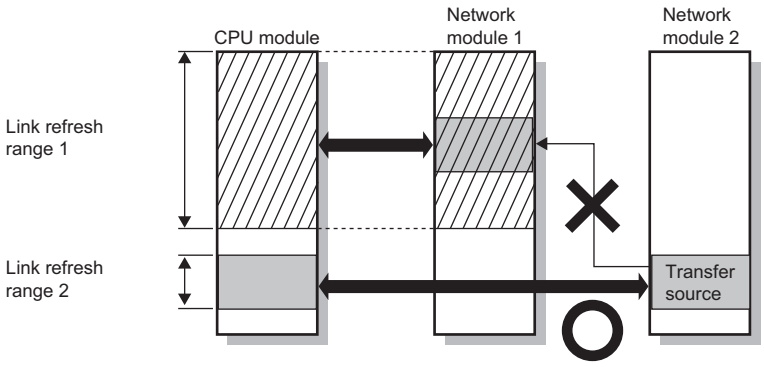
Precautions

■Modules supporting interlink transmission

- RJ71GN11-T2 (master station)
- CC-Link IE Controller Network-equipped module (control station, normal station)
- CC-Link IE Field Network-equipped module (master station and submaster station)
- RJ71LP21-25 (control station and normal station)

■Transfer destination link device setting

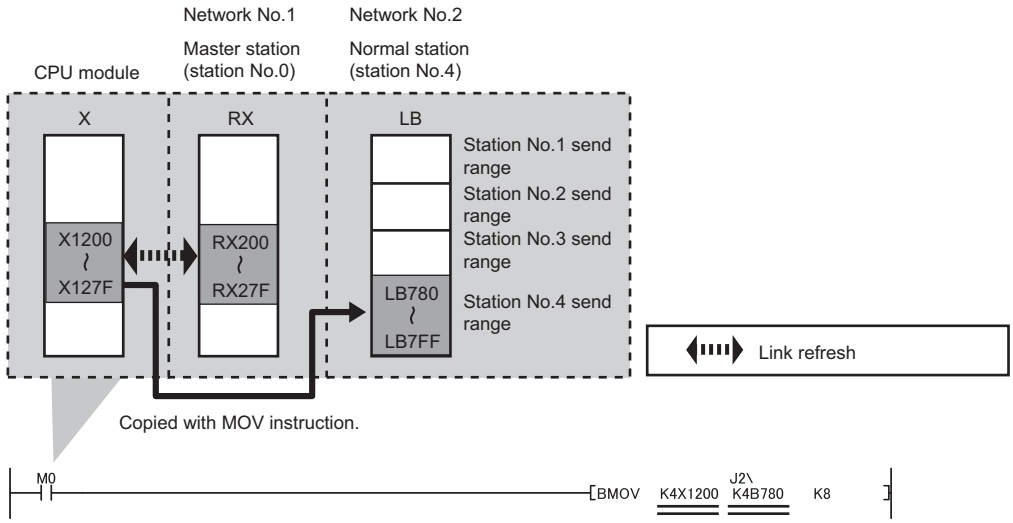
Do not use link devices set for link refresh range as a transfer target. If doing so, transfer target link devices will be overwritten by link refresh. To use transfer target link device data in the CPU module, set the transfer source link device as the link refresh range.



■Setting 65 or more interlink transmission ranges

Use link direct devices in a program to perform interlink transmission.

Ex.



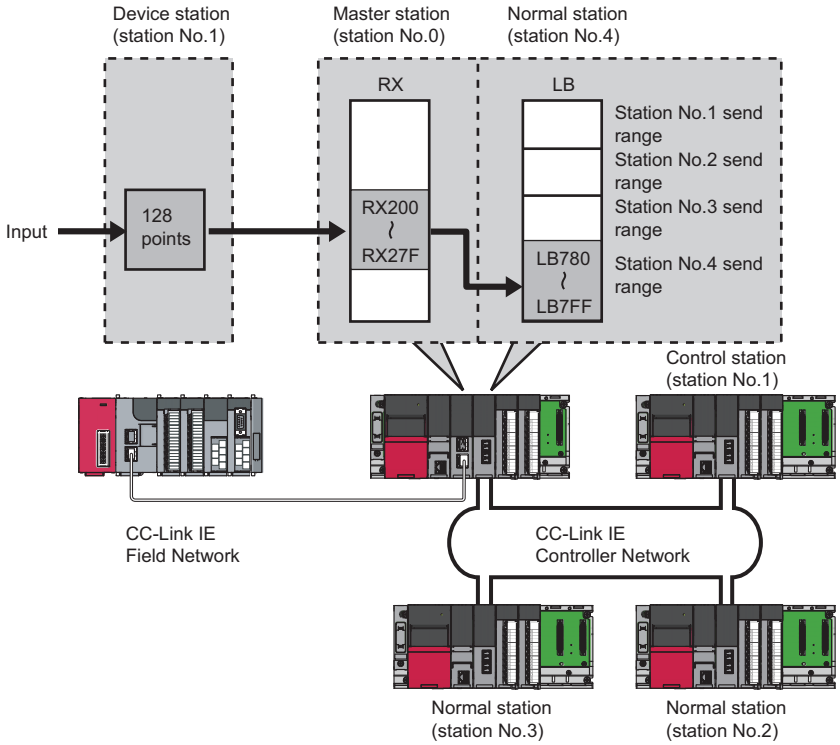
Link direct device cannot be specified for both the first and second arguments. Specify CPU device by link refresh for either one.

■Performing interlink transmission in a multiple CPU system

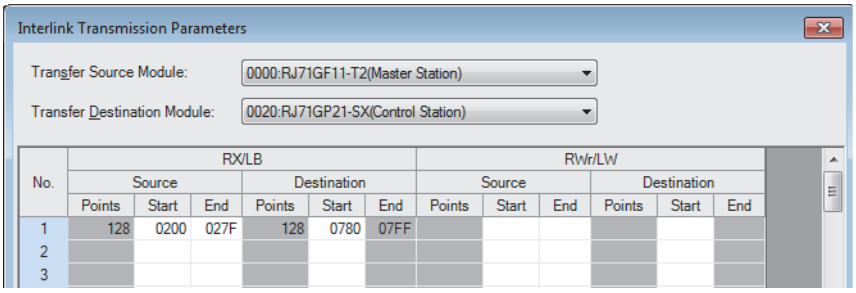
When different control CPUs are set for the network modules, interlink transmission cannot be performed using interlink transmission parameters or a program. Perform interlink transmission using data communication by the CPU buffer memory. (MELSEC iQ-R CPU Module User's Manual (Application))

Setting example

The following is a setting example to perform interlink transmission from the master station on CC-Link IE Field Network to stations on CC-Link IE Controller Network. In this example, 128-point data input from the device station (station No.1) is transferred.



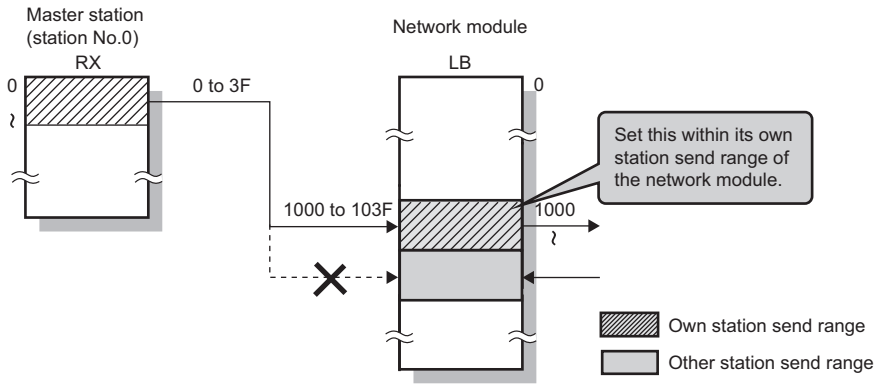
1. Select "0000: RJ71GF11-T2 (Master Station)" for "Transfer Source Module" and "0020: RJ71GP21-SX (Normal Station)" for "Transfer Destination Module", and enter the transfer ranges of link devices.



2. Click the [OK] button.

Point

If the transfer target network module is on a network other than CC-Link IE Field Network, set the transfer target link devices within the own station send range of the network module. If the link devices are set within the send range of another station, the transferred data are overwritten with the send data of another station.



Safety Communication Setting

Set whether to use the safety communication function or not and set safety connections.

Item	Description	Setting range
To Use or Not to Use the Safety Communication Setting	Set whether to use the safety communication function or not.	• Not Use • Use (Default: Not Use)
Safety Communication Setting	Set the connection setting that performs safety communications, the safety device transfer range, and the safety protocol version.	☞ Page 168 Setting items

Restriction

Set the following items before configuring the safety communication setting.

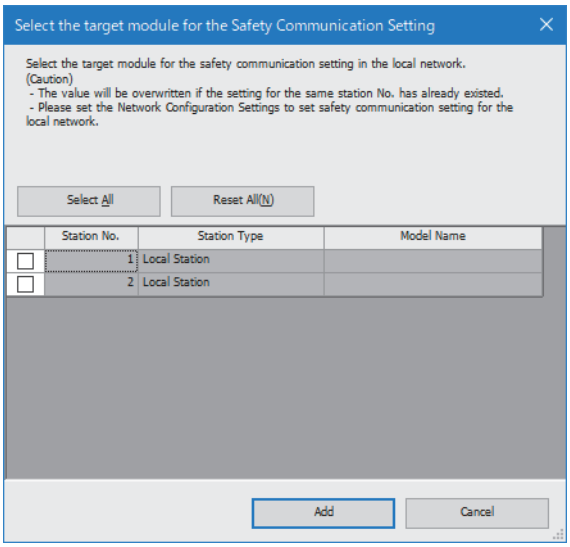
- "Network Configuration Settings" in "Basic Settings" (☞ Page 141 Network Configuration Settings)
- "Parameter Processing of Device Station" in "Network Configuration Settings" under "Basic Settings" (📖 User's manual for the device station used)

If the above items are not set, the device station is not displayed as the target module in "Select the target module for the Safety Communication Setting" window and safety communications cannot be set.

Setting procedure

The procedure for the safety communication setting is shown below.

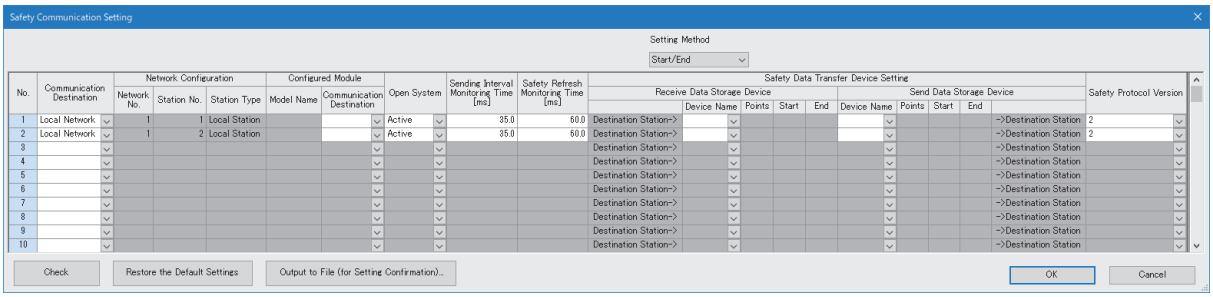
1. Set "Communication Destination" to "Local Network".
2. For the master station, select the target module of safety communications in "Select the target module for the Safety Communication Setting" window and click the [Add] button.



Point

- For a system using the SIL2 Process CPU, click the [Import Setting] button in the "Select the target module for the Safety Communication Setting" window, and import the project of the remote head module. Only the module set to the SIL2 mode Main of the intelligent device station (safety station) is displayed.
- In the system using the SIL2 Process CPU, set the safety connection of the master station (safety station) and the intelligent device station (safety station) to the same setting. If the safety connection settings are different, the safety communications may not be performed.

3. Set the required items.



4. Click the [OK] button to finish the safety communication setting.

Setting items

Item		Description	Setting range
Setting Method		Select an assignment method in "Safety Data Transfer Device Setting". • Start/End: Enter the start and end numbers of safety devices. • Points/Start: Enter the points and start numbers of safety devices.	• Start/End • Points/Start (Default: Start/End)
No.		Safety connection number for distinguishing settings for each safety connection.	1 to 120[*1]
Communication Destination		Set a network of the communication destination.	Local Network (Default: Blank)
Network Configuration	Network No.	Displays the local network number.	—
	Station No.	• When the own station is the master station: The station number of communication destination selected in "Select the target module for the Safety Communication Setting" window is displayed. • When the own station is a local station: Set the station number of communication destination.	• When the own station is the master station: — • When the own station is a local station: 0 to 120 (Default: Blank)
	Station Type	When the own station is the master station, the station type of the communication destination selected in "Select the target module for the Safety Communication Setting" window is displayed.	—
Configured Module	Base No.[*2]	When the own station is the master station, the base number of the communication destination selected in "Select the target module for the Safety Communication Setting" window is displayed. (For the intelligent device station only)	—
	Mounting slot number[*2]	When the own station is the master station, the mounting slot number of the communication destination selected in "Select the target module for the Safety Communication Setting" window is displayed. (For the intelligent device station only)	—
	Model Name	When the own station is the master station, the module model name of the communication destination selected in "Select the target module for the Safety Communication Setting" window is displayed. (Only device station other than the local station)	—
	Communication Destination	In the following cases, set the Safety CPU model name of the communication destination. (Only when the Safety CPU is used) • When the own station is a master station: When the communication destination is a local station and the open system of the own station is Active • When the own station is a local station: When the open system of the own station is Active	• R08SFCPU • R16SFCPU • R32SFCPU • R120SFCPU (Default: Blank)
Open System[*3]		Set the open system of the own station. • Active: Safety connections are established from the own station. • Passive: Safety connections are established from the communication destination.	• Active • Passive (Default: Blank)
Sending Interval Monitoring Time [ms]		In each safety connection, set sending interval monitoring time for a receiving station to detect safety communication errors.	■When the Safety CPU is used 3.0 to 1000.0 (Default: Blank) ■When the SIL2 Process CPU is used 30.0 to 3000.0 (Default: Blank)
Safety Refresh Monitoring Time [ms]		In each safety connection, set safety refresh monitoring time for a receiving station to detect safety communication errors. Set this item for the Active side of the safety stations that perform safety communications.	■When the Safety CPU is used 4.0 to 2000.0 (Default: Blank) ■When the SIL2 Process CPU is used 40.0 to 6000.0 (Default: Blank)

Item		Description	Setting range
Safety Data Transfer Device Setting	Receive Data Storage Device[*4]	Set a safety device of the SIL2 Process CPU and the Safety CPU where safety data are stored.	Device Name • SA\X • SA\M • SA\B • SA\D • SA\W (Default: Blank) Points ■When the communication destination is safety protocol version 1 • For bit device: 16 to 128 (set in increments of 16 points) • For word device: 1 to 8 (set in increments of 1 point) ■When the communication destination is safety protocol version 2[*6] • For bit device: 16 or more (set in increments of 16 points) • For word device: 1 or more (set in increments of 1 point) (Default: Blank) Start/End Range of a safety device in the SIL2 Process CPU and the Safety CPU (Default: Blank)
	Send Data Storage Device[*5]	Set a safety device of the SIL2 Process CPU and the Safety CPU where safety data are sent.	Device Name • SA\Y • SA\M • SA\B • SA\D • SA\W (Default: Blank) Points ■When the communication destination is safety protocol version 1 • For bit device: 16 to 128 (set in increments of 16 points) • For word device: 1 to 8 (set in increments of 1 point) ■When the communication destination is safety protocol version 2[*6] • For bit device: 16 or more (set in increments of 16 points) • For word device: 1 or more (set in increments of 1 point) (Default: Blank) Start/End Range of a safety device in the SIL2 Process CPU and the Safety CPU (Default: Blank)

Item	Description	Setting range
[Output to File (for Setting Confirmation)] button	Outputs the contents of the safety communication setting to a CSV file. The file is used to check whether there is no discrepancy between the safety communication setting written to the Safety CPU and that of the project. (📖 GX Works3 Operating Manual)	—
Safety Protocol Version	Set the safety protocol version to be used for safety communications. For details on safety protocol versions, refer to the following. (☞ Page 118 System using the Safety CPU, ☞ Page 123 System using the SIL2 Process CPU)	■When the Safety CPU is used • 1*7 • 2 (Default: Blank) ■When the SIL2 Process CPU is used*8 • 1*7 • 2 (Default: Blank) (Initial value after project import: 2)

*1 Set the safety connection number starting with 1.
Even if the safety connection is set in a random line, the unset line is deleted and the number is set starting with 1 when the [OK] button is clicked.

*2 This item is displayed only for a project of the SIL2 Process CPU.

*3 This item is fixed to "Active" when the communication destination is an intelligent device station.

*4 For a project of the SIL2 Process CPU, the output module with diagnostic functions cannot be set.

*5 For a project of the SIL2 Process CPU, the input module with diagnostic functions cannot be set.

*6 When the communication destination is safety protocol version 2, set the upper limit value for the number of points in accordance with the specifications of the communication destination module.

*7 When using safety protocol version 1, there are restrictions on the combination of system configuration and safety communication settings. (☞ Page 171 Restrictions for safety protocol version 1 (SIL2/SIL3))

*8 This item can be set only when the own station is a master station.

Restrictions for safety protocol version 1 (SIL2/SIL3)

In safety systems using safety protocol version 1, required performance for SIL2 and SIL3 may not be satisfied depending on the combination of the system configuration and the safety communication settings.

To check whether the combination of the system configuration and the safety communication settings satisfies the required performance for SIL2 and SIL3, check the restrictions. When the conditions for the restrictions are not satisfied, take the required measures. (☞ Page 172 Restrictions for SIL2 and SIL3)

■Target module

The target modules are shown below.

Target module			
Series name	**Product**	**Model**	**Firmware version**
MELSEC iQ-R series	Safety CPU set	R08SFCPU-SET, R16SFCPU-SET, R32SFCPU-SET, R120SFCPU-SET	"01" or later
	SIL2 process CPU set	R08PSFCPU-SET, R16PSFCPU-SET, R32PSFCPU-SET, R120PSFCPU-SET	
	DC input module with diagnostic functions	RX40NC6B	"02" or later
	Transistor output module with diagnostic functions	RY40PT5B	
	SIL2 analog control-compatible output module	RY40PT5B-AS	"01" or later
	Channel isolated analog-digital converter module	R60AD8-G	"02" or later
	Channel isolated digital-analog converter module	R60DA8-G	"03" or later
Network related products	CC-Link IE Field Network remote I/O module (with safety functions)	NZ2GFSS2-8D, NZ2GFSS2-8TE, NZ2GFSS2-16DTE, NZ2GFSS2-32D	"01" or later
	CC-Link IE Field Network remote I/O module (water-proof/dust-proof type with safety functions)	NZ2GFS12A2-14DT, NZ2GFS12A2-16DTE	
MELSERVO-J4 series	Functional safety unit	MR-D30	"Version A2" or later

■Restrictions for SIL2 and SIL3

Restrictions for SIL2 and SIL3 when using safety protocol version 1 in a safety system are shown below.

If the conditions for restrictions are not satisfied, check and correct the number of safety connections and the sending interval monitoring time.

Item	Condition
Required performance for SIL2 (when a system uses the SIL2 Process CPU)	• m ≤ 10 × TM m: Number of safety connections (☞ Page 128 How to count the number of safety connections) TM: Sending Interval Monitoring Time (☞ Page 406 Transmission interval monitoring time)*1
Required performance for SIL3 (when a system uses the Safety CPU)	• m ≤ TM m: Number of safety connections (☞ Page 122 How to count the number of safety connections) TM: Sending Interval Monitoring Time (☞ Page 406 Transmission interval monitoring time)*2

*1 The default value for TM is 400ms.

*2 The default value for TM is 35ms.

Ex.

The system configuration using the Safety CPU and the procedure for checking the restrictions for SIL3 with that configuration are shown below.

Station type	Product	Model	Quantity
Master station	Safety CPU	R08SFCPU	1
	Safety function module	R6SFM	1
	CC-Link IE Field Network master/local module	RJ71GF11-T2	1
Remote device station	Remote I/O module with safety functions (main module)	NZ2GFSS2-32D	4

1. Check the number of "communication destinations" in the settings for the master station. In the example, m = 4.

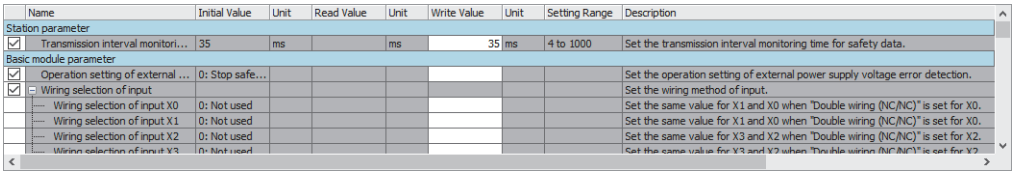
[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2] ⇨ [Application Settings] ⇨ [Safety Communication Setting]

No.	Communication Destination	Network Configuration			Configured Module		Open System	Sending Interval Monitoring Time [ms]	Safety Refresh Monitoring Time [ms]
		Network No.	Station No.	Station Type	Model Name	Communication Destination			
1	Local Network	1	1	Remote Device	NZ2GFSS2-32D		Active	35.0	60.0
2	Local Network	1	2	Remote Device	NZ2GFSS2-32D		Active	35.0	60.0
3	Local Network	1	3	Remote Device	NZ2GFSS2-32D		Active	35.0	60.0
4	Local Network	1	4	Remote Device	NZ2GFSS2-32D		Active	35.0	60.0
5									

2. Compare the "Sending Interval Monitoring Time" in the settings for the master station and the "Sending Interval Monitoring Time" in the settings for the device station. Whichever is the smaller of the two values becomes the sending interval monitoring time used to check restrictions. In the example, TM = 35.

Master station: [Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2] ⇨ [Application Setting] ⇨ [Safety Communication Setting]

Device station: [Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2] ⇨ [Basic Settings] ⇨ [Network Configuration Settings] ⇨ Select the target remote device station from the list of stations. ⇨ Right-click ⇨ [Online] ⇨ [Parameter Processing of Device Station]



3. Check if the restrictions for SIL3 are satisfied. In the example, as m = 4 and TM = 35, m ≤ TM. Therefore, the conditions for the SIL3 restrictions are satisfied. If the restrictions are not satisfied, check and correct the number of safety connections and the sending interval monitoring time.

Redundant System Settings

Set the redundant system function.

Item	Description	Setting range
Station No. (System A)	Displays the station number set in "Station No." under "Required Settings".	—
Module Operation Mode (System A)	Displays the module operation mode set for "Module Operation Mode" under "Application Settings".	—
Station No. (System B)	Displays the station number of system B.	—
Module Operation Mode (System B)	Set the module operation mode of system B. For details on the module operation mode, refer to the following. ☞ Page 161 Module Operation Mode	• Online • Offline • Module Communication Test (Default: Online)

3 PROGRAMMING

This chapter describes programming and startup examples of CC-Link IE Field Network.

3.1 Precautions for Programming

This section describes precautions to create CC-Link IE Field Network programs.

Cyclic transmission program

For a cyclic transmission program, configure an interlock with the following module labels.

- 'Data link error status of own station' (SB0049)
- 'Data link status of each station' (SW00B0 to SW00B7)

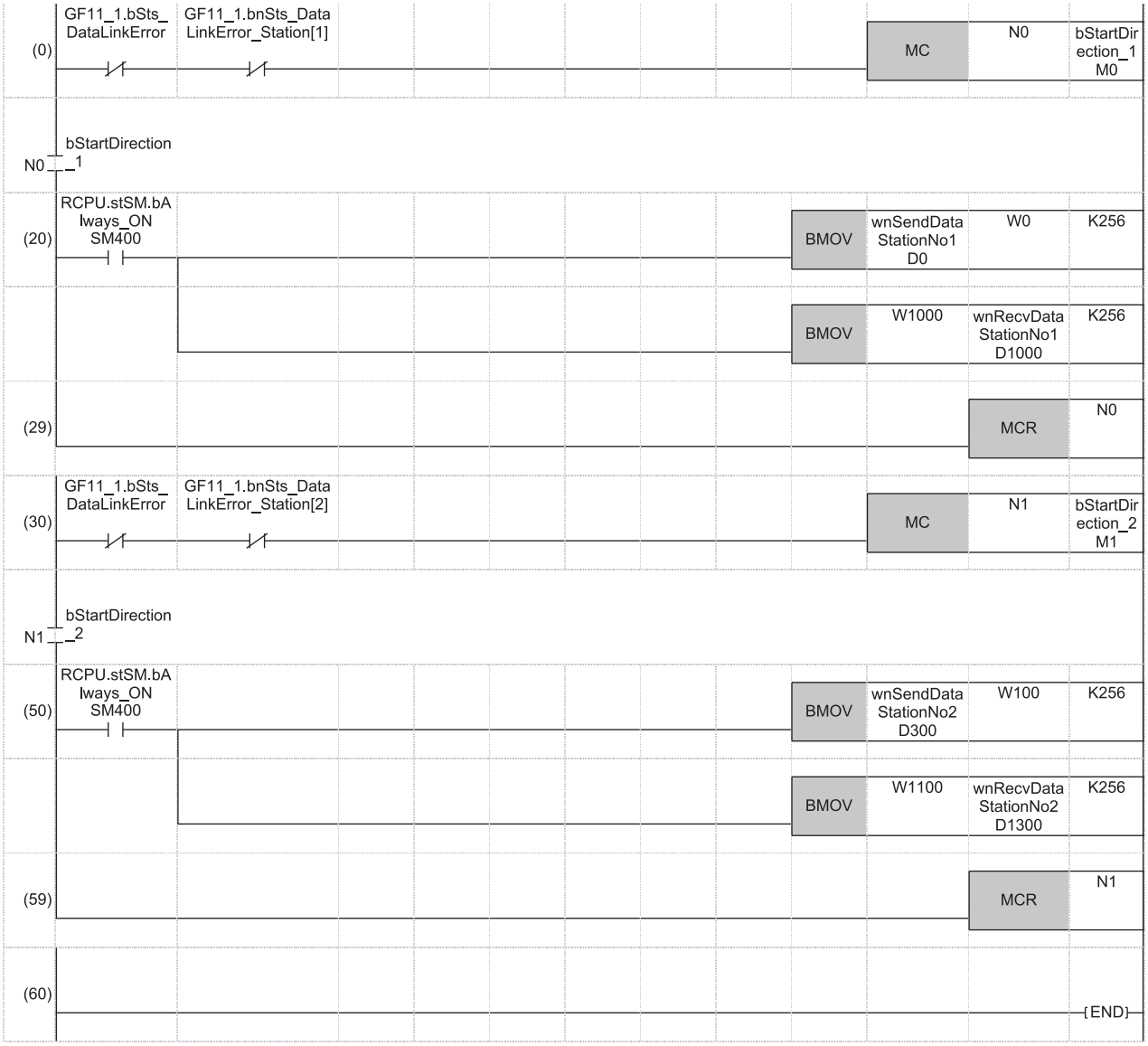
Point

- For a program using safety communication function, interlock with the safety special register. (☞ Page 177 Program using safety communication function)
- When the own station is a redundant system, replace the module labels used for the interlock with those for a redundant system. (☞ Page 177 Program using redundant system function)

Ex.

Interlock example

Classification	Label name	Description	Device
Module label	GF11_1.bSts_DataLinkError	Data link error status of own station	SB0049
	GF11_1.bnSts_DataLinkError_Station[1]	Data link status of each station (station No.1)	SW00B0.0
	GF11_1.bnSts_DataLinkError_Station[2]	Data link status of each station (station No.2)	SW00B0.1



(20)Communication program with station No.1

(50)Communication program with station No.2

Transient transmission program

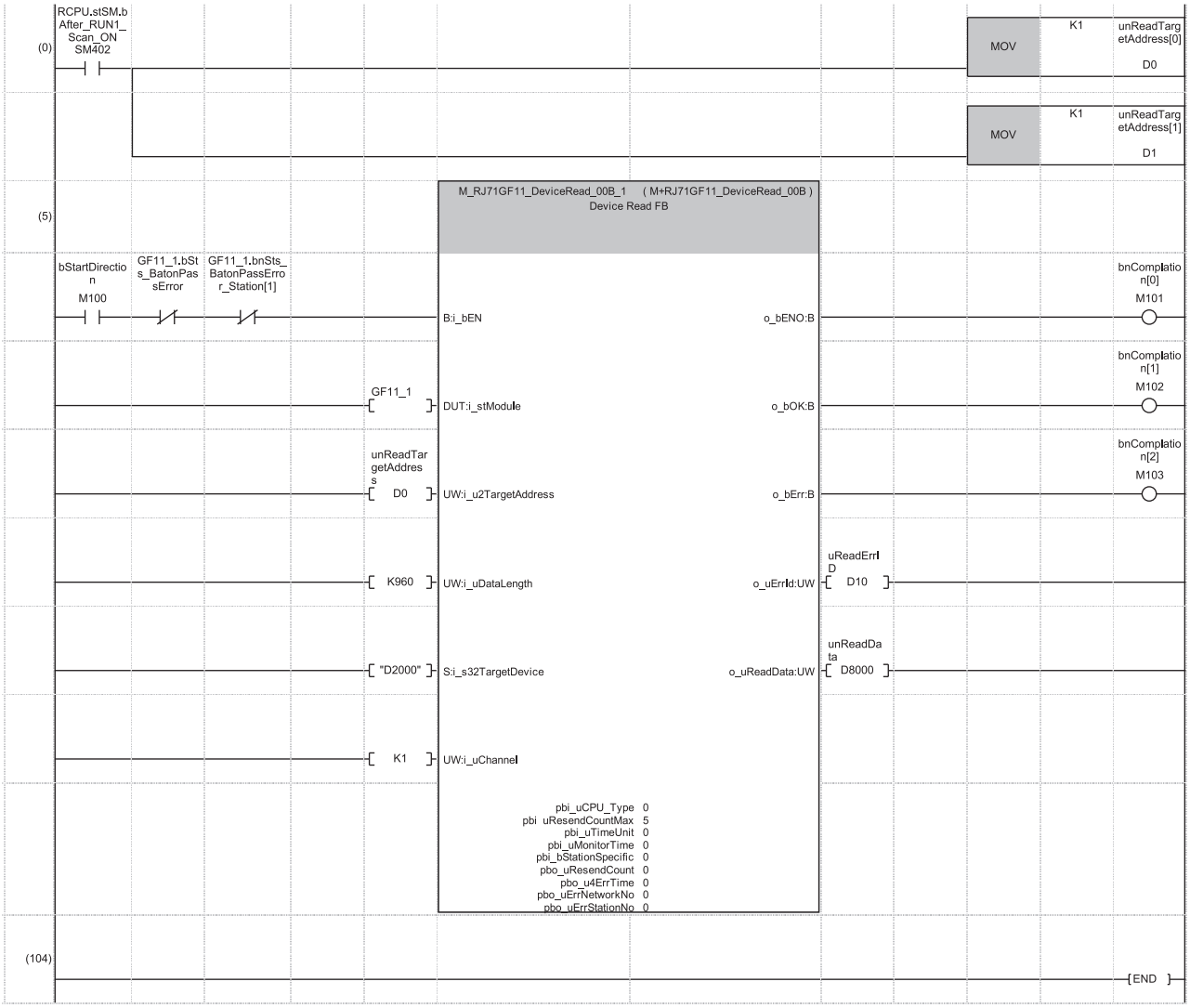
For a transient transmission program, configure an interlock with the following module labels.

- 'Baton pass status of own station' (SB0047)
- 'Baton pass status of each station' (SW00A0 to SW00A7)

Ex.

Interlock example

Classification	Label name	Description	Device
Module label	GF11_1.bSts_BatonPassError	Baton pass status of own station	SB0047
	GF11_1.bnSts_BatonPassError_Station[1]	Baton pass status of each station (station No.1)	SW00A0.0



(5) Module FB for the station number 1

Program using redundant system function

■When the own station is a redundant system

For a cyclic transmission program, replace the following target module labels with those for a redundant system.

Target module label	Module label for a redundant system
'Data link error status of each station' (SB00B0)	'Redundant system data link error status of each station' (SB01B0)
'Data link error status of master station' (SB00B1)	'Redundant system data link error status of master station' (SB01B1)
'Data link error status of station No.0' (SB00BF)	'Redundant system data link error status of station No.0' (SB01BF)
'Data link status of each station' (SW00B0 to SW00B7)	'Redundant system data link status of each station' (SW01B0 to SW01B7)

■The method for checking the redundant system status of other stations

The following describes the method for checking the redundant system status of other stations on a network program that contains a redundant system.

System configuration	Checking method
Existence of redundant system station	When there is a redundant system station on the network, 'Redundant system' (Un\G24511.F) turns on. The station numbers of redundant system stations can be checked with 'Redundant function information of each station' (Un\G24504 to Un\G24511).
Existence of separate mode station	When there is a separate mode station on the network, 'Separate mode' (Un\G24519.F) turns on. The station numbers of separate mode stations can be checked with 'Separate mode status of each station' (Un\G24512 to Un\G24519).
Existence of pairing-set station	When there is a pairing-set station on the network, 'Pairing-set station exists information' (SB00D8) turns on. The station numbers of pairing-set stations can be checked with 'Pairing setting status of each station' (SW00D8 to SW00DF).
Existence of standby system CPU module	• When there is a standby system CPU module on the network, 'Station of standby system exists information' (SB0118) turns on. • The system status of the master station CPU module can be checked with 'Redundant CPU system status of the master station' (SB0119) or 'Redundant CPU system status of station No.0' (SB011A). • The station number of the standby system CPU module can be checked with 'Redundant CPU system status of each station' (SW0118 to SW011F).

■When a redundant master station configuration is used

Check the programming of when the submaster function is used. (☞ Page 190 Programming for when the submaster function is used)

Program using safety communication function

For a program using safety communication function, interlock with the safety special register described below. (For the 1st master/local module)

• 'Safety refresh communication status of each safety connection (1st module)' (SA\SD1008 to SA\SD1015)

For a communication example using the safety communication function, refer to the following.

(☞ Page 192 Communication Example of Safety Communication Function, Page 216 Communication Example of Safety Communication Function Used in Redundant Master Stations, Page 231 Communication Example of Safety Communication Function Used in a Redundant Line)

Program that uses a media converter in the system configuration

When using a media converter in a ring topology, create a program so that 'Media converter use in ring topology' (Un\G29962) is set to Use (1).

However, when the master operating station is switched, the new master operating station does not inherit the settings of the old master operating station. Therefore, create a program so that 'Media converter use in ring topology' (Un\G29962) is set to Use (1) in the new master operating station after switching.

3.2 Communication Example Using the Submaster Function

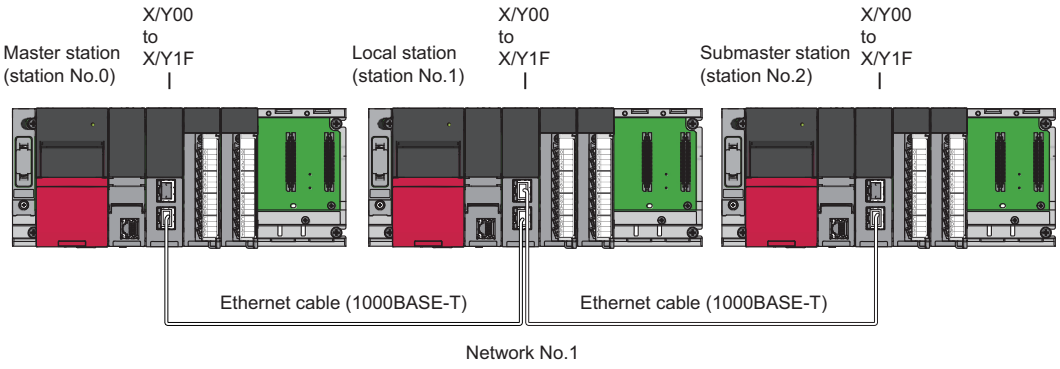
This section provides a communication example using the submaster function.

System configuration example

The following system configuration is used to explain communications using the submaster function.

System configuration

- Power supply module: R61P
- CPU module: R04CPU
- Master/local module: RJ71GF11-T2
- Input module: RX10
- Output module: RY10R2

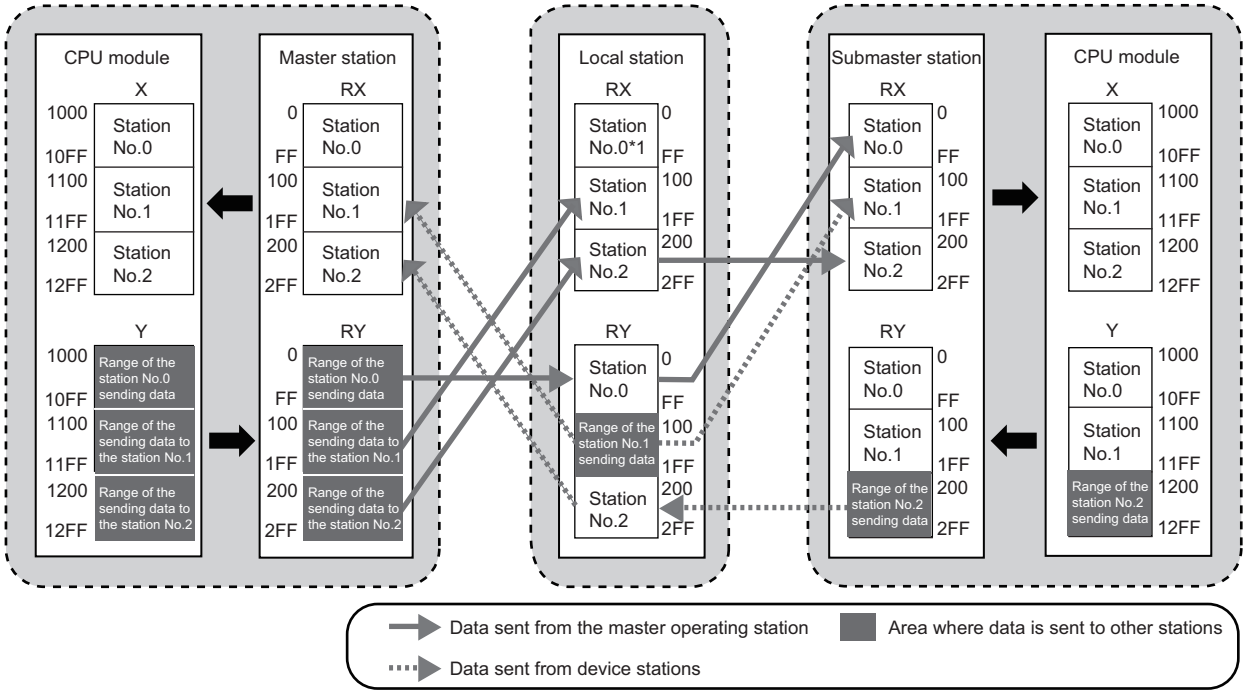


Link device assignment

256 points are assigned to each station.

■RX/RY assignment

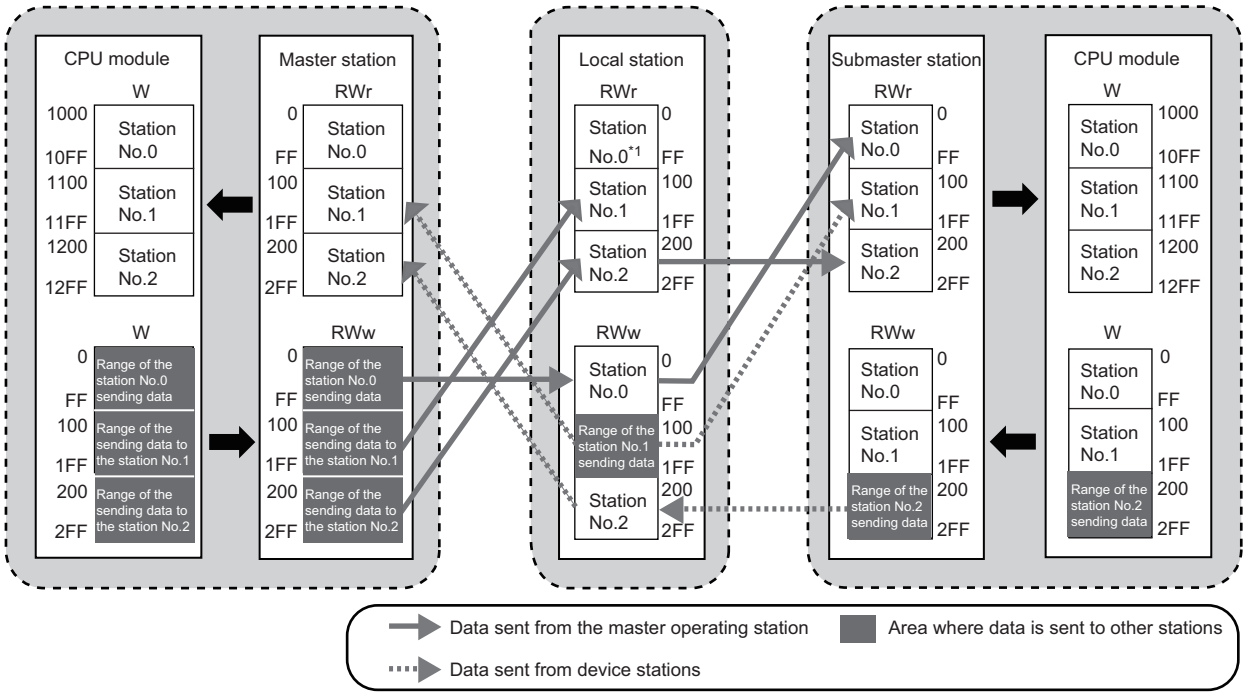
The setting for the link refresh target device of the local station is the same as that of the master station.



*1 Data that is sent from "Range of the station No.0 sending data" and stored in RY is stored.

■RWr/RWw assignment

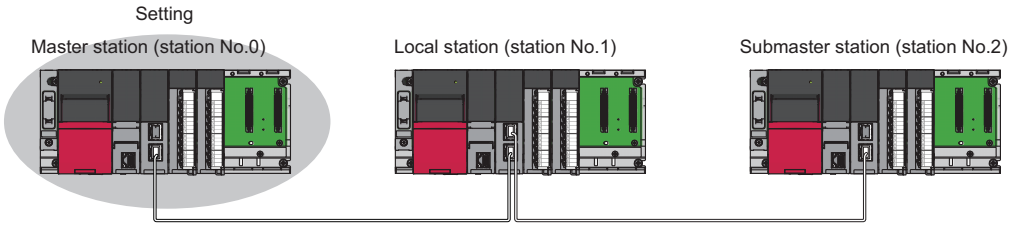
The setting for the link refresh target device of the local station is the same as that of the master station.



*1 Data that is sent from "Range of the station No.0 sending data" and stored in RWw is stored.

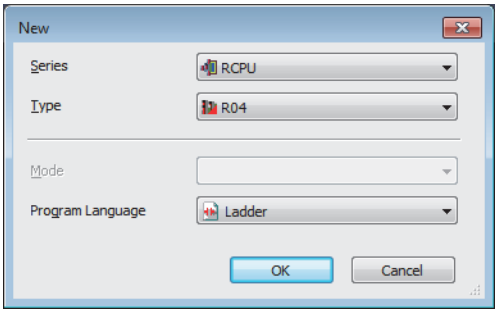
Setting in the master station

Connect the engineering tool to the CPU module of the master station and set parameters.

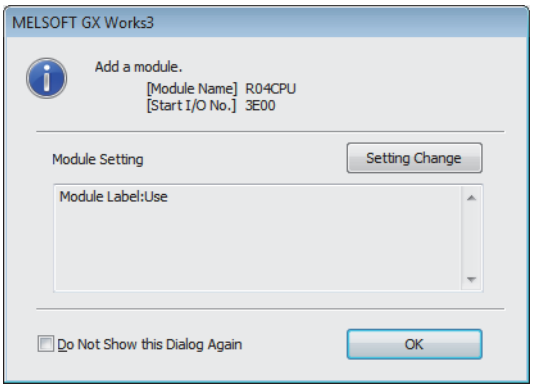


1. Set the CPU module as follows.

[Project] ⇨ [New]

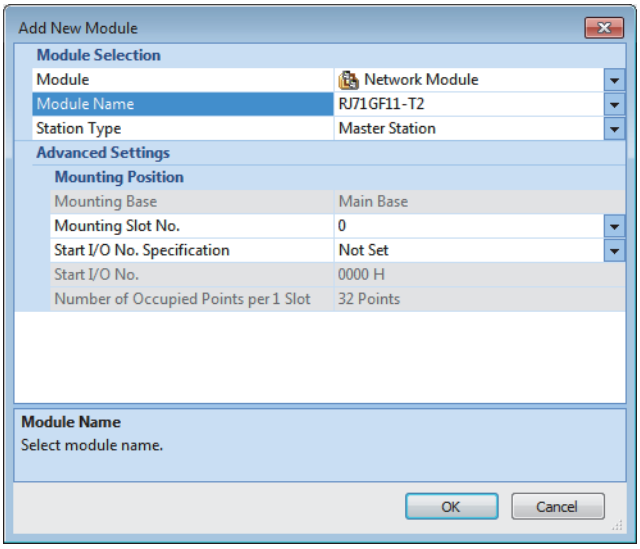


2. Click the [OK] button to add the module labels of the CPU module.

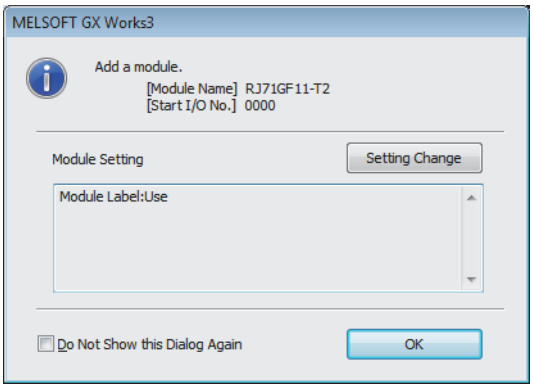


3. Set the master/local module as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Right-click ⇨ [Add New Module]



4. Click the [OK] button to add the module labels of the master/local module.



5. Set the items in "Required Settings" as follows.

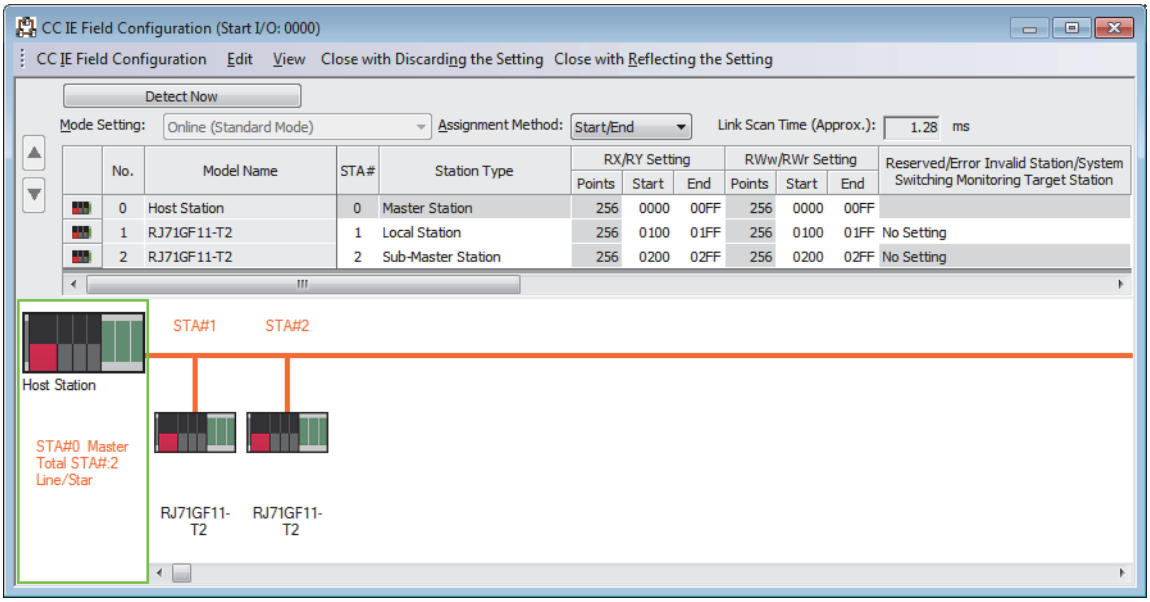
[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2] ⇨ [Required Settings]

Setting Item

Item	Setting
Station Type	
Station Type	Master Station
Network No.	
Network No.	1
Station No.	
Setting Method	Parameter Editor
Station No.	0
Parameter Setting Method	
Setting Method of Basic/Application Settings	Parameter Editor

6. Set the network configuration as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2] ⇨ [Basic Settings] ⇨ [Network Configuration Settings]



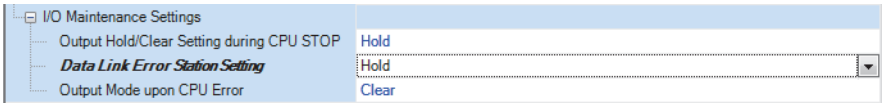
7. Set the refresh settings as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2] ⇨ [Basic Settings] ⇨ [Refresh Settings]

No.	Link Side					CPU Side				
	Device Name	Points	Start	End		Target	Device Name	Points	Start	End
-	SB	512	00000	001FF		Module Label				
-	SW	512	00000	001FF		Module Label				
1	RX	768	00000	002FF		Specify Device	X	768	01000	012FF
2	RY	768	00000	002FF		Specify Device	Y	768	01000	012FF
3	RWr	768	00000	002FF		Specify Device	W	768	01000	012FF
4	RWw	768	00000	002FF		Specify Device	W	768	00000	002FF
5										

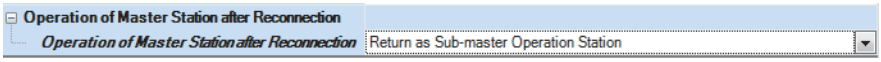
8. Set the data link faulty station setting as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2] ⇨ [Application Settings] ⇨ [Supplementary Cyclic Settings] ⇨ [I/O Maintenance Settings] ⇨ [Data Link Error Station Setting]



9. Set the operation of master station after reconnection as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2] ⇨ [Basic Settings] ⇨ [Operation of Master Station after Reconnection]



10. Write the set parameters to the CPU module on the master station.

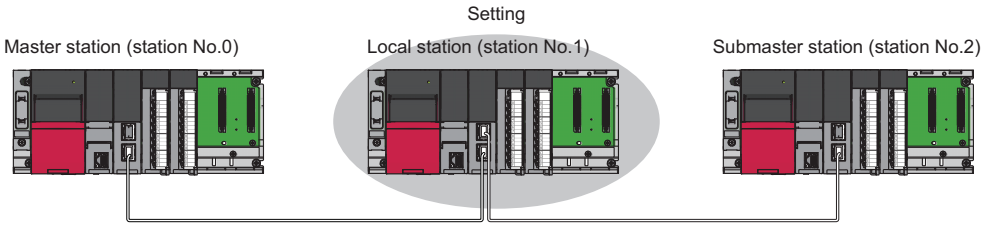
[Online] ⇨ [Write to PLC]

Point

In this example, default values were used for parameters that are not shown above. For the parameter setting, refer to the chapter explaining the parameters in this manual. (☞ Page 137 PARAMETER SETTINGS)

Setting in the local station

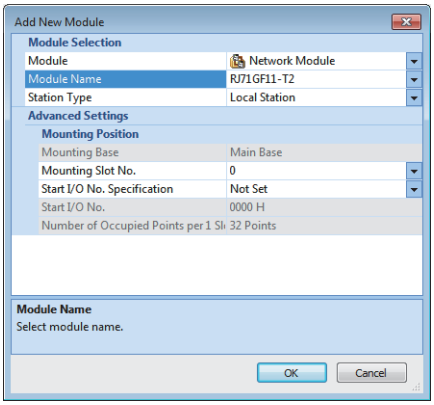
Connect the engineering tool to the CPU module on the local station and set parameters.



1. Set the CPU module and add the module labels of the CPU module. The setting method of the CPU module and addition method of the module label are the same as those of the master station. (☞ Page 180 Setting in the master station)

2. Set the master/local module as follows.

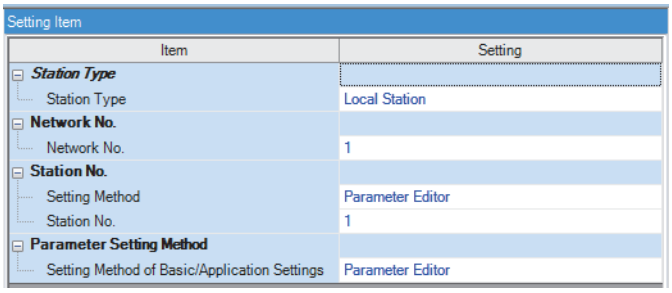
[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Right-click ⇨ [Add New Module]



3. Add the module labels of the master/local module. The addition method of the module label is the same as that of the master station. (☞ Page 180 Setting in the master station)

4. Set the items in "Required Settings" as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2] ⇨ [Required Settings]



5. Set the refresh parameters. Set the same refresh parameters as those set for the master station. (☞ Page 180 Setting in the master station)

6. Set "Data Link Error Station Setting" to "Hold". Follow the same procedure as that for the master station. (☞ Page 180 Setting in the master station)

7. Write the set parameters to the CPU module on the local station.

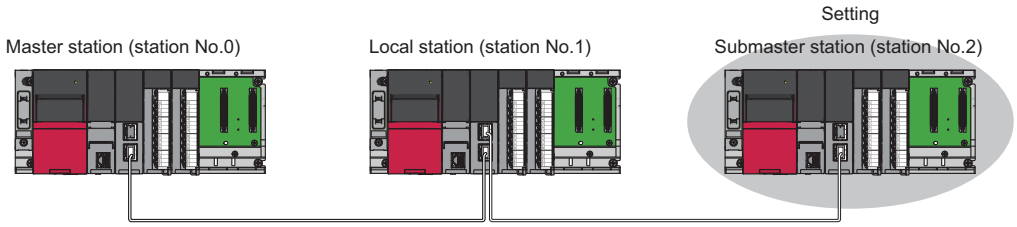
[Online] ⇨ [Write to PLC]

Point

In this example, default values were used for parameters that are not shown above. For the parameter setting, refer to the chapter explaining the parameters in this manual. (☞ Page 137 PARAMETER SETTINGS)

Setting in the submaster station

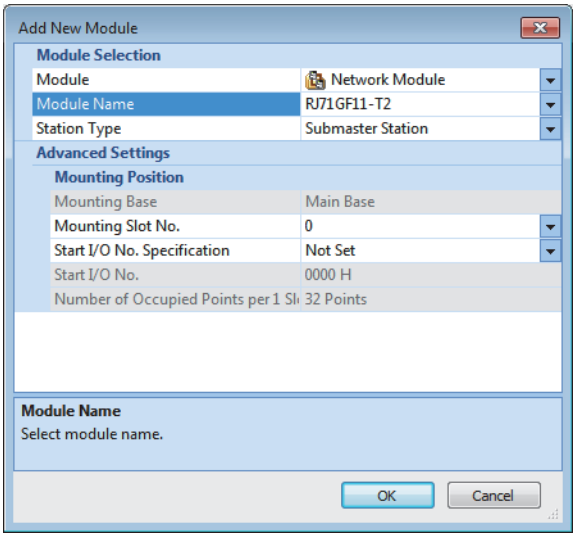
Connect the engineering tool to the CPU module on the submaster station and set parameters.



1. Set the CPU module and add the module labels of the CPU module. The setting method of the CPU module and addition method of the module label are the same as those of the master station. (☞ Page 180 Setting in the master station)

2. Set the master/local module as follows.

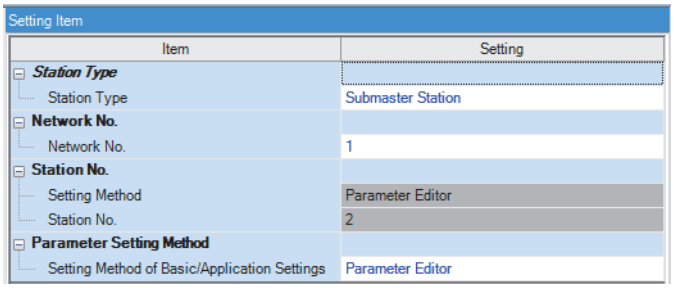
[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Right-click ⇨ [Add New Module]



3. Add the module labels of the master/local module. The addition method of the module label is the same as that of the master station. (☞ Page 180 Setting in the master station)

4. Set the items in "Required Settings" as follows. Set the same value as that of the master station in "Network No.".

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2] ⇨ [Required Settings]



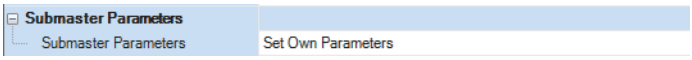
Point

Do not set the same station number as that of the master station and other device stations.

5. Set the refresh parameters. Set the same refresh parameters as those set for the master station. (☞ Page 180 Setting in the master station)

6. Set the submaster parameters as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2] ⇨ [Module Parameter] ⇨ [Submaster Parameters]



7. Set the network configuration. Set the same network configuration as that of the master station. (☞ Page 180 Setting in the master station)

Point

When "Read Parameters of the Master Station" is selected for "Submaster Parameters" in "Basic Settings", the submaster station operates according to the parameters set for the master station. Note, however, that data link cannot be started if the submaster station starts up independently (such as when the submaster station is powered off and on during data link by the submaster station with the master station disconnected); therefore, it is recommended to set the same parameters as those of the master station in the submaster station. To reflect the settings of the master station into the submaster station, data link needs to be performed with the master station once.

8. Set "Data Link Error Station Setting" to "Hold". Follow the same procedure as that for the master station. (☞ Page 180 Setting in the master station)

9. Write the set parameters to the CPU module on the submaster station.

[Online] ⇨ [Write to PLC]

Point

In this example, default values were used for parameters that are not shown above. For the parameter setting, refer to the chapter explaining the parameters in this manual. (☞ Page 137 PARAMETER SETTINGS)

Starting up the system

Reset the CPU module or power off and on the system in order of the local station, master station, and submaster station.

Point

Start up the master station before the submaster station. If the submaster station is started up first, it may operate as a master operating station. Even if the submaster station operates as a master operating station, the master station starts to take in control after it starts up. Then 'Data link error status of own station' (SB0049) temporarily turns on, causing an error to be detected. (This applies when "Return as Master Operation Station" is selected for "Operation of Master Station after Reconnection" in "Basic Settings".)

The MST LED of the master/local module are as follows.

- Master station (master operation): On
- Local station: Off
- Submaster station (submaster operation): Flashing

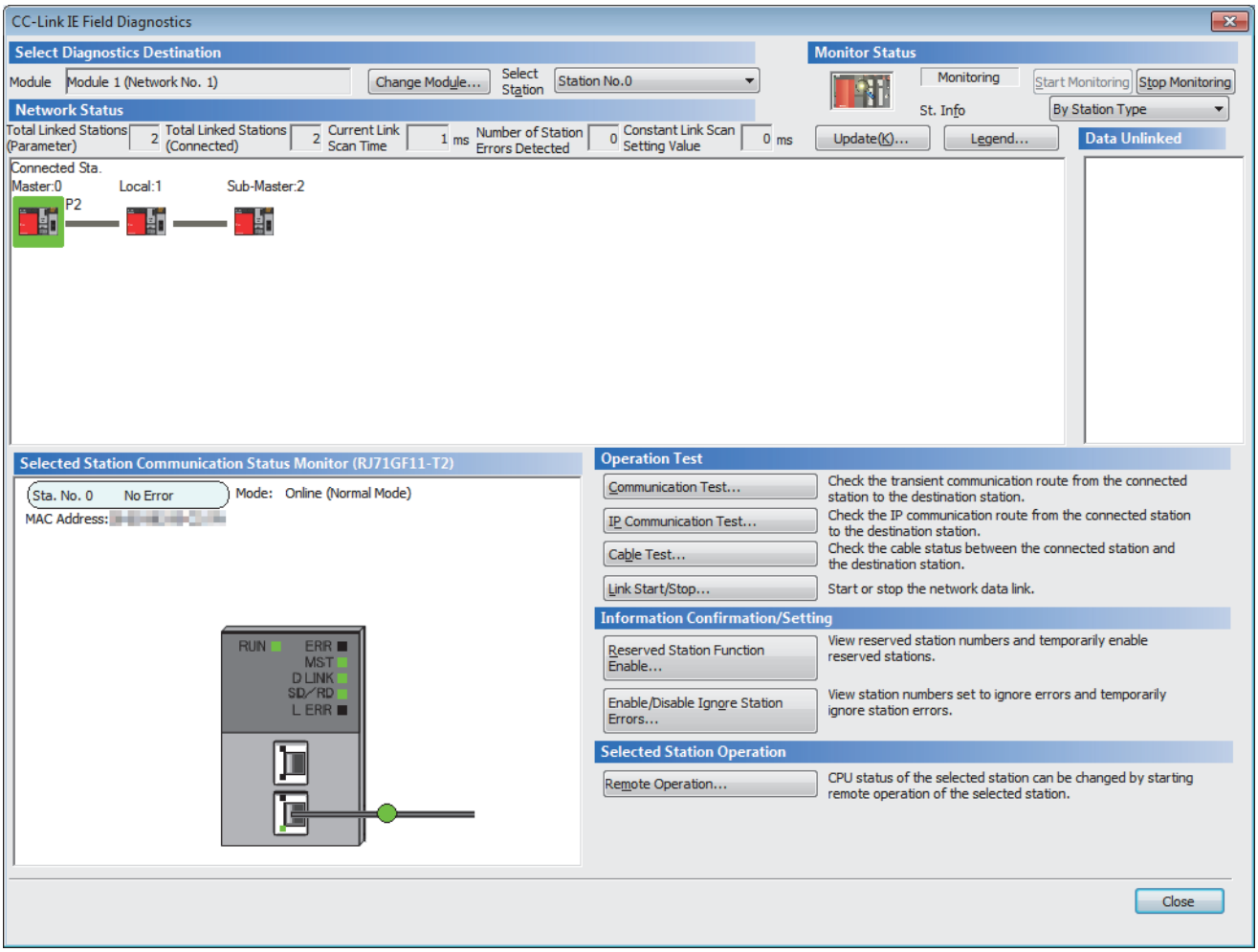
Checking the network status

After starting up the system, check whether data link can be normally performed. For the check, use the CC-Link IE Field Network diagnostics of the engineering tool.

1. Connect the engineering tool to the CPU module on the master station.
2. Start the CC-Link IE Field Network diagnostics.

[Diagnostics] ⇨ [CC-Link IE Field Diagnostics]

If the following display appears, data link is normal.

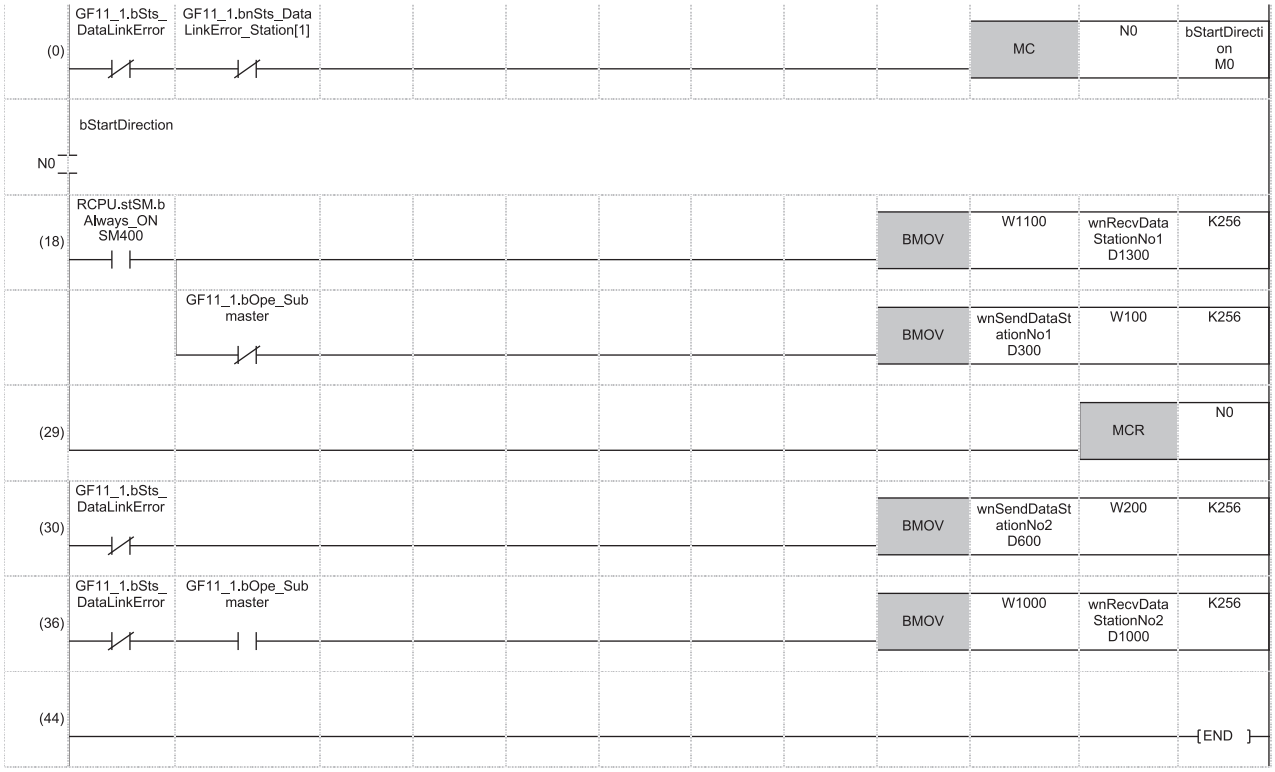


If an error icon appears in "Network Status" area on the "CC-Link IE Field Diagnostics" window, use the CC-Link IE Field Network diagnostics to identify the cause of the error and take corrective actions. (☞ Page 275 Checking the Network Status)

Program examples

- Master station (station No.0)

Classification	Label name	Description	Device
Module label	GF11_1.bSts_DataLinkError	Data link error status of own station	SB0049
	GF11_1.bOpe_Submaster	Own station master/submaster function operation status	SB004E
	GF11_1.bnSts_DataLinkError_Station[1]	Data link status of each station (station No.1)	SW00B0.0
Label to be defined	Define global labels as shown below: Label Name / Data Type / Class / Assign (Device/Label) bStartDirection / Bit / VAR_GLOBAL / M0 wnRecvDataStationNo1 / Word [Signed](0..255) / VAR_GLOBAL / D1300 wnSendDataStationNo1 / Word [Signed](0..255) / VAR_GLOBAL / D300 wnSendDataStationNo2 / Word [Signed](0..255) / VAR_GLOBAL / D600 wnRecvDataStationNo2 / Word [Signed](0..255) / VAR_GLOBAL / D1000		



(18) Receive/send processing (master operating station processing) from/to the station number 1

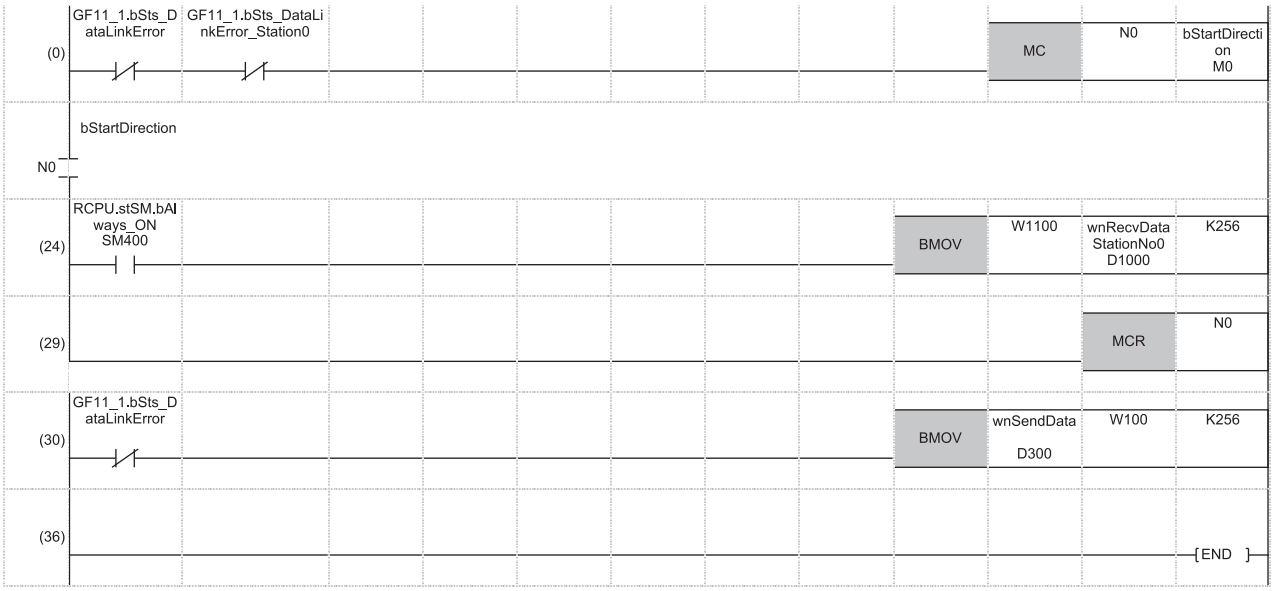
(29), (30) Create programs of the same structure as "Send/receive processing from/to the station number 1" by the number of device stations (exclusive of the submaster station) between (29) and (30).
Change the interlock of 'Data link status of each station' (SW00B0) according to the station numbers.

(30) Send processing of the own station (master station)

(36) Receive processing (submaster operating station processing) from the submaster station

• Local station (station No.1)

Classification	Label name	Description	Device
Module label	GF11_1.bSts_DataLinkError	Data link error status of own station	SB0049
	GF11_1.bSts_DataLinkError_Station0	Data link error status of station No.0	SB00BF
Label to be defined	Define global labels as shown below: Label Name / Data Type / Class / Assign (Device/Label) bStartDirection / Bit / VAR_GLOBAL / M0 wnRecvDataStationNo0 / Word [Signed](0..255) / VAR_GLOBAL / D1000 wnSendData / Word [Signed](0..255) / VAR_GLOBAL / D300		



(24) Receive processing from the station number 0 (master station)

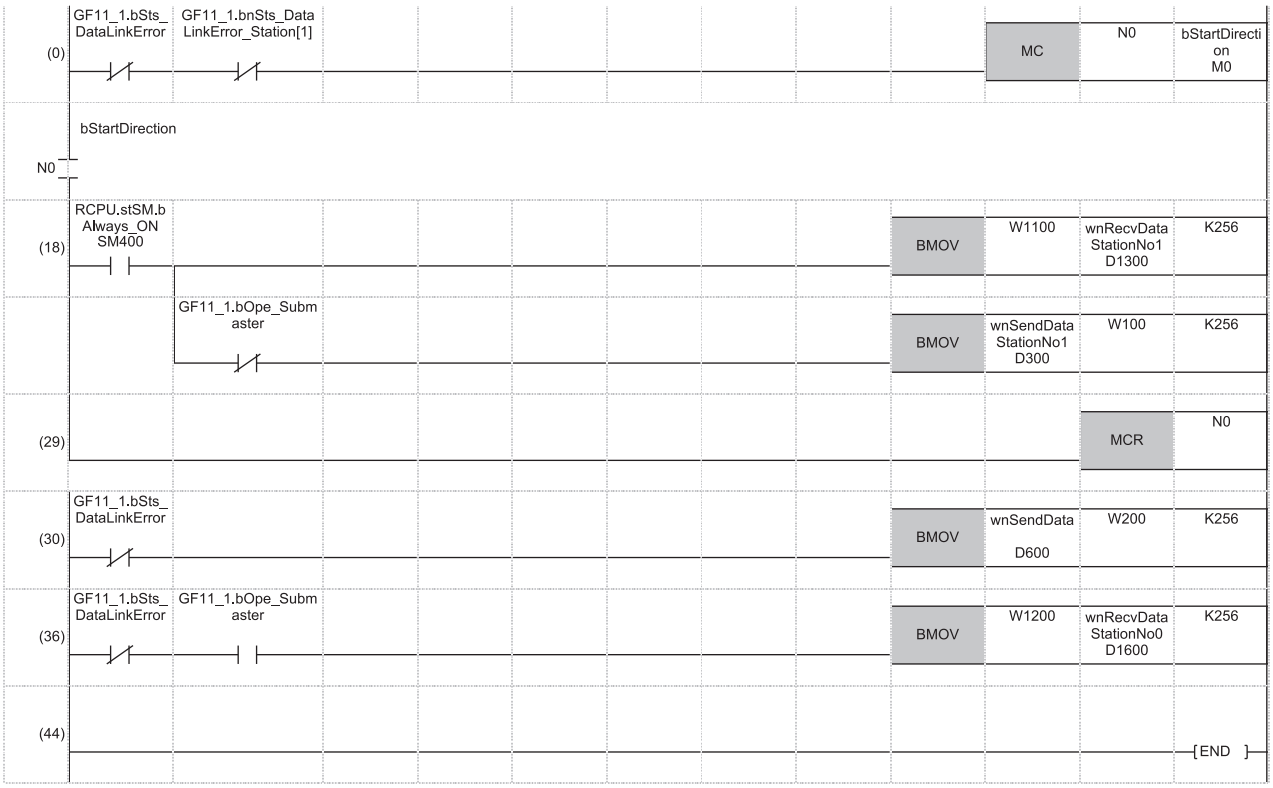
(29), (30) Create programs of receiving data from a device station of the same structure as "Receive processing from the station number 0 (master station)" by the number of device stations (exclusive of the submaster station) between (29) and (30).
Change the interlock of 'Data link error status of station No.0' (SB00BF) to 'Data link status of each station' (SW00B0).

(30) Send processing of the own station (local station)

• Submaster station (station number 2)

Classification	Label name	Description	Device
Module label	GF11_1.bSts_DataLinkError	Data link error status of own station	SB0049
	GF11_1.bOpe_Submaster	Own station master/submaster function operation status	SB004E
	GF11_1.bnSts_DataLinkError_Station[1]	Data link status of each station (station No.1)	SW00B0.0
Label to be defined	Define global labels as shown below:		

Label Name	Data Type		Class	Assign (Device/Label)
bStartDirection	Bit	...	VAR_GLOBAL	M0
wnRecvDataStationNo1	Word [Signed](0..255)	...	VAR_GLOBAL	D1300
wnSendDataStationNo1	Word [Signed](0..255)	...	VAR_GLOBAL	D300
wnSendData	Word [Signed](0..255)	...	VAR_GLOBAL	D600
wnRecvDataStationNo0	Word [Signed](0..255)	...	VAR_GLOBAL	D1600



(18) Receive/send processing (master operating station processing) from/to the station number 1

(29), (30) Create programs of the same structure as "Send/receive processing from/to the station number 1" by the number of device stations (exclusive of the master station) between (29) and (30).
Change the interlock of 'Data link status of each station' (SW00B0) according to the station numbers.

(30) Send processing of the own station (submaster station)

(36) Receive processing (submaster operating station processing) from the master station

Programming for when the submaster function is used

This section describes the programming of when the submaster function is used. For other programming, refer to the following.

- Cyclic transmission (📖 MELSEC iQ-R Ethernet/CC-Link IE User's Manual (Startup))
- Transient transmission (📖 MELSEC iQ-R Programming Manual (Module Dedicated Instructions))

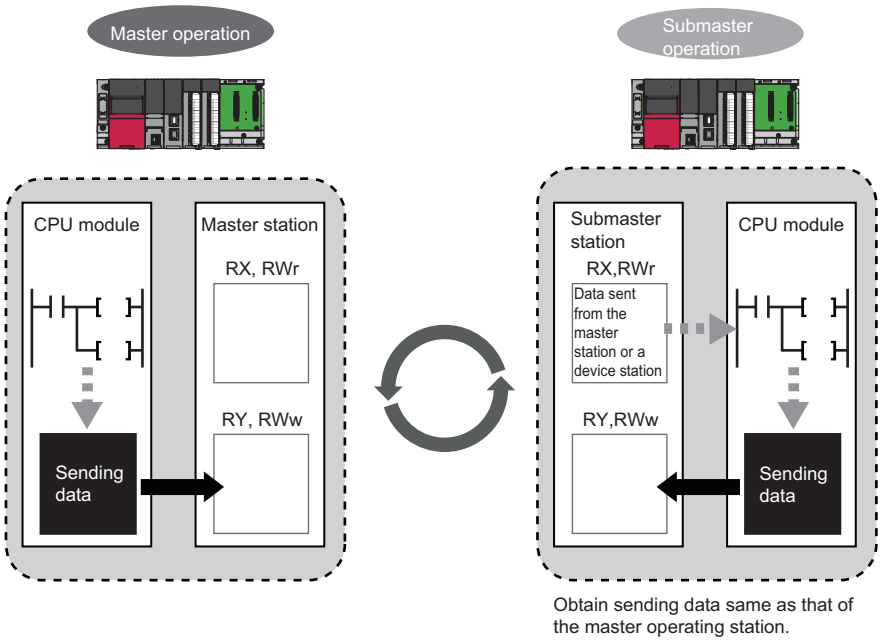
Programming for cyclic transmission

After checking that data link is normally performed, create a program to control device stations.

■Use of data stored in RY, RWw of the master operating station

Even after the control is shifted to the submaster operating station, send data in the master operating station is not transferred to the submaster operating station.

Therefore, the submaster operating station needs to produce the same send data as the master operating station. Create a program where send data (RY, RWw) is produced based on receive data (RX, RWr).



■When the operation is switched between the master operation and submaster operation

When the operation is switched between the master operation and submaster operation, a temporary data link error is detected. ('Data link error status of own station' (SB0049) and 'Data link error status of each station' (SB00B0) turn on.)
While the operation is being switched, do not use cyclic data and the following signals.

Label name	Description	Device
bSts_DataLinkError	Data link error status of own station	SB0049
bOpe_DataLinkbySubmaster	Master station information	SB0070
bVal_Submaster_System	Submaster station information	SB0071
bSts_BatonPassError_System	Baton pass error status of each station	SB00A0
bSts_BatonPassError_Master	Baton pass error status of master station	SB00A1
bSts_BatonPassError_Station0	Baton pass error status of station No.0	SB00AF
bSts_DataLinkError_System	Data link error status of each station	SB00B0
bSts_DataLinkError_Master	Data link error status of master station	SB00B1
bSts_DataLinkError_Station0	Data link error status of station No.0	SB00BF
uVal_MaxSlaveNumber_BatonPass	Maximum baton pass station number	SW005A
uVal_MaxSlaveNumber_DataLink	Maximum data link station number	SW005B
uSts_Connection	Connection status of own station	SW0064
uVal_StationNumber_Master	Master operating station number	SW006D
uVal_StationNumber_Submaster	Submaster operating station number	SW006E
bnSts_BatonPassError_Station	Baton pass status of each station	SW00A0 to SW00A7
bnSts_DataLinkError_Station	Data link status of each station	SW00B0 to SW00B7
In_DataLink	Own station data link status	X1
In_NotDataLink_Other	Other stations data link status	X3

Point

The time until the operation is switched varies depending on how the operation is switched as described below:

- When the operation is switched because the master operating station is down: up to three seconds
- When the operation is forced to be switched using 'Forced master switch command' (SB0019): up to three seconds
- When the master station where "Return as Master Operation Station" has been selected for "Operation of Master Station after Reconnection" in "Basic Settings" returns: up to 20 seconds

Programming for transient transmission

■Use of the REMFR, REMTO, REMFRD, REMTOD, SINFTYRD, and SINFSTRD instructions

The REMFR, REMTO, REMFRD, REMTOD, SINFTYRD, and SINFSTRD instructions can be executed only from the master operating station. Create a program where these instructions can be executed only in the master operating station using 'Master/submaster function operation status of own station' (SB004E). (Set SB004E to off.)
Check that the data link status of the own station is normal. ('Data link error status of own station' (SB0049) is off.)

■Use of the WRITE, SWRITE, RIWT, and REQ instructions

Data can be written from both of a master operating station and submaster operating station; therefore, create a program where data are not written in the same area at the same time. Especially, pay attention when the program of a master station is used for a submaster station. Use 'Master/submaster function operation status of own station' (SB004E) to check whether the own station is the master operating station or submaster operating station and do not execute the WRITE, SWRITE, RIWT, and REQ instructions at the same time.
Check that the data link status of the own station is normal. ('Data link error status of own station' (SB0049) is off.)

■Dedicated instructions when the control is switched between the master operating station and the submaster operating station or when the master station returns

Dedicated instructions may end abnormally. Create a program where transient transmission is performed again even if dedicated instructions end abnormally.

3.3 Communication Example of Safety Communication Function

This section describes the communication example of the system using the Safety CPU.

Before setting the safety protocol version, check the firmware version of the module used. (☞ Page 118 System using the Safety CPU)

System configuration example

The following system configuration is used to explain communications using the Safety CPU.

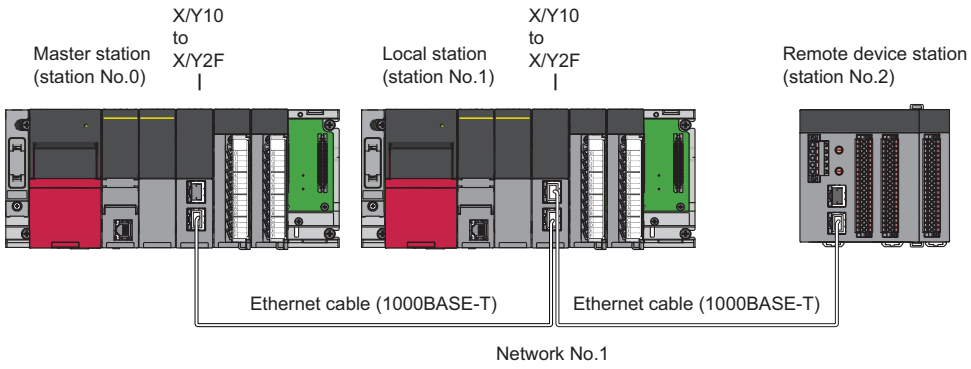
System configuration

■For safety protocol version 1

- Power supply module: R61P
- Safety CPU: R08SFCPU
- Safety function module: R6SFM
- Master/local module: RJ71GF11-T2
- Input module: RX10
- Output module: RY10R2
- Remote I/O module with safety functions (main module): NZ2GFSS2-32D
- Remote I/O module with safety functions (extension module): NZ2EXSS2-8TE

■For safety protocol version 2

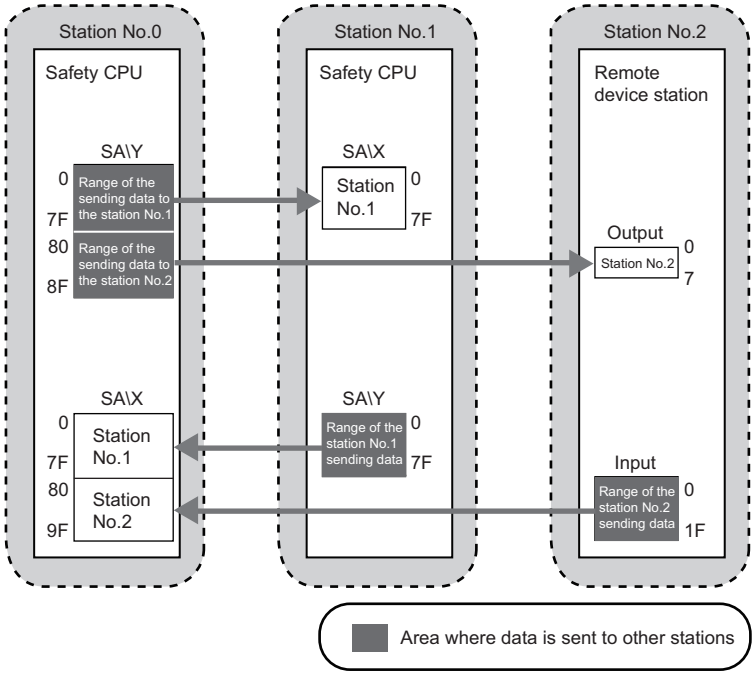
- Power supply module: R61P
- Safety CPU: R08SFCPU
- Safety function module: R6SFM
- Master/local module: RJ71GF11-T2
- Input module: RX10
- Output module: RY10R2
- Remote I/O module with safety functions (main module): NZ2GFSS2-32D-S1
- Remote I/O module with safety functions (extension module): NZ2EXSS2-8TE



In this program example, I/O devices are connected to X0, X1 (double input) and Y0, Y1 (double output) of the remote device station.

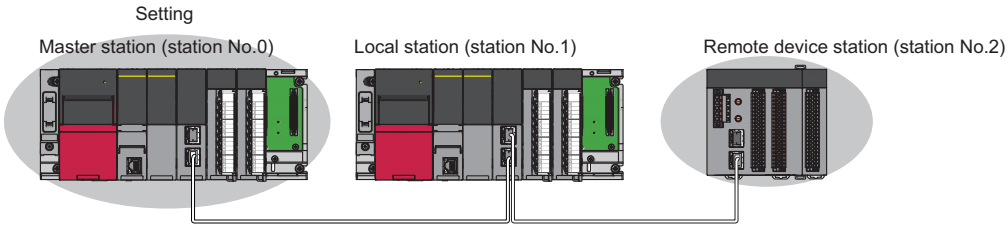
Safety device assignment

The following figure shows safety device assignment to be set in "Safety Communication Setting" under "Application Settings".



Setting in the master station and remote device station

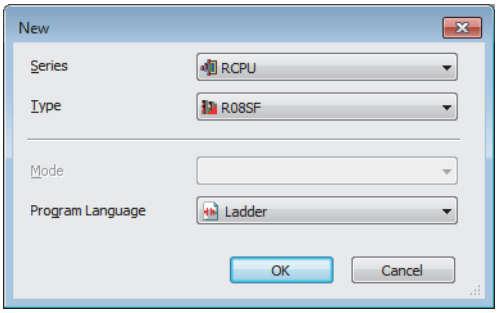
Connect the engineering tool to the Safety CPU of the master station and set parameters.



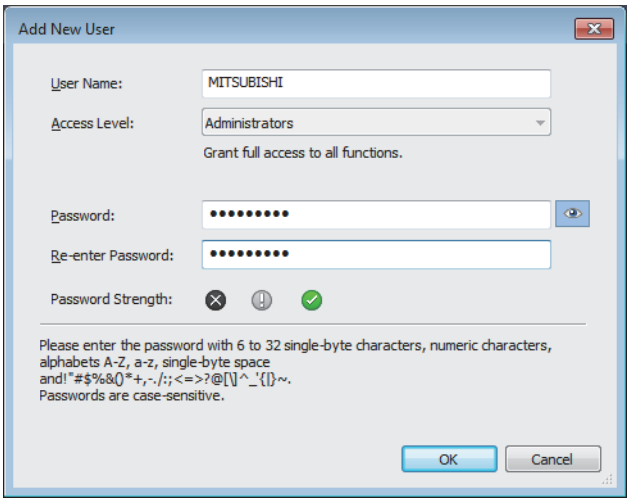
For safety protocol version 1

1. Set the Safety CPU as follows.

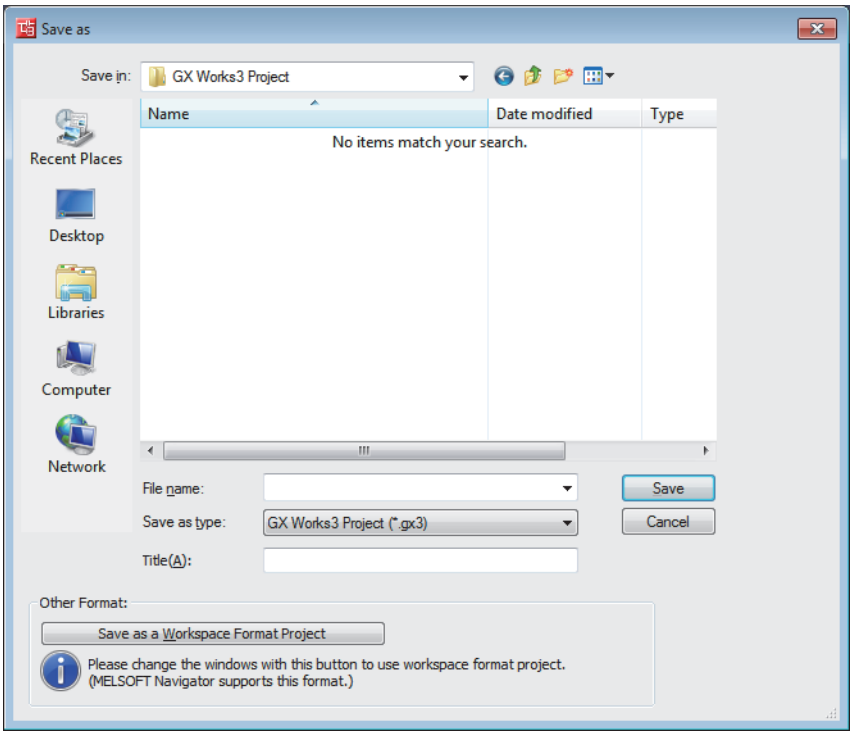
[Project] ⇨ [New]



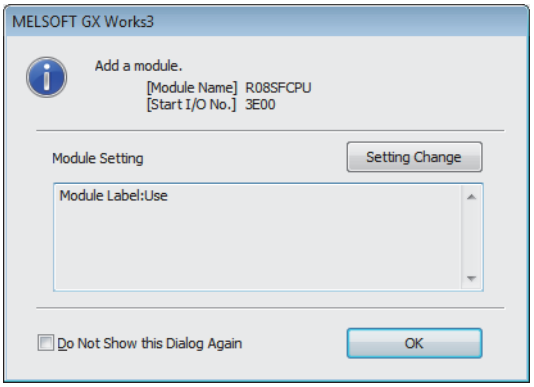
2. In the following window, enter a password and re-enter password, and click the [OK] button.



3. In the following window, enter a file name, and click the [Save] button.

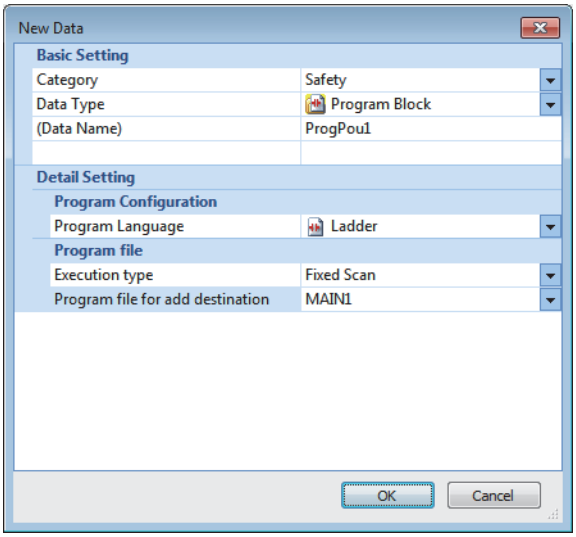


4. Click the [OK] button to add a module label of the Safety CPU.



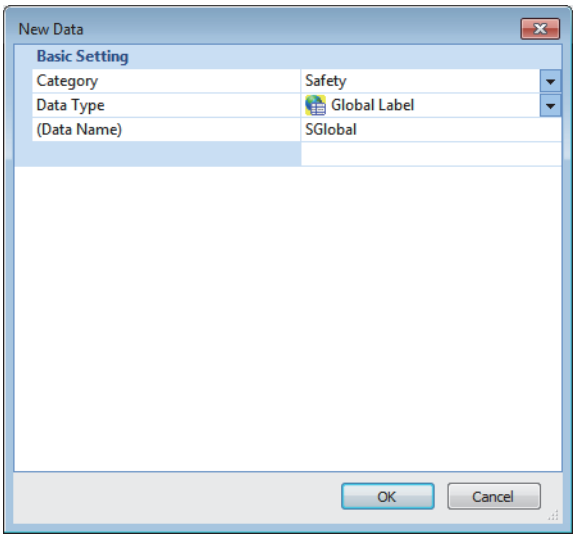
5. Add the safety program in the following item.

[Navigation window] ⇨ [Program] ⇨ [Fixed Scan] ⇨ Right-click ⇨ [Add New Data]



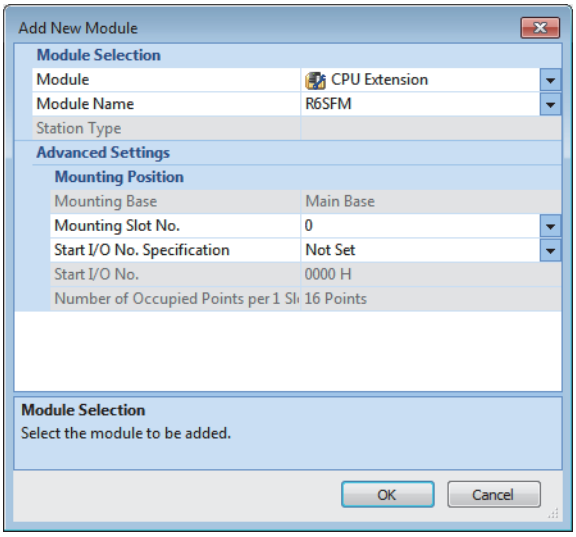
6. Add the safety global label in the following item.

[Navigation window] ⇨ [Label] ⇨ [Global Label] ⇨ Right-click ⇨ [Add New Data]

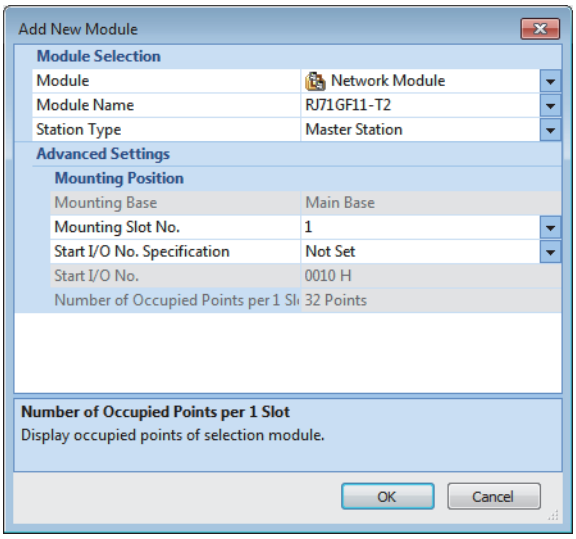


7. In the I/O assignment setting, set the safety function module for slot No.0.

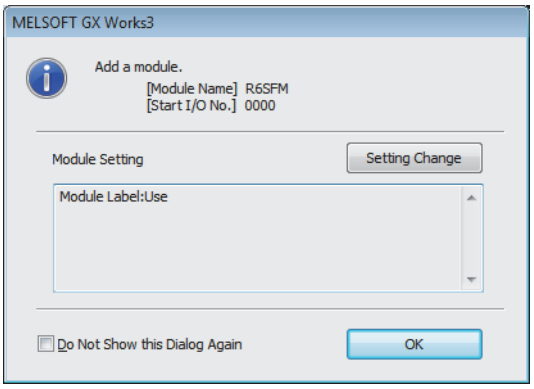
[Navigation window] ⇨ [Parameter] ⇨ [System Parameter] ⇨ [I/O Assignment] tab ⇨ [I/O Assignment Setting]



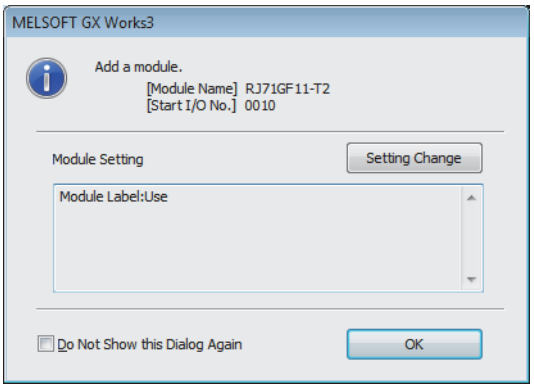
8. Set the master/local module for slot No.1.



9. Click the [OK] button to add the module labels of the safety function module.

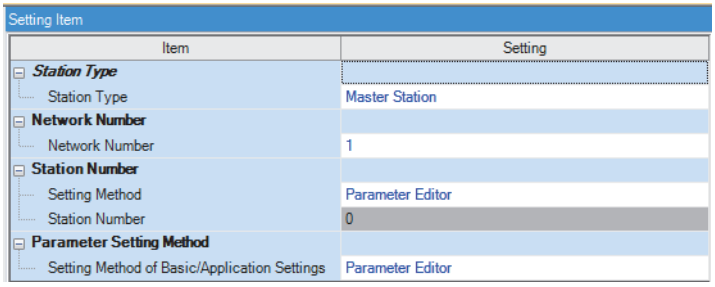


10. Click the [OK] button to add the module labels of the master/local module.



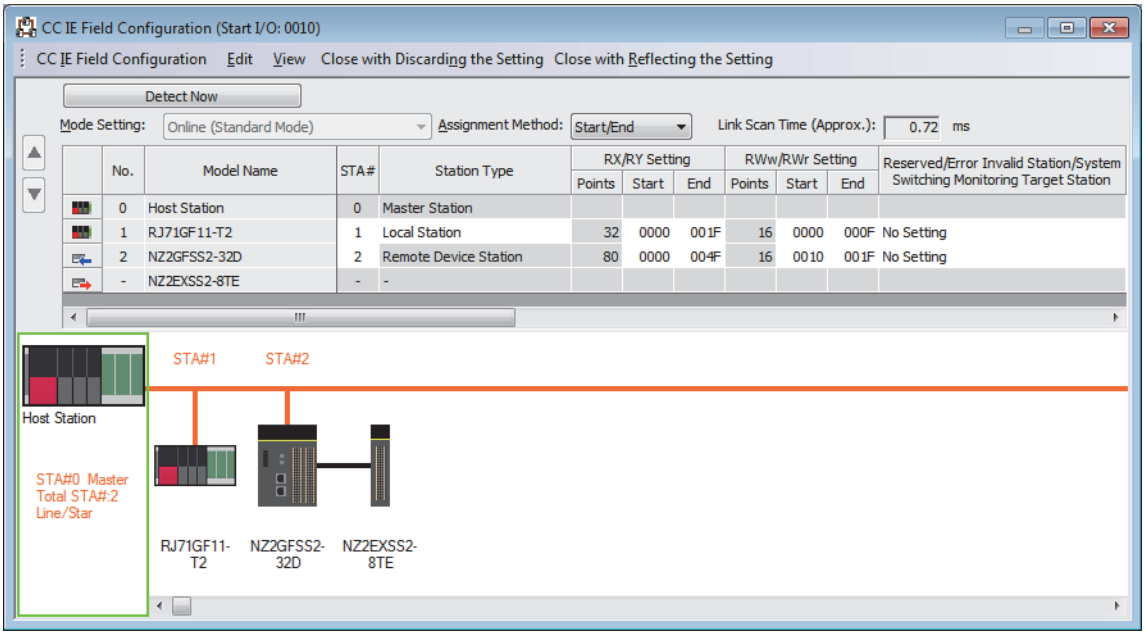
11. Set the items in "Required Settings" as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2] ⇨ [Required Settings]



12. Set the network configuration as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2] ⇨ [Basic Settings] ⇨ [Network Configuration Settings]



- RX/RY and RWw/RWr setting of the local station is for standard communications.
- RX/RY setting of the remote device station is used as a remote control and monitor input signal in standard communications.
- RWw/RWr setting of the remote device station is used in the safety system. Set to 16 points.

13. Set the refresh settings as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2] ⇨ [Basic Settings] ⇨ [Refresh Settings]

No.	Link Side					CPU Side				
	Device Name	Points	Start	End		Target	Device Name	Points	Start	End
-	SB	512	00000	001FF		Module Label				
-	SW	512	00000	001FF		Module Label				
1	RX	112	00000	0006F		Specify Device	X	112	01000	0106F
2	RY	112	00000	0006F		Specify Device	Y	112	01000	0106F
3	RWr	16	00000	0000F		Specify Device	W	16	00000	0000F
4	RWw	16	00000	0000F		Specify Device	W	16	01000	0100F
5										

- The refresh settings are for standard communications.

14. Log on to the programmable controller.

[Online] ⇨ [User Authentication] ⇨ [Log on to PLC]

- If logon cannot be performed, writing user information or initializing all information of the programmable controller is required. (GX Works3 Operating Manual)

15. Write the set parameters to the Safety CPU on the master station.

[Online] ⇨ [Write to PLC]

16. Set the parameters of the remote device station in the "CC IE Field Configuration" window as shown below and write the parameters.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2] ⇨ [Basic Settings] ⇨ [Network Configuration Settings] ⇨ Select the NZ2GFSS2-32D in the list of stations. ⇨ [CC IE Field Configuration] ⇨ [Online] ⇨ [Parameter Processing of Device Station]

Name	Write value
Wiring selection of input X0	1: Double wiring (NC/NC)
Wiring selection of input X1	1: Double wiring (NC/NC)
Ext. module 1_Wiring selection of output Y0	1: Double wiring (Source/Source)
Ext. module 1_Wiring selection of output Y1	1: Double wiring (Source/Source)

- For items other than above, write the initial value.
- Select [Close with Reflecting the Setting] and close the "CC IE Field Configuration" window after writing parameters of the remote device station.

17. Visually check if the parameter of the remote device station is correctly written after writing parameters. For how to check the parameters, refer to the following.

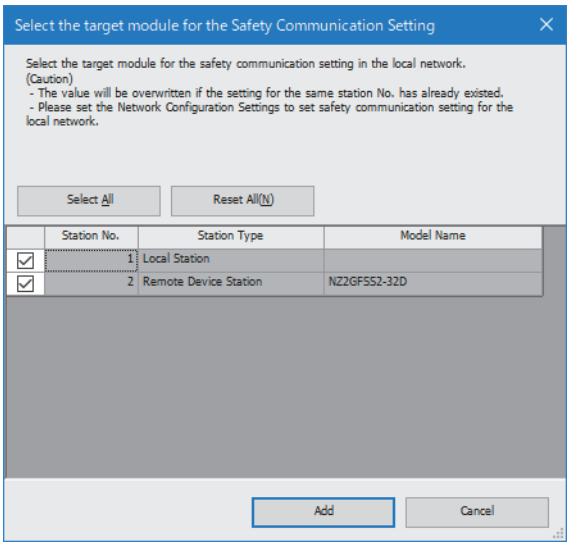
GX Works3 Operating Manual

18. Set "To Use or Not to Use the Safety Communication Setting" to "Use".

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2] ⇨ [Application Settings] ⇨ [Safety Communication Setting] ⇨ [To Use or Not to Use the Safety Communication Setting]

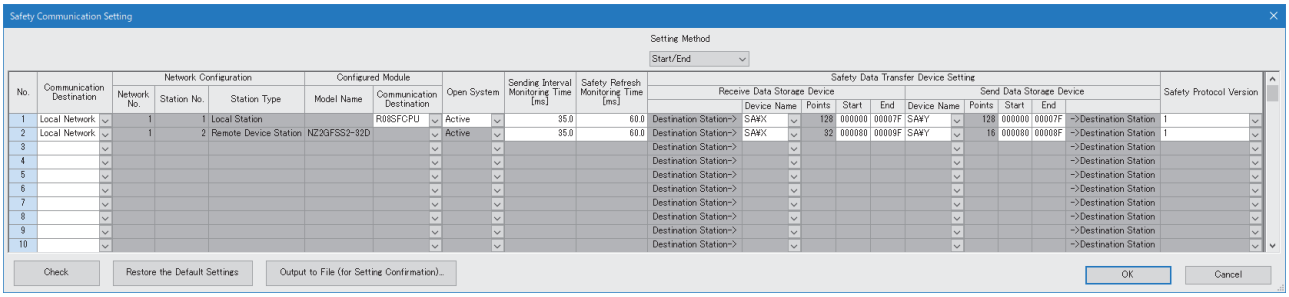
19. Select "Local Network" from "Communication Destination" in "Safety Communication Setting" window and set the destination module in "Select the target module for the Safety Communication Setting" window.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2] ⇨ [Application Settings] ⇨ [Safety Communication Setting] ⇨ [Safety Communication Setting]



20. Set the "Safety Communication Setting" as follows.

Item			No.1	No.2
Communication Destination			Local Network	Local Network
Configured Module	Communication Destination		R08SFCPU	—
Open System			Active	Active
Sending Interval Monitoring Time [ms]			35.0	35.0
Safety Refresh Monitoring Time [ms]			60.0	60.0
Safety Data Transfer Device Setting	Receive Data Storage Device	Device Name	SA\X	SA\X
		Start	000000	000080
		End	00007F	00009F
	Send Data Storage Device	Device Name	SA\Y	SA\Y
		Start	000000	000080
		End	00007F	00008F
Safety Protocol Version			1	1



21. Write the set parameters to the Safety CPU on the master station.

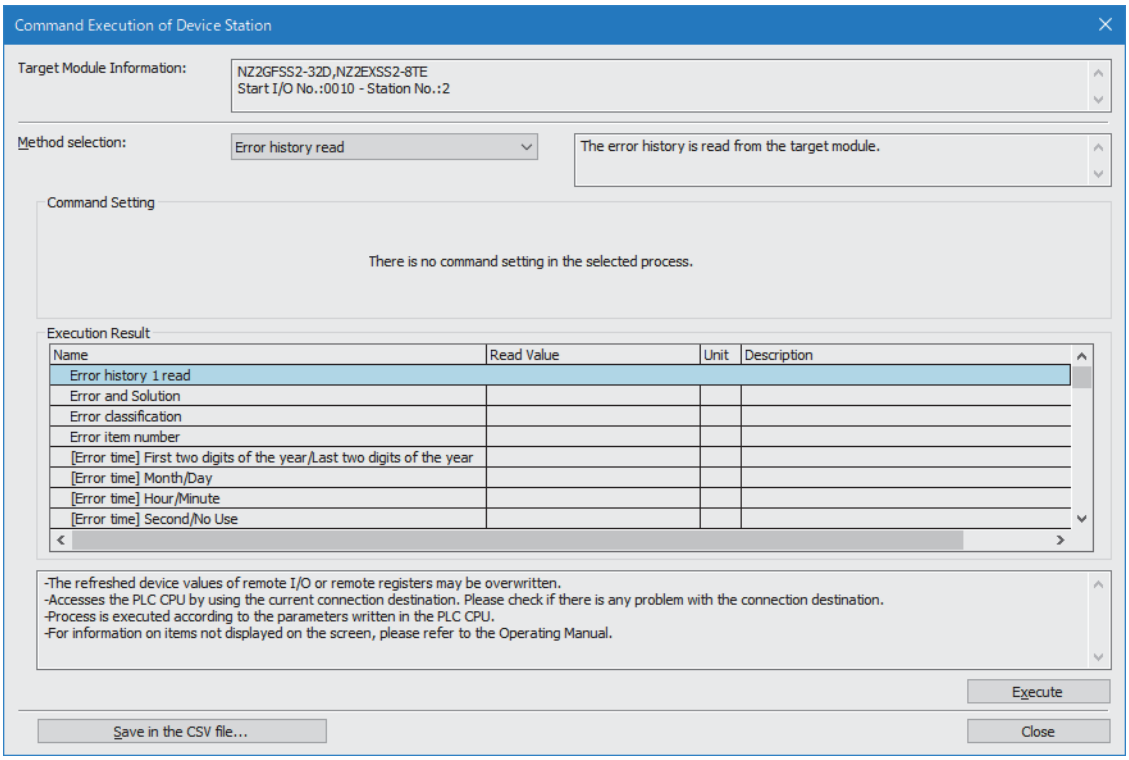
[Online] ⇨ [Write to PLC]

22. Visually check if the safety communication setting is correctly written after writing parameters. For how to check the parameters, refer to the following.

GX Works3 Operating Manual

23. Open the "Command Execution of Device Station" window in the "CC IE Field Configuration" window.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2] ⇨ [Basic Settings] ⇨ [Network Configuration Settings] ⇨ Select the NZ2GFSS2-32D in the list of stations. ⇨ [CC IE Field Configuration] ⇨ [Online] ⇨ [Command Execution of Device Station]



24. Select "Start of checking the module position" in "Method selection" and click the [Execute] button.

25. The SAFETY LED of the NZ2GFSS2-32D flashes. Check if the NZ2GFSS2-32D on which the SAFETY LED flashes has been installed on the desired position.

26. After checking the position of the module, select "Stop of checking the module position" in "Method selection" in the "Command Execution of Device Station" window and click the [Execute] button.

27. The flashing of the SAFETY LED of the NZ2GFSS2-32D stops.

28. Select "Safety module validation" in "Method selection" and click the [Execute] button.

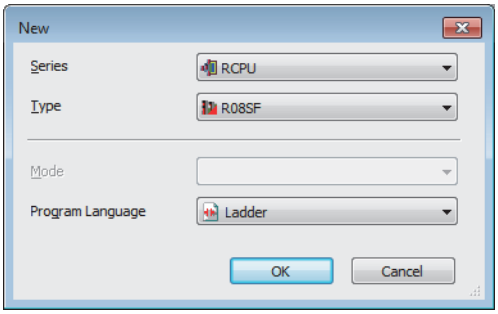
Point

- In this example, default values were used for parameters that are not shown above. For the parameter setting, refer to the chapter explaining the parameters in this manual. (☞ Page 137 PARAMETER SETTINGS)
- Depending on the time after logon to the Safety CPU, user authentication may be required again.

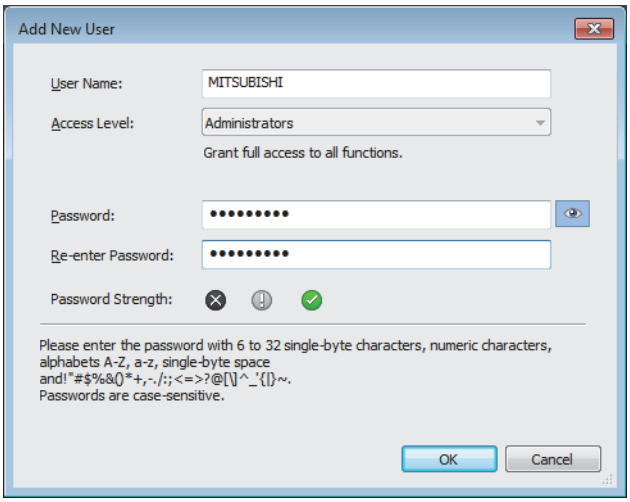
For safety protocol version 2

1. Set the Safety CPU as follows.

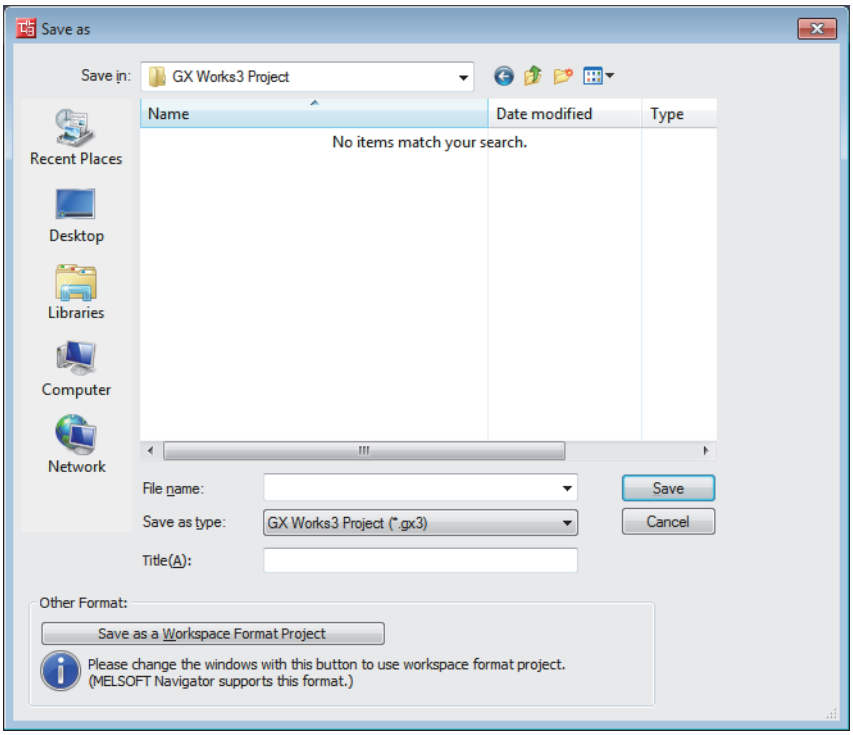
[Project] ⇨ [New]



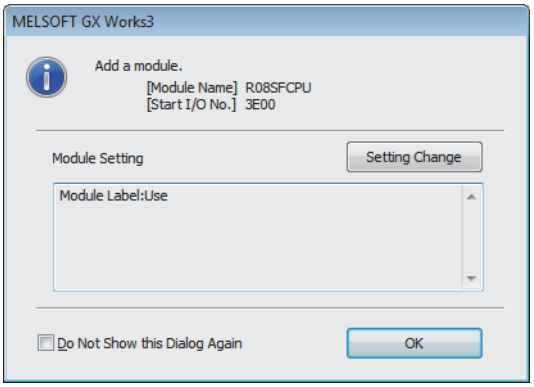
2. In the following window, enter a password and re-enter password, and click the [OK] button.



3. In the following window, enter a file name, and click the [Save] button.

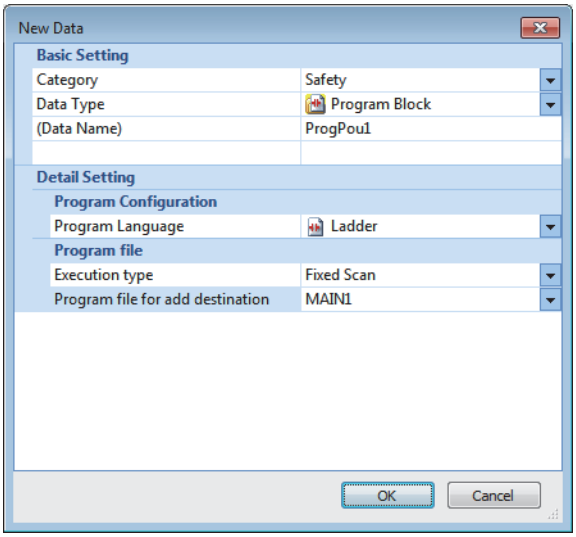


4. Click the [OK] button to add a module label of the Safety CPU.



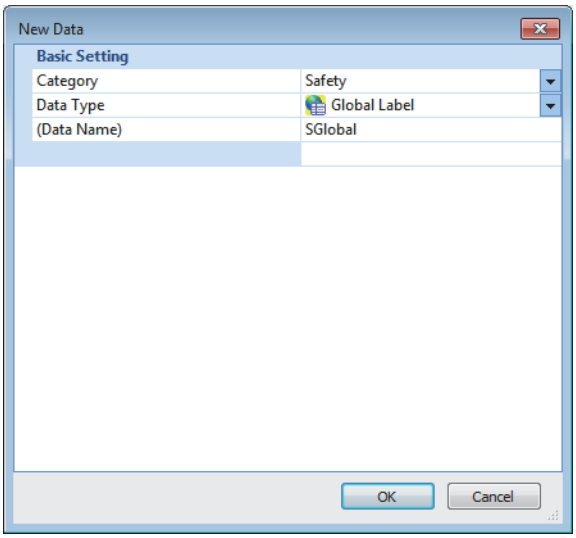
5. Add the safety program in the following item.

[Navigation window] ⇨ [Program] ⇨ [Fixed Scan] ⇨ Right-click ⇨ [Add New Data]



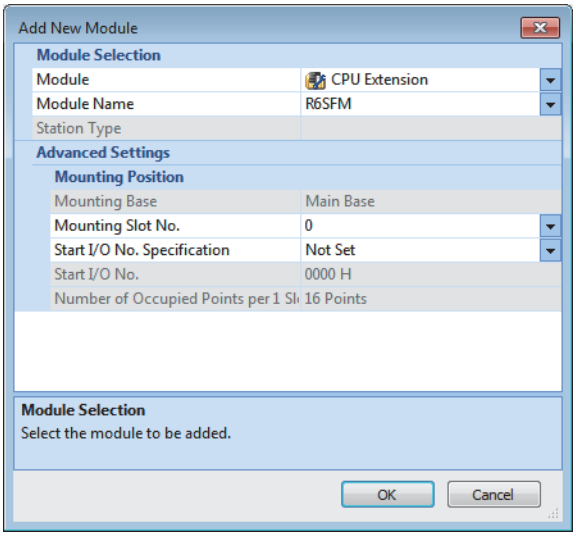
6. Add the safety global label in the following item.

[Navigation window] ⇨ [Label] ⇨ [Global Label] ⇨ Right-click ⇨ [Add New Data]

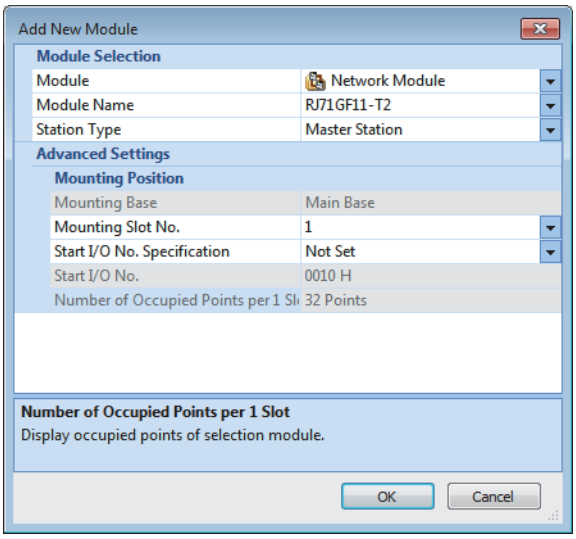


7. In the I/O assignment setting, set the safety function module for slot No.0.

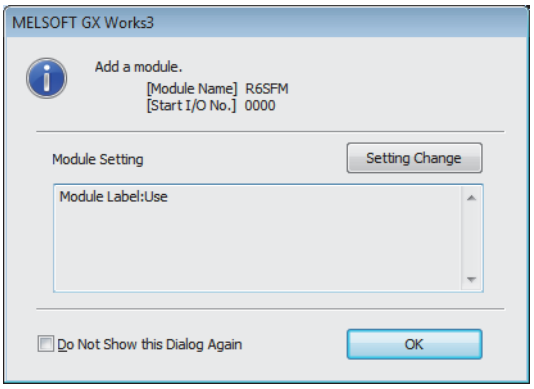
[Navigation window] ⇨ [Parameter] ⇨ [System Parameter] ⇨ [I/O Assignment] tab ⇨ [I/O Assignment Setting]



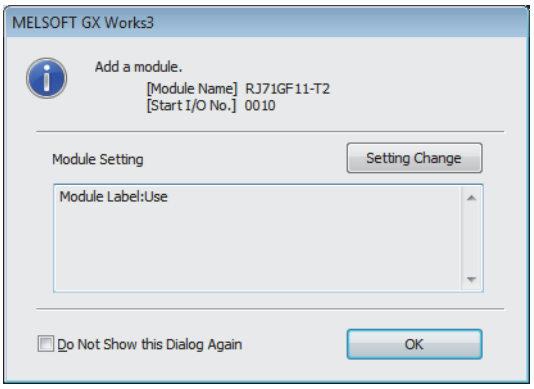
8. Set the master/local module for slot No.1.



9. Click the [OK] button to add the module labels of the safety function module.



10. Click the [OK] button to add the module labels of the master/local module.



11. Set the items in "Required Settings" as follows.

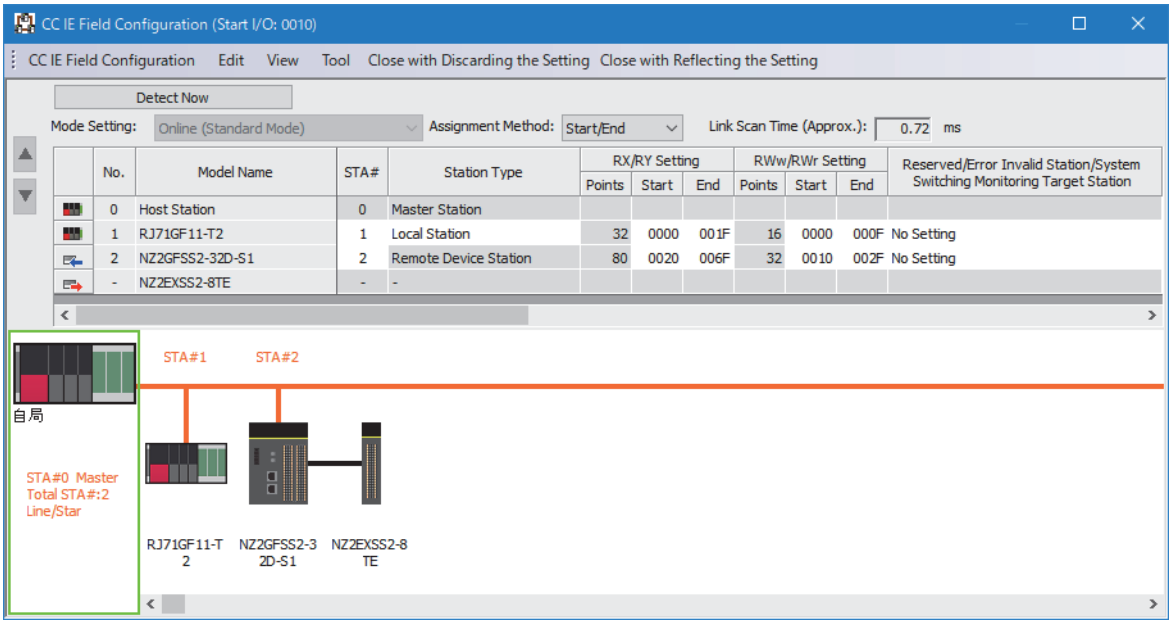
[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2] ⇨ [Required Settings]

Setting Item

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

12. Set the network configuration as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2] ⇨ [Basic Settings] ⇨ [Network Configuration Settings]



- RX/RY and RWw/RWr setting of the local station is for standard communications.
- RX/RY setting of the remote device station is used as a remote control and monitor input signal in standard communications.
- RWw/RWr setting of the remote device station is used in the safety system. As the number of RWw/RWr points used varies depending on the device, check the specifications of the external device before setting. In the example, it is set to 32 points.

13. Set the refresh settings as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2] ⇨ [Basic Settings] ⇨ [Refresh Settings]

No.	Link Side					CPU Side				
	Device Name	Points	Start	End		Target	Device Name	Points	Start	End
-	SB	512	00000	001FF		Module Label				
-	SW	512	00000	001FF		Module Label				
1	RX	112	00000	0006F		Specify Device	X	112	01000	0106F
2	RY	112	00000	0006F		Specify Device	Y	112	01000	0106F
3	RWr	16	00000	0000F		Specify Device	W	16	00000	0000F
4	RWw	16	00000	0000F		Specify Device	W	16	01000	0100F
5										

- The refresh settings are for standard communications.

14. Log on to the programmable controller.

[Online] ⇨ [User Authentication] ⇨ [Log on to PLC]

- If logon cannot be performed, writing user information or initializing all information of the programmable controller is required. (GX Works3 Operating Manual)

15. Write the set parameters to the Safety CPU on the master station.

[Online] ⇨ [Write to PLC]

16. Set the parameters of the remote device station in the "CC IE Field Configuration" window as shown below and write the parameters.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2] ⇨ [Basic Settings] ⇨ [Network Configuration Settings] ⇨ Select the NZ2GFSS2-32D-S1 in the list of stations. ⇨ [CC IE Field Configuration] ⇨ [Online] ⇨ [Parameter Processing of Device Station]

Name	Write value
Wiring selection of input X0	1: Double wiring (NC/NC)
Wiring selection of input X1	1: Double wiring (NC/NC)
Ext. module 1_Wiring selection of output Y0	1: Double wiring (Source/Source)
Ext. module 1_Wiring selection of output Y1	1: Double wiring (Source/Source)

- For items other than above, write the initial value.
- Select [Close with Reflecting the Setting] and close the "CC IE Field Configuration" window after writing parameters of the remote device station.

17. Visually check if the parameter of the remote device station is correctly written after writing parameters. For how to check the parameters, refer to the following.

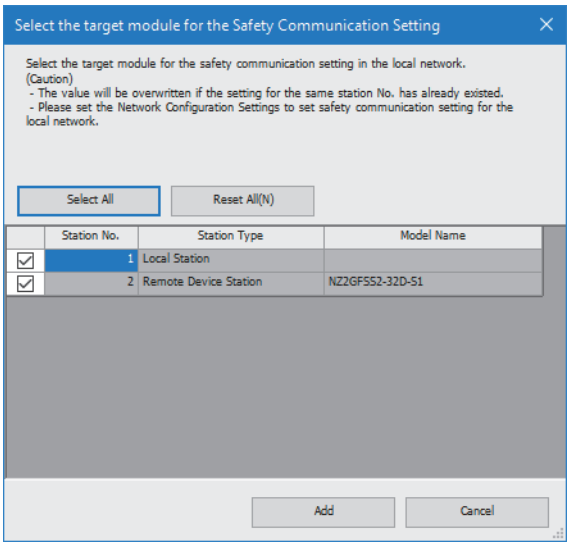
GX Works3 Operating Manual

18. Set "To Use or Not to Use the Safety Communication Setting" to "Use".

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2] ⇨ [Application Settings] ⇨ [Safety Communication Setting] ⇨ [To Use or Not to Use the Safety Communication Setting]

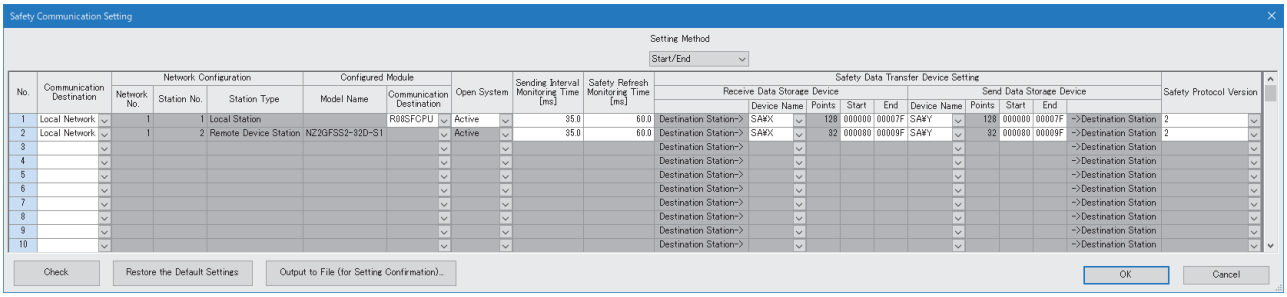
19. Select "Local Network" from "Communication Destination" in "Safety Communication Setting" window and set the destination module in "Select the target module for the Safety Communication Setting" window.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2] ⇨ [Application Settings] ⇨ [Safety Communication Setting] ⇨ [Safety Communication Setting]



20. Set the "Safety Communication Setting" as follows.

Item			No.1	No.2
Communication Destination			Local Network	Local Network
Configured Module	Communication Destination		R08SFCPU	—
Open System			Active	Active
Sending Interval Monitoring Time [ms]			35.0	35.0
Safety Refresh Monitoring Time [ms]			60.0	60.0
Safety Data Transfer Device Setting	Receive Data Storage Device	Device Name	SA\X	SA\X
		Start	000000	000080
		End	00007F	00009F
	Send Data Storage Device	Device Name	SA\Y	SA\Y
		Start	000000	000080
		End	00007F	00009F
Safety protocol version			2	2



21. Write the set parameters to the Safety CPU on the master station.

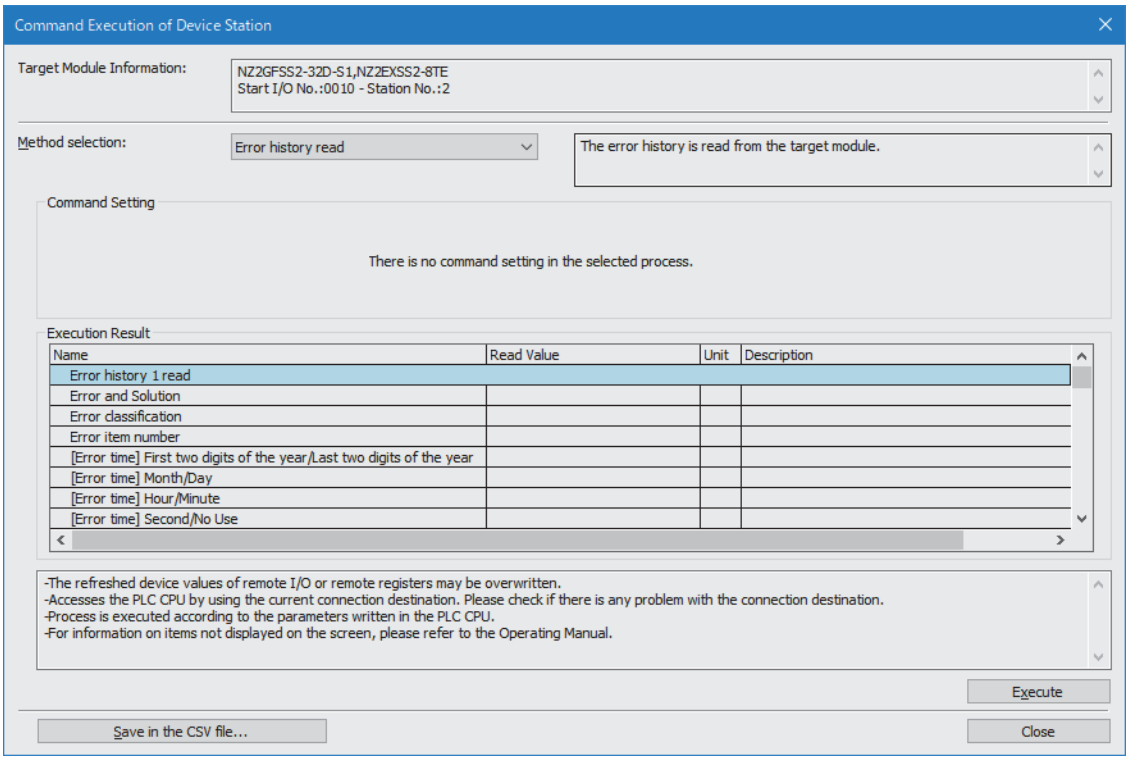
[Online] ⇨ [Write to PLC]

22. Visually check if the safety communication setting is correctly written after writing parameters. For how to check the parameters, refer to the following.

GX Works3 Operating Manual

23. Open the "Command Execution of Device Station" window in the "CC IE Field Configuration" window.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2] ⇨ [Basic Settings] ⇨ [Network Configuration Settings] ⇨ Select the NZ2GFSS2-32D-S1 in the list of stations. ⇨ [CC IE Field Configuration] ⇨ [Online] ⇨ [Command Execution of Device Station]



24. Select "Start of checking the module position" in "Method selection" and click the [Execute] button.

25. The SAFETY LED of the NZ2GFSS2-32D-S1 flashes. Check if the NZ2GFSS2-32D-S1 on which the SAFETY LED flashes has been installed on the desired position.

26. After checking the position of the module, select "Stop of checking the module position" in "Method selection" in the "Command Execution of Device Station" window and click the [Execute] button.

27. The flashing of the SAFETY LED of the NZ2GFSS2-32D-S1 stops.

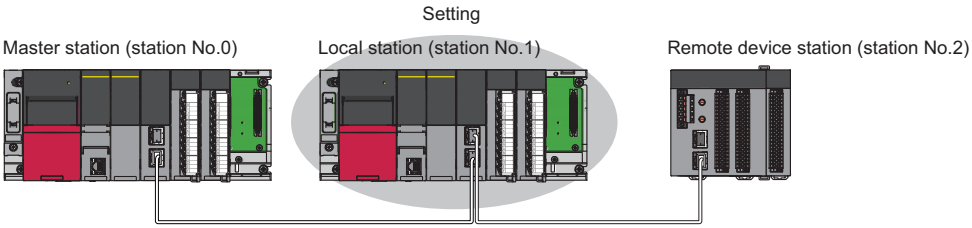
28. Select "Safety module validation" in "Method selection" and click the [Execute] button.

Point

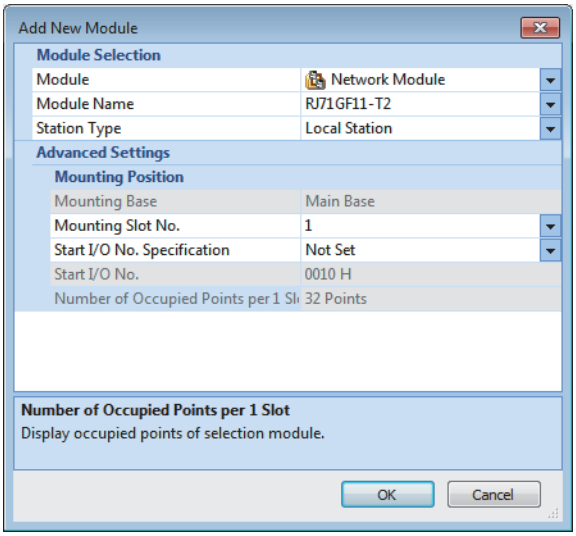
- In this example, default values were used for parameters that are not shown above. For the parameter setting, refer to the chapter explaining the parameters in this manual. (☞ Page 137 PARAMETER SETTINGS)
- Depending on the time after logon to the Safety CPU, user authentication may be required again.

Setting in the local station

Connect the engineering tool to the Safety CPU of the local station and set parameters.

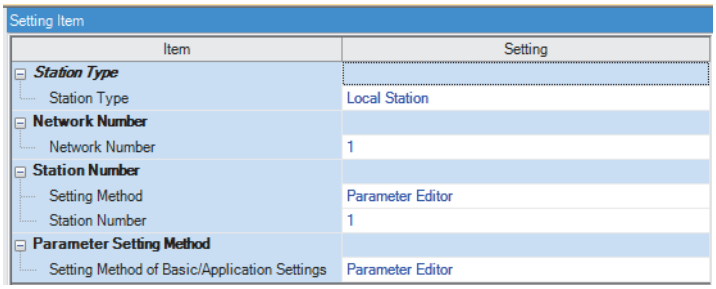


1. Set the Safety CPU and add the module label. Also, add the safety program and safety global label. The setting method is the same as that of the master station. (☞ Page 194 Setting in the master station and remote device station)
2. Set the safety function module. Follow the same procedure as that for the master station. (☞ Page 194 Setting in the master station and remote device station)
3. In the I/O assignment setting, set the master/local module for slot No.1.



4. Add the module labels of the safety function module and master/local module. The addition method of the module label is the same as that of the master station. (☞ Page 194 Setting in the master station and remote device station)
5. Set the items in "Required Settings" as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2] ⇨ [Required Settings]



6. Set the refresh parameters. Set the same refresh parameters as those set for the master station. (☞ Page 194 Setting in the master station and remote device station)
7. Set "To Use or Not to Use the Safety Communication Setting" to "Use".

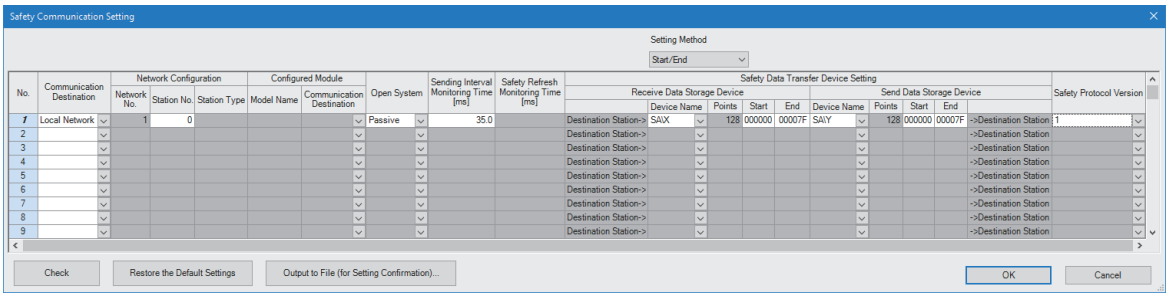
[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2] ⇨ [Application Settings] ⇨ [Safety Communication Setting] ⇨ [To Use or Not to Use the Safety Communication Setting]

8. Set the safety communication setting as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2] ⇨ [Application Settings] ⇨ [Safety Communication Setting] ⇨ [Safety Communication Setting]

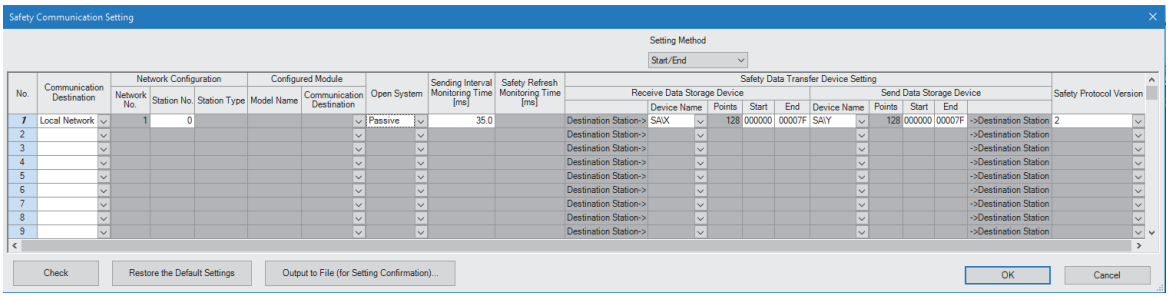
- For safety protocol version 1

Item			No.1
Communication Destination			Local Network
Network Configuration	Station No.		0
Open System			Passive
Sending Interval Monitoring Time [ms]			35.0
Safety Data Transfer Device Setting	Receive Data Storage Device	Device Name	SA\X
		Start	000000
		End	00007F
	Send Data Storage Device	Device Name	SA\Y
		Start	000000
		End	00007F
Safety Protocol Version			1



- For safety protocol version 2

Item			No.1
Communication Destination			Local Network
Network Configuration	Station No.		0
Open System			Passive
Sending Interval Monitoring Time [ms]			35.0
Safety Data Transfer Device Setting	Receive Data Storage Device	Device Name	SA\X
		Start	000000
		End	00007F
	Send Data Storage Device	Device Name	SA\Y
		Start	000000
		End	00007F
Safety Protocol Version			2



9. Log on to the programmable controller.

[Online] ⇨ [User Authentication] ⇨ [Log on to PLC]

- If logon cannot be performed, writing user information or initializing all information of the programmable controller is required. (GX Works3 Operating Manual)

10. Write the set parameters to the Safety CPU on the local station.

[Online] ⇨ [Write to PLC]

11. Visually check if the safety communication setting is correctly written after writing parameters. For how to check the parameters, refer to the following.

GX Works3 Operating Manual

Point

In this example, default values were used for parameters that are not shown above. For the parameter setting, refer to the chapter explaining the parameters in this manual. (☞ Page 137 PARAMETER SETTINGS)

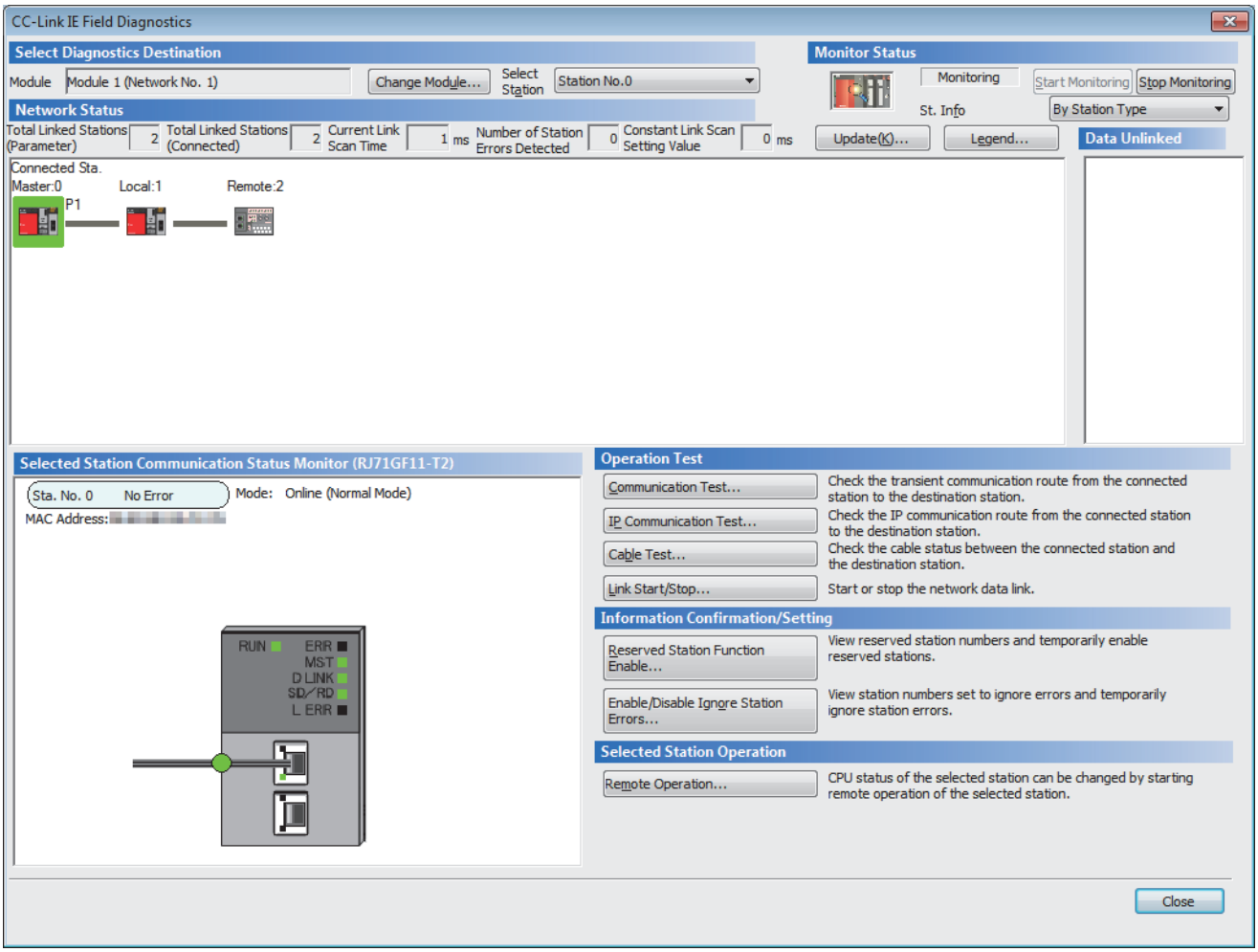
Checking the network status

After starting up the system, check whether data link can be normally performed. For the check, use the CC-Link IE Field Network diagnostics of the engineering tool.

1. Connect the engineering tool to the Safety CPU on the master station.
2. Start the CC-Link IE Field Network diagnostics.

[Diagnostics] ⇨ [CC-Link IE Field Diagnostics]

If the following display appears, data link is normal.



If an error icon appears in "Network Status" area on the "CC-Link IE Field Diagnostics" window, use the CC-Link IE Field Network diagnostics to identify the cause of the error and take corrective actions. (☞ Page 275 Checking the Network Status)

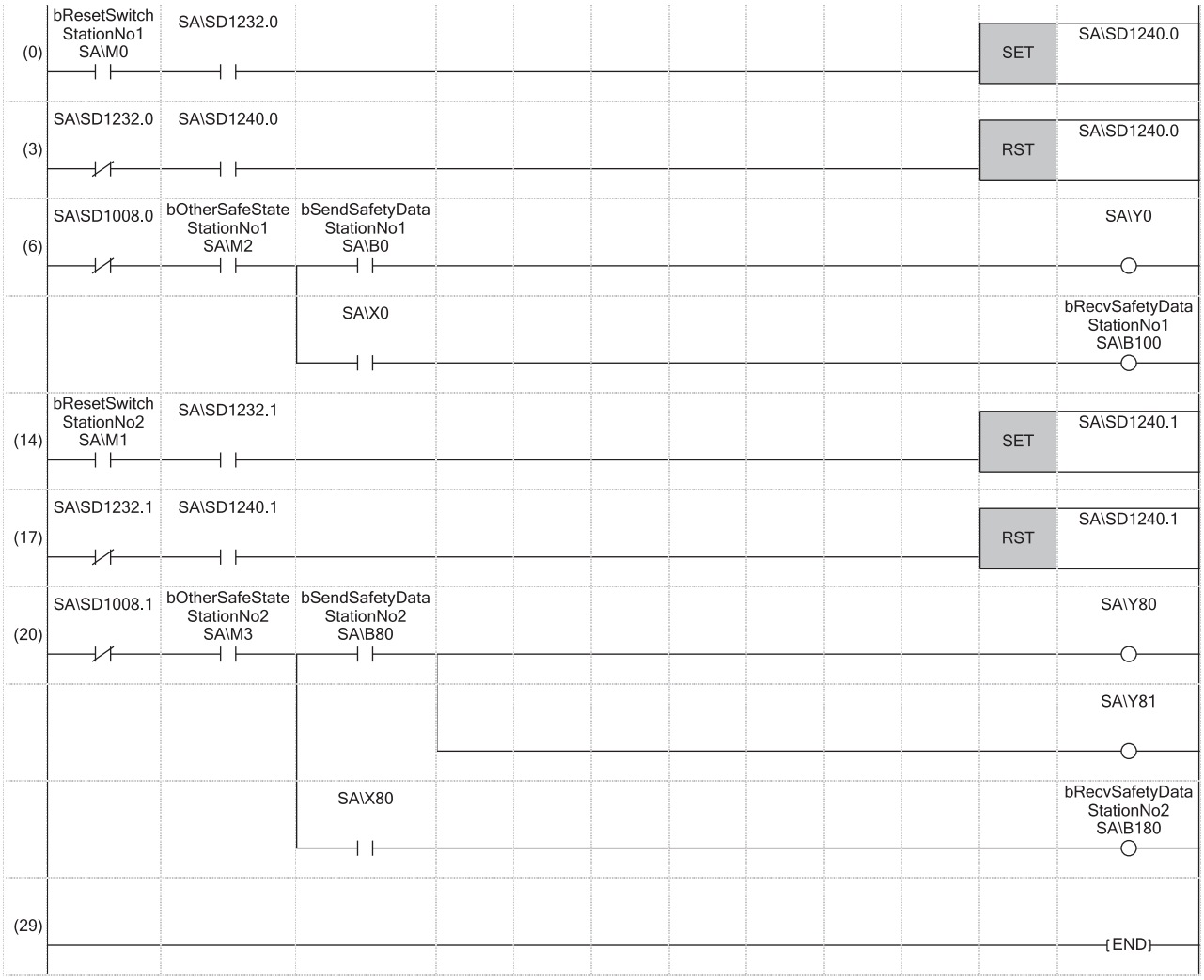
Program examples

The following shows a program example of each station when the safety program and safety global device are used.

- Master station (station No.0)

Classification	Device	Description
Safety special register	SA\SD1008.0	Safety refresh communication status of each safety connection (1st module) (safety connection No.1)
	SA\SD1008.1	Safety refresh communication status of each safety connection (1st module) (safety connection No.2)
	SA\SD1232.0	Interlock status of each safety connection (1st module) (safety connection No.1)
	SA\SD1232.1	Interlock status of each safety connection (1st module) (safety connection No.2)
	SA\SD1240.0	Interlock release request for each safety connection (1st module) (safety connection No.1)
	SA\SD1240.1	Interlock release request for each safety connection (1st module) (safety connection No.2)
Label to be defined	Define safety global labels as shown below:	

Label Name	Data Type		Class	Assign (Device/Label)
bResetSwitchStationNo1	Bit	...	VAR_GLOBAL	SA\M0
bResetSwitchStationNo2	Bit	...	VAR_GLOBAL	SA\M1
bOtherSafeStateStationNo1	Bit	...	VAR_GLOBAL	SA\M2
bOtherSafeStateStationNo2	Bit	...	VAR_GLOBAL	SA\M3
bSendSafetyDataStationNo1	Bit	...	VAR_GLOBAL	SA\B0
bSendSafetyDataStationNo2	Bit	...	VAR_GLOBAL	SA\B80
bRecvSafetyDataStationNo1	Bit	...	VAR_GLOBAL	SA\B100
bRecvSafetyDataStationNo2	Bit	...	VAR_GLOBAL	SA\B180

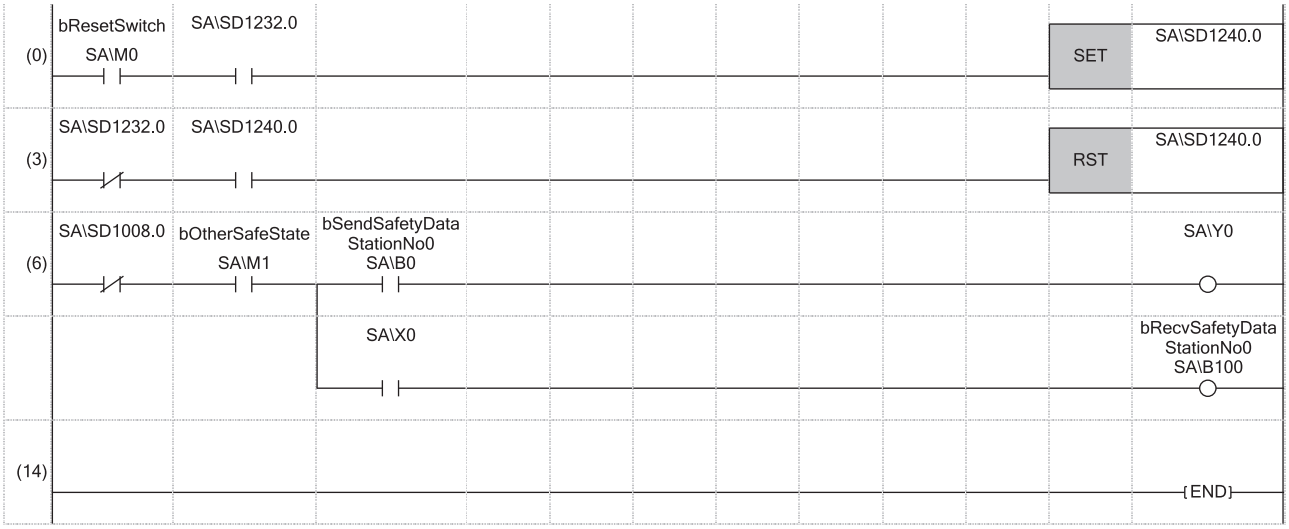


(0)Processing to release the safety station interlock status in safety communications with station No.1
(6)Communication program with station No.1
(14)Processing to release the safety station interlock status in safety communications with station No.2
(20)Communication program with station No.2

• Local station (station No.1)

Classification	Device	Description
Safety special register	SA\SD1008.0	Safety refresh communication status of each safety connection (1st module) (safety connection No.1)
	SA\SD1232.0	Interlock status of each safety connection (1st module) (safety connection No.1)
	SA\SD1240.0	Interlock release request for each safety connection (1st module) (safety connection No.1)
Label to be defined	Define safety global labels as shown below:	

Label Name	Data Type		Class	Assign (Device/Label)
bResetSwitch	Bit	...	VAR_GLOBAL	SA\M0
bOtherSafeState	Bit	...	VAR_GLOBAL	SA\M1
bSendSafetyDataStationNo0	Bit	...	VAR_GLOBAL	SA\B0
bRecvSafetyDataStationNo0	Bit	...	VAR_GLOBAL	SA\B100



(0) Processing to release the safety station interlock status in safety communications with station No.0 (master station)
(6) Communication program with station No.0 (master station)

3.4 Communication Example of Safety Communication Function Used in Redundant Master Stations

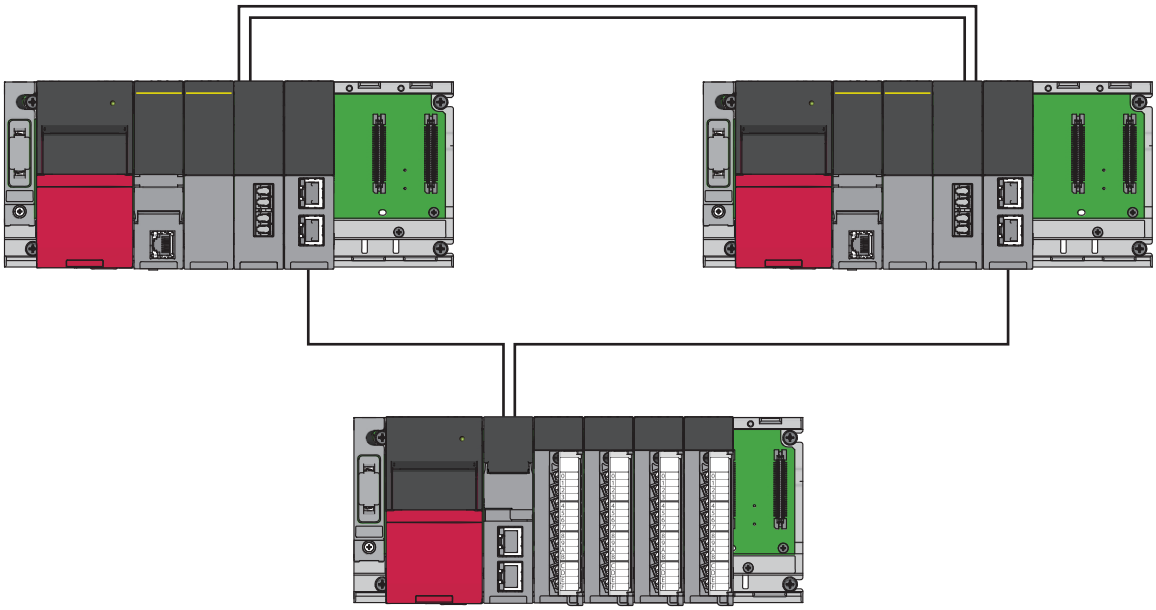
This section describes the communication example of the safety communication function using safety protocol version 1 in the system that uses the SIL2 Process CPU and has a redundant master station.

System configuration example

The following system configuration is used to describe the communication example of safety communication function when the system uses the SIL2 Process CPU and the master station is redundant.

System configuration

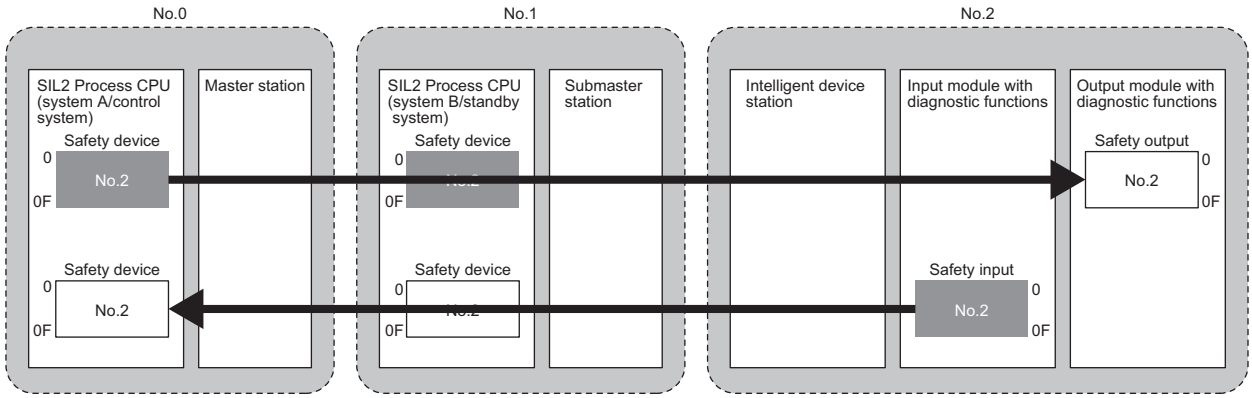
Power supply module: R61P
SIL2 Process CPU: R16PSFCPU
SIL2 function module: R6PSFM
Redundant function module: R6RFM
Master/local module: RJ71GF11-T2
Remote head module: RJ72GF15-T2
Input module with diagnostic functions: RX40NC6B
Output module with diagnostic functions: RY40PT5B



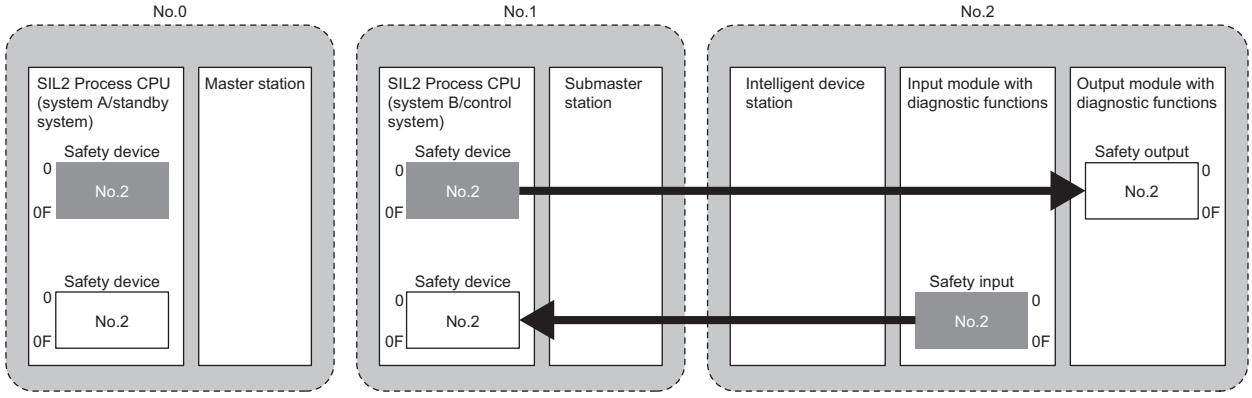
Safety device assignment

The following figure shows safety device assignment to be set in "Safety Communication Setting" under "Application Settings".

■When the system A is the control system, and the system B is the standby system



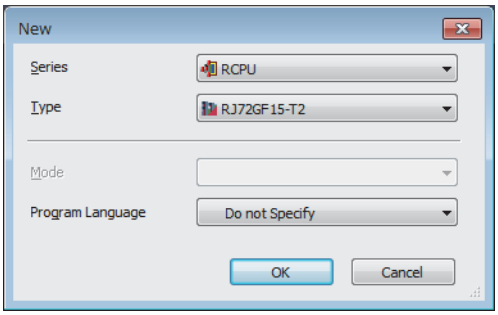
■When the system A is the standby system, and the system B is the control system



Intelligent device station setting

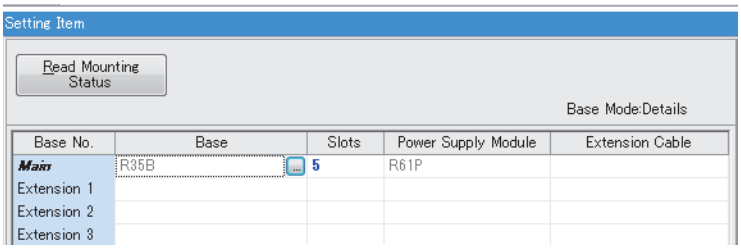
Connect the engineering tool to the remote head module, and set parameters.

1. In the following window, set the remote head module.



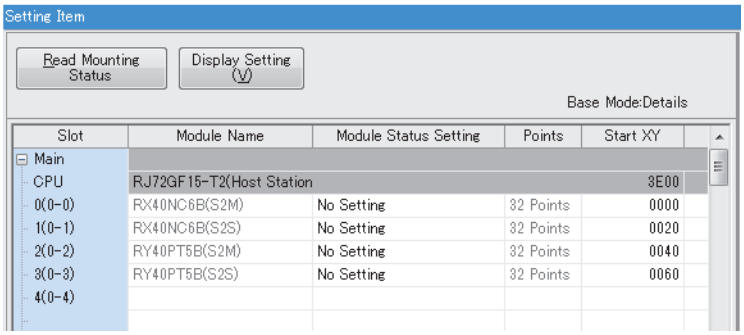
2. In the following window, set the items for Base/Power/Extension Cable Setting.

[Navigation window] ⇨ [Parameter] ⇨ [System Parameter] ⇨ [I/O Assignment] tab ⇨ [Base/Power/Extension Cable Setting]



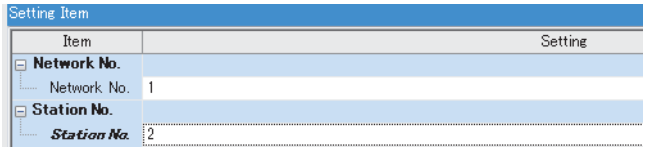
3. In the I/O assignment setting, set the I/O module with diagnostic functions to be mounted.

[Navigation window] ⇨ [Parameter] ⇨ [System Parameter] ⇨ [I/O Assignment] tab ⇨ [I/O Assignment Setting]



4. Set the items in "Network Required Setting" of "CPU Parameter" as follows.

[Navigation window] ⇨ [Parameter] ⇨ [RJ72GF15-T2] ⇨ [CPU Parameter] ⇨ [Network Required Setting]



5. Set the items for the input module with diagnostic functions and the output module with diagnostic functions as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RX40NC6B(S2M)] ⇨ [Basic Settings] ⇨ [Wiring input selection]

Setting Item

Item	X00	X01	X02	X03	X04
LED display settings during an error	Set the LED display method during an error condition				
LED display settings during an error	Do not display I/O error				
Input response time	Set the input response time of input signals in increments of one point.				
Input response time	10ms	10ms	10ms	10ms	10ms
Transmission interval monitoring time	Set the transmission interval monitoring time for safety data.				
Transmission interval monitoring time	400 ms				
Wiring input selection	Set the wiring method of inputs in increments of one point.				
Wiring input selection	Redundant (NC/NC)	Not used	Not used	Not used	Not used

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RY40PT5B(S2M)] ⇨ [Basic Settings] ⇨ [Wiring output selection]

Setting Item

Item	Y00	Y01	Y02	Y03	Y04
LED display settings during an error	Set the LED display method during an error condition				
LED display settings during an error	Do not display I/O error				
Transmission interval monitoring time	Set the transmission interval monitoring time for safety data.				
Transmission interval monitoring time	400 ms				
Wiring output selection	Set the wiring method of outputs in increments of one point.				
Wiring output selection	Double wiring(Source/Source)	Not used	Not used	Not used	Not used

6. Write the set parameters to the remote head module, and reset or power off and on the remote head module.

[Online] ⇨ [Write to PLC]

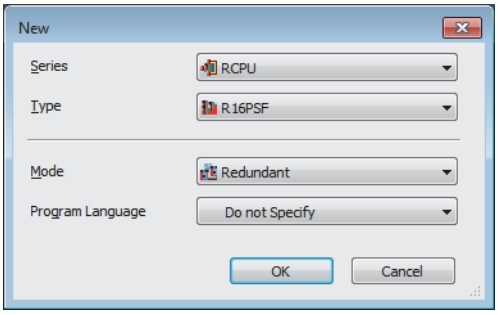
7. Save the project.

Master station setting

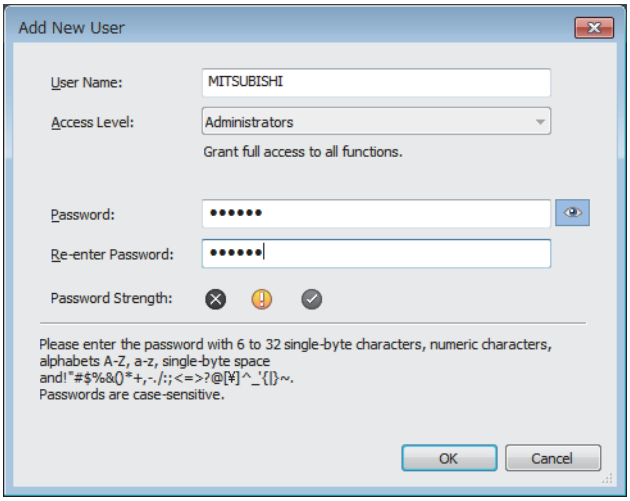
Connect the engineering tool to the SIL2 Process CPU of the master station, and set parameters.
In a system using the SIL2 Process CPU, the same program and parameter are written to both systems. A new project does not need to be created for the standby system.

1. In the following window, set the SIL2 Process CPU.

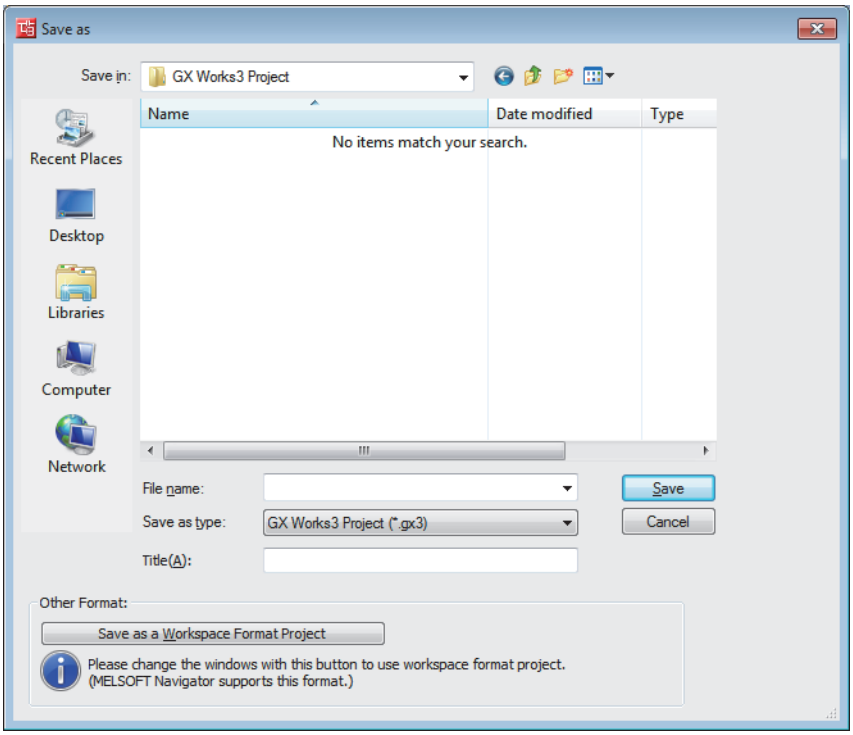
[Project] ⇨ [New]



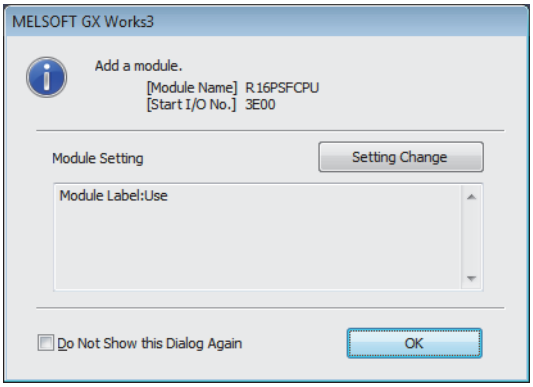
2. In the following window, enter a password and re-enter password, and click the [OK] button.



3. In the following window, enter a file name, and click the [Save] button.

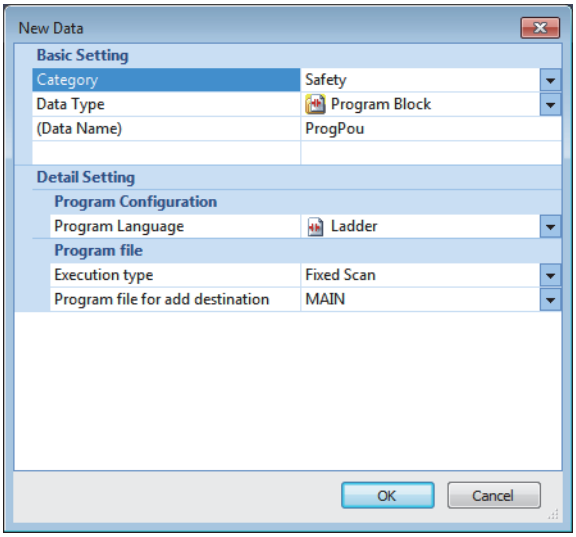


4. In the following window, click the [OK] button to add a module label of the SIL2 Process CPU.



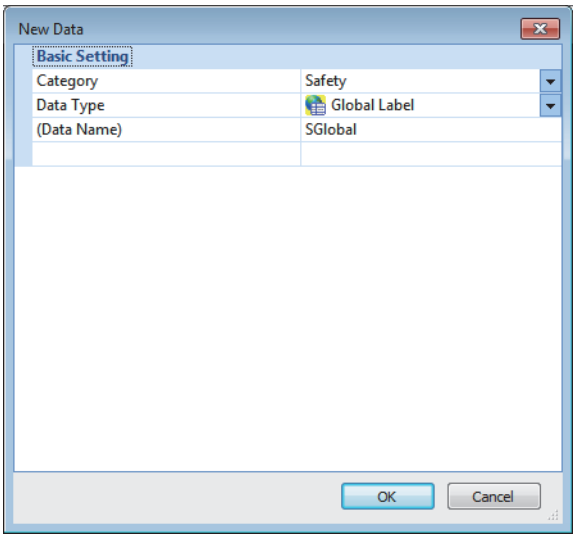
5. In the following window, add a safety program.

[Navigation window] ⇨ [Program] ⇨ [Fixed Scan] ⇨ Right-click ⇨ [Add New Data]



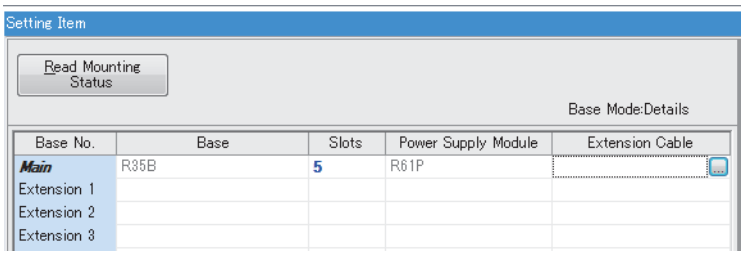
6. Add the safety global label in the following item.

[Navigation window] ⇨ [Label] ⇨ [Global Label] ⇨ Right-click ⇨ [Add New Data]



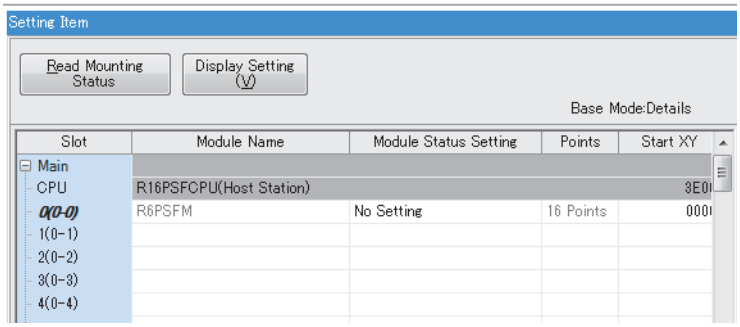
7. In the following window, set the items for Base/Power/Extension Cable Setting.

[Navigation window] ⇨ [Parameter] ⇨ [System Parameter] ⇨ [I/O Assignment] tab ⇨ [Base/Power/Extension Cable Setting]

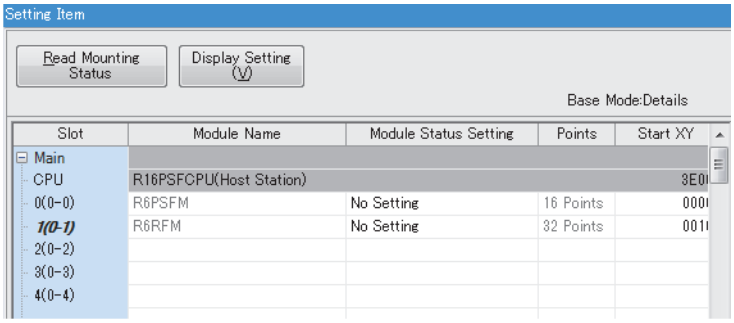


8. In the I/O assignment setting, set the SIL2 function module for slot No.0.

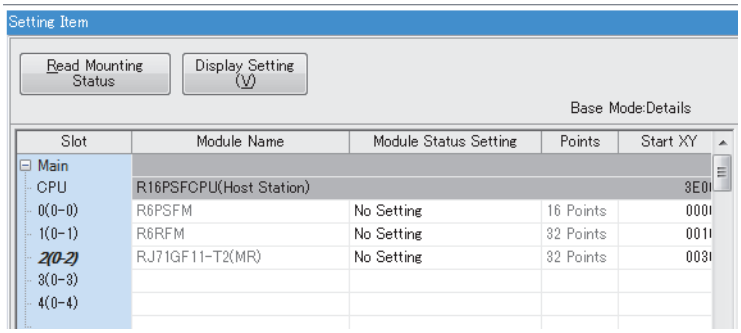
[Navigation window] ⇨ [Parameter] ⇨ [System Parameter] ⇨ [I/O Assignment] tab ⇨ [I/O Assignment Setting]



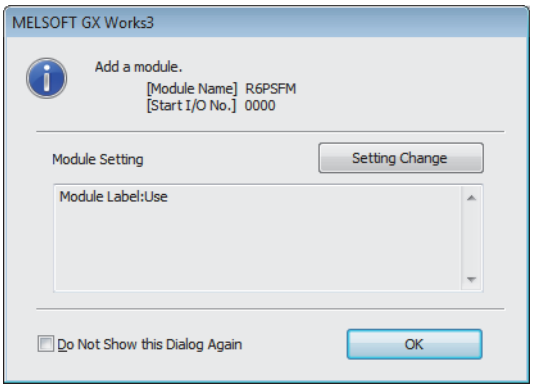
9. Set the redundant function module for slot No.1.



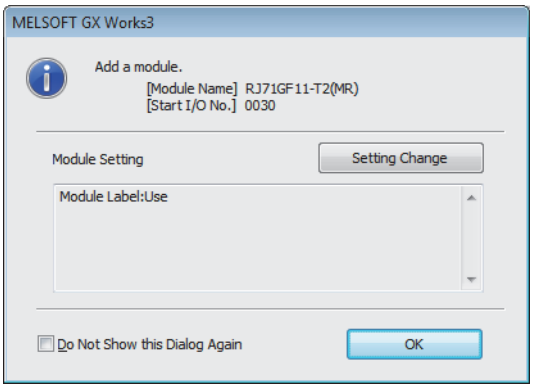
10. Set the RJ71GF11-T2 for slot No.2.



11. In the following window, click the [OK] button to add a module label of the SIL2 function module.



12. In the following window, click the [OK] button to add a module label of the RJ71GF11-T2.



13. Set the items in "Required Settings" as follows.

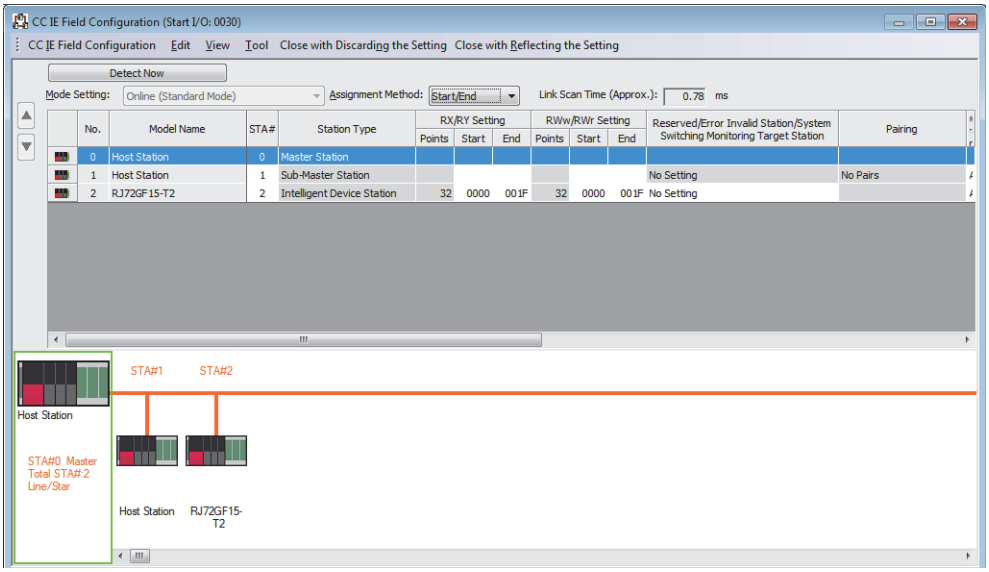
[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2(MR)] ⇨ [Required Settings]

Setting Item

Item	Setting
Station Type	
Station Type	Master Station
Network No.	
Network No.	1
Station No.	
Setting Method	Parameter Editor
Station No.	0
Parameter Setting Method	
Setting Method of Basic/Application Settings	Parameter Editor

14. Set the network configuration as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2(MR)] ⇨ [Basic Settings] ⇨ [Network Configuration Settings]



15. Set the refresh settings as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2(MR)] ⇨ [Basic Settings] ⇨ [Refresh Settings]

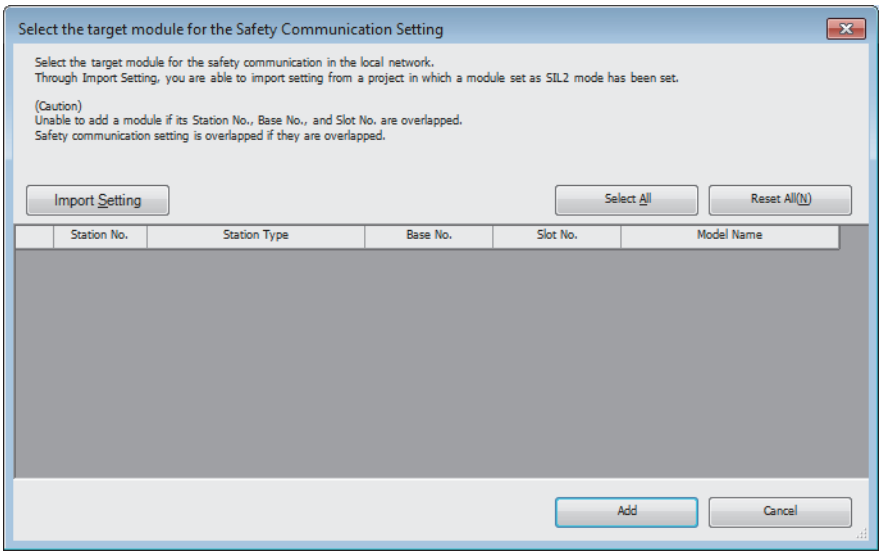
No.	Link Side					CPU Side				
	Device Name	Points	Start	End		Target	Device Name	Points	Start	End
-	SB	512	00000	001FF	⇔	Module Lab				
-	SW	512	00000	001FF	⇔	Module Lab				
1	RX	64	00000	0003F	⇔	Specify Dev	X	64	01000	0103F
2	RY	64	00000	0003F	⇔	Specify Dev	Y	64	01000	0103F
3	RWr	64	00000	0003F	⇔	Specify Dev	W	64	00000	0003F
4	RWw	64	00000	0003F	⇔	Specify Dev	W	64	01000	0103F

16. Set "To Use or Not to Use the Safety Communication Setting" to "Use".

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2(MR)] ⇨ [Application Settings] ⇨ [Safety Communication Setting] ⇨ [To Use or Not to Use the Safety Communication Setting]

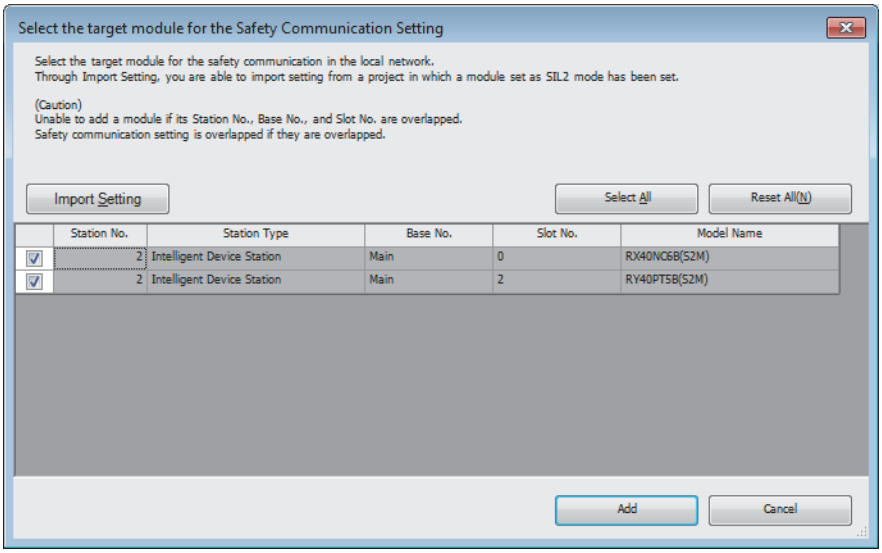
17. Select "Local Network" from "Communication Destination" in "Safety Communication Setting" window and display the "Select the target module for the Safety Communication Setting" window.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2(MR)] ⇨ [Application Settings] ⇨ [Safety Communication Setting] ⇨ [Safety Communication Setting]



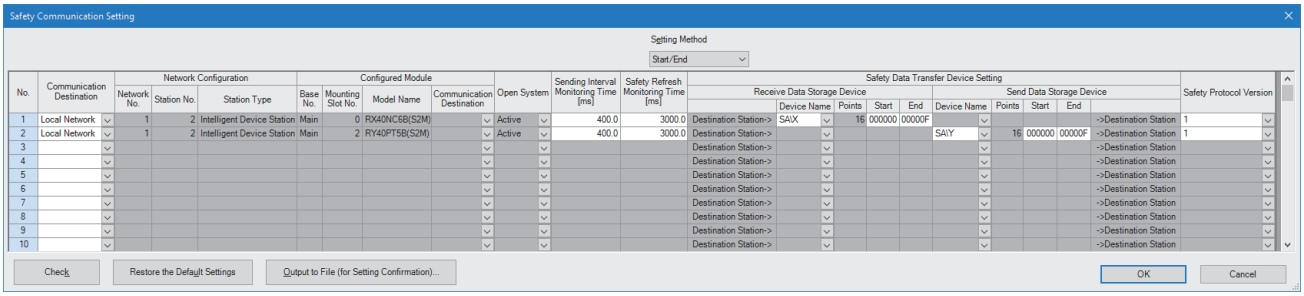
18. Click the [Import Setting] button to import the project of the remote head module.

19. Select the checkbox of the target module for the safety communication setting, and click the [Add] button.



20. Set the safety communication setting of the added module in the "Safety Communication Setting" window. The setting values are as follows.

Item			No.1	No.2
Communication Destination			Local Network	Local Network
Network Configuration	Network No.		1	1
	Station No.		2	2
	Station Type		Intelligent Device Station	Intelligent Device Station
Configured Module	Base No.		Main	Main
	Mounting Slot No.		0	2
	Model Name		RX40NC6B(S2M)	RY40PT5B(S2M)
	Communication Destination		—	—
Open System			Active	Active
Sending Interval Monitoring Time [ms]			400.0	400.0
Safety Refresh Monitoring Time [ms]			3000.0	3000.0
Safety Data Transfer Device Setting	Receive Data Storage Device	Device Name	SA\X	—
		Points	16	—
		Start	000000	—
		End	00000F	—
	Send Data Storage Device	Device Name	—	SA\Y
		Points	—	16
		Start	—	000000
		End	—	00000F
Safety Protocol Version			1	1



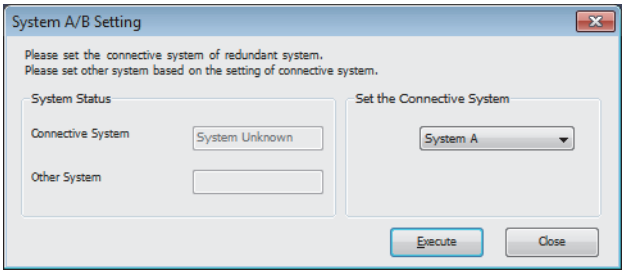
3

Point

If there are multiple communication destinations with the same combination of network number and station number, set the same safety protocol version for all of them. Check the safety protocol version of the communication destination, and if a module that supports a different safety protocol version is included, replace it with a module that supports the safety protocol version to be set, and re-import the project on the remote head module side. (☞ Page 446 Combination when the Safety Communication Function Is Used (For a System Using the SIL2 Process CPU))

21. Set the redundant function module of the own system as the system A in the "System A/B Setting" window, and reset the CPU modules of both systems or power off and on the both systems.

[Online] ⇨ [Redundant PLC Operation] ⇨ [System A/B Setting]



22. Log on to the programmable controller.

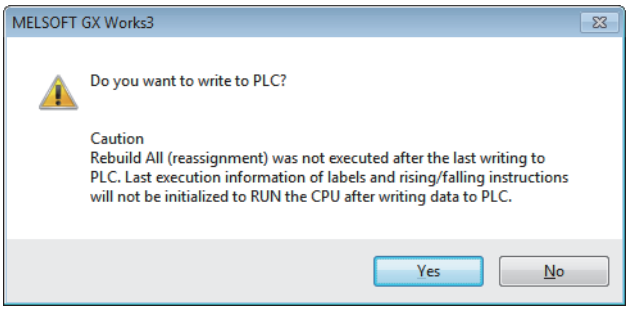
[Online] ⇨ [User Authentication] ⇨ [Log on to PLC]

If logon cannot be performed, writing user information or initializing all information of the programmable controller is required. (GX Works3 Operating Manual)

23. Write the set parameters to the system A CPU module.

[Online] ⇨ [Write to PLC]

24. Click the [Yes] button to write to the CPU modules of both systems.



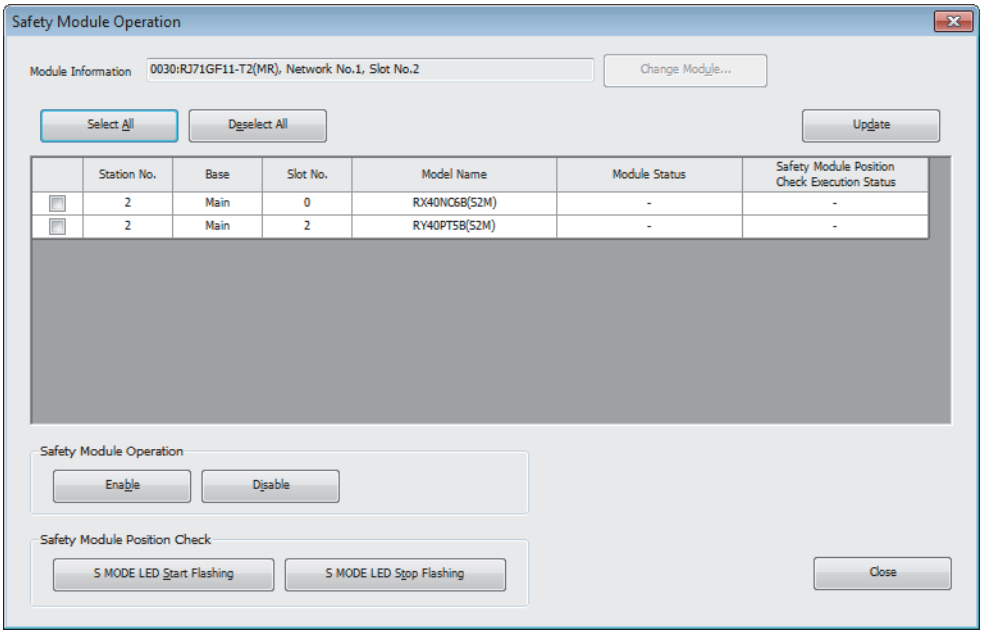
25. Either reset the CPU modules of both systems or power off and on both systems.

Point

In this setting example, default settings are used for parameters that are not shown above. For the parameter setting, refer to the following. (☞ Page 137 PARAMETER SETTINGS)

26. Validate the RX40NC6B(S2M) and the RY40PT5B(S2M) to make them usable in the system using the SIL2 Process CPU.

[Online] ⇨ [Safety PLC Operation] ⇨ [Safety Module Operation]



27. Select the checkbox of the RX40NC6B(S2M) and the RY40PT5B(S2M) to be validated, and click the [S MODE LED Start Flashing] button. Check the flashing of the LEDs on the RX40NC6B(S2M), RX40NC6B(S2S), RY40PT5B(S2M), and RY40PT5B(S2S). Following this step allows you to check whether the target module is set properly before starting validation.

28. Check the flashing of the S MODE LEDs on the RX40NC6B(S2M), RX40NC6B(S2S), RY40PT5B(S2M), and RY40PT5B(S2S), and click the [S MODE LED Stop Flashing] button to stop the S MODE LEDs flashing.

29. Click the [Enable] button.

30. Switch the safety operation mode to the SAFETY MODE.

[Online] ⇨ [Safety PLC Operation] ⇨ [Switch Safety Operation Mode]

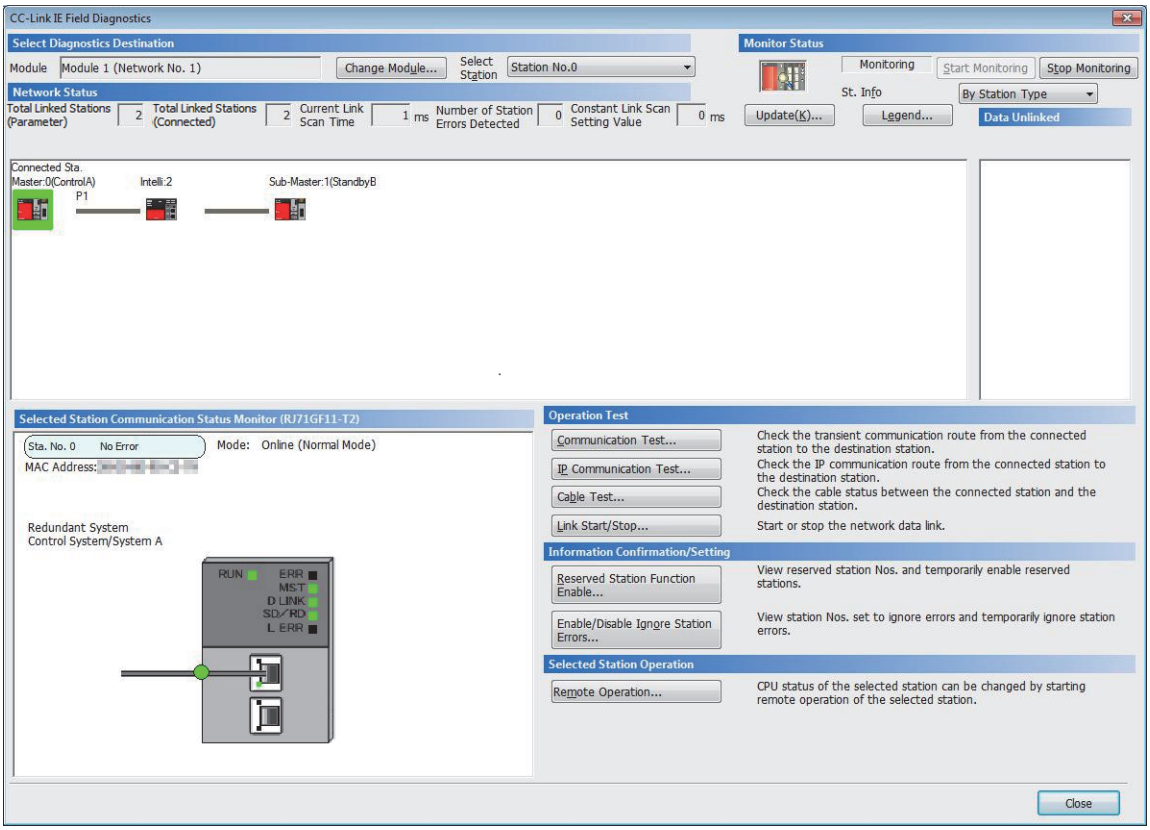
Checking the network status

After starting up the system, check whether data link can be normally performed. For the check, use the CC-Link IE Field Network diagnostics of the engineering tool.

1. Connect the engineering tool to the SIL2 Process CPU of the master station.
2. Start the CC-Link IE Field Network diagnostics.

[Diagnostics] ⇨ [CC-Link IE Field Diagnostics]

If the following display appears, data link is normal.

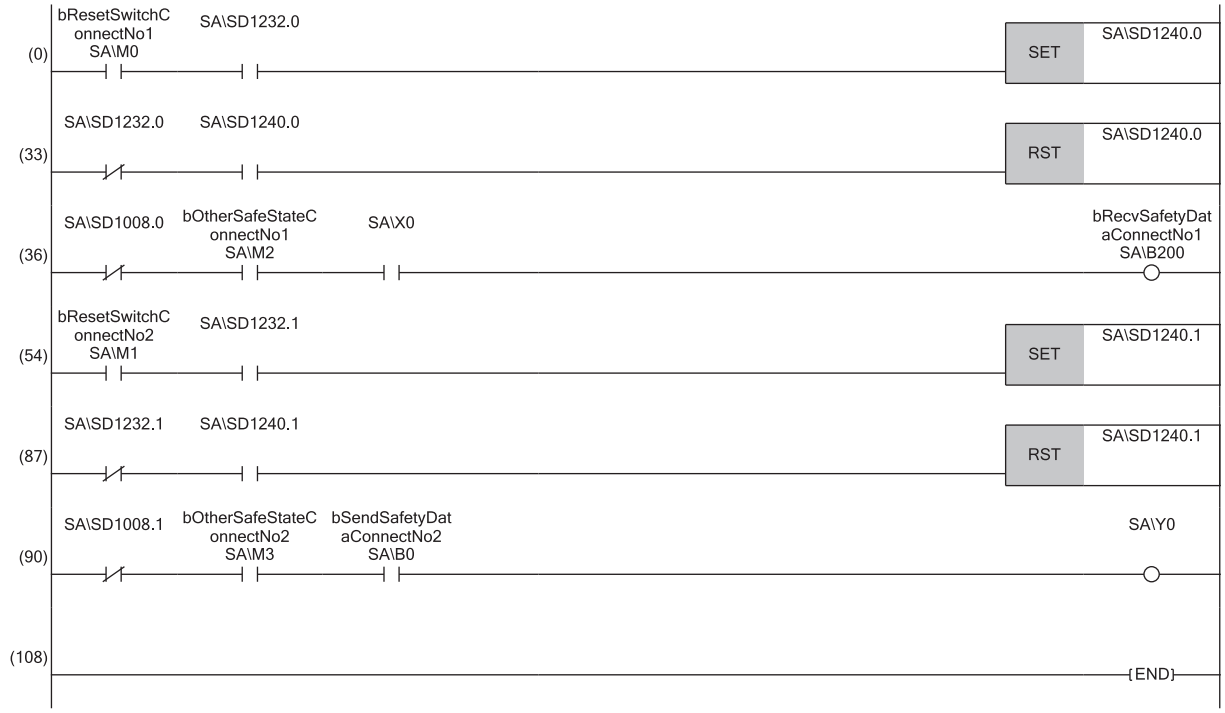


Program examples

The following shows a program example of each station when the safety program and safety global device are used.

Classification	Device	Description
Safety special register	SA\SD1008.0	Safety refresh communication status of each safety connection (1st module) (safety connection No.1)
	SA\SD1008.1	Safety refresh communication status of each safety connection (1st module) (safety connection No.2)
	SA\SD1232.0	Interlock status of each safety connection (1st module) (safety connection No.1)
	SA\SD1232.1	Interlock status of each safety connection (1st module) (safety connection No.2)
	SA\SD1240.0	Interlock release request for each safety connection (1st module) (safety connection No.1)
	SA\SD1240.1	Interlock release request for each safety connection (1st module) (safety connection No.2)
Label to be defined	Define safety global labels as shown below:	

	Label Name	Data Type		Class	Assign (Device/Label)
1	bResetSwitchConnectNo1	Bit		VAR_GLOBAL	SA\M0
2	bResetSwitchConnectNo2	Bit		VAR_GLOBAL	SA\M1
3	bOtherSafeStateConnectNo1	Bit		VAR_GLOBAL	SA\M2
4	bOtherSafeStateConnectNo2	Bit		VAR_GLOBAL	SA\M3
5	bSendSafetyDataConnectNo2	Bit		VAR_GLOBAL	SA\B0
6	bRecvSafetyDataConnectNo1	Bit		VAR_GLOBAL	SA\B200



(0), (33)Processing to release the safety station interlock in safety communications with station No.2 (safety connection No.1)

(36)Processing to send/receive the safety data to/from the station No.2 (safety connection No.1)

(54), (87)Processing to release the safety station interlock in safety communications with station No.2 (safety connection No.2)

(90)Processing to send/receive the safety data to/from the station No.2 (safety connection No.2)

3.5 Communication Example of Safety Communication Function Used in a Redundant Line

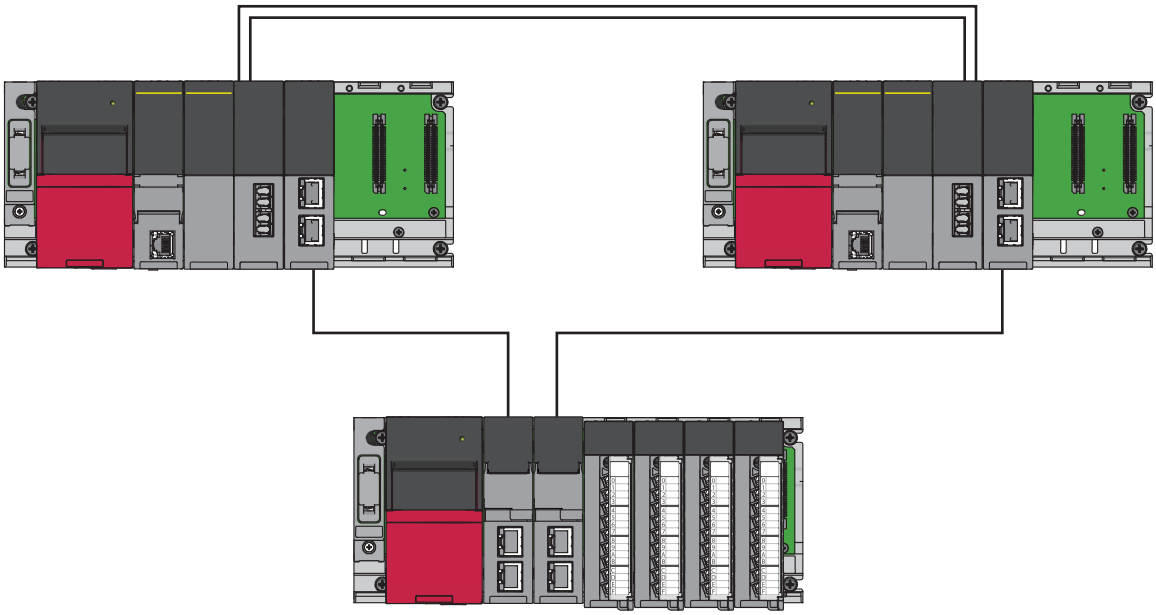
This section describes the communication example of the safety communication function using safety protocol version 1 in the system uses the SIL2 Process CPU and has a redundant line.

System configuration example

The following system configuration is used to describe the communication example of safety communication function when the system uses the SIL2 Process CPU and the line is redundant.

System configuration

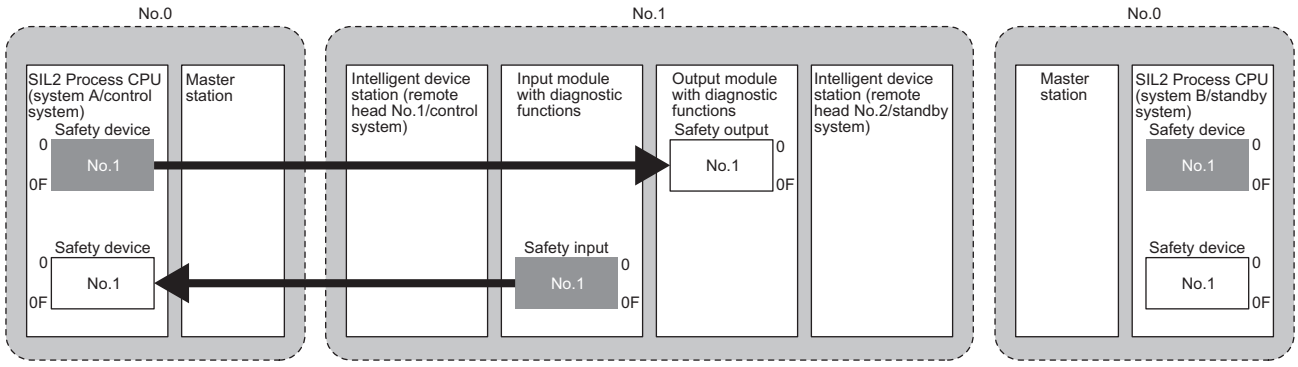
- Power supply module: R61P
- SIL2 Process CPU: R16PSFCPU
- SIL2 function module: R6PSFM
- Redundant function module: R6RFM
- Master/local module: RJ71GF11-T2
- Remote head module: RJ72GF15-T2
- Input module with diagnostic functions: RX40NC6B
- Output module with diagnostic functions: RY40PT5B



Safety device assignment

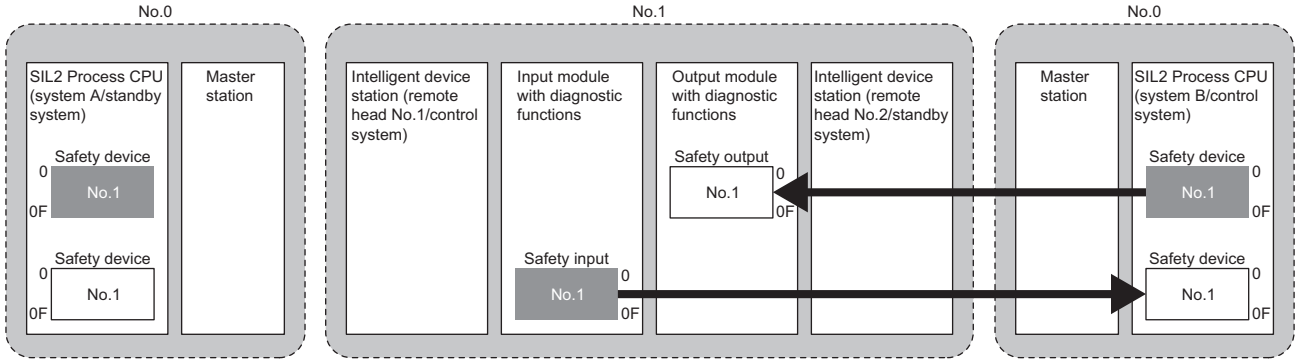
The following figure shows safety device assignment to be set in "Safety Communication Setting" under "Application Settings".

■When the system A is the control system, and the system B is the standby system



Area where data is sent to other stations

■When the system A is the standby system, and the system B is the control system

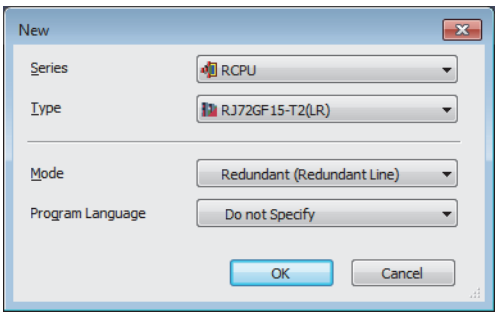


Area where data is sent to other stations

Intelligent device station setting

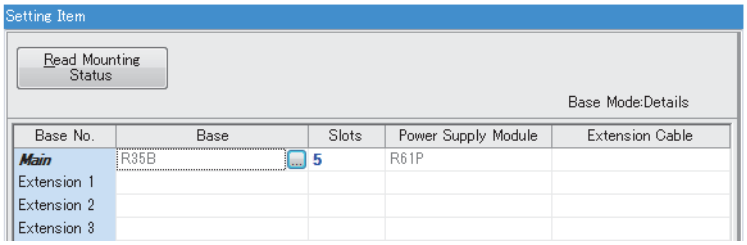
Connect the engineering tool to the remote head module of the remote head module No.1, and set parameters.
In a system using the SIL2 Process CPU, write the same parameters also to remote head module No.2.

1. In the following window, set the remote head module.



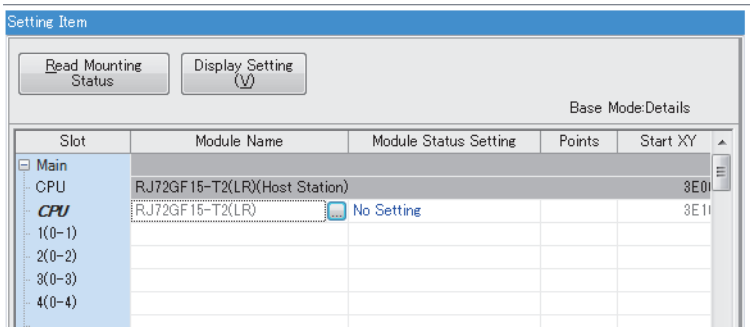
2. In the following window, set the items for Base/Power/Extension Cable Setting.

[Navigation window] ⇨ [Parameter] ⇨ [System Parameter] ⇨ [I/O Assignment] tab ⇨ [Base/Power/Extension Cable Setting]

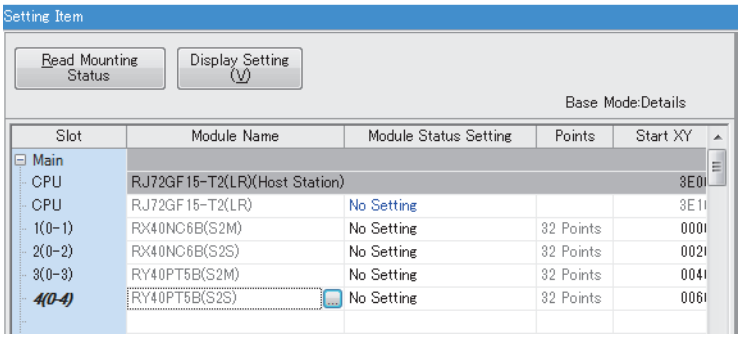


3. In the I/O assignment setting, set the remote head module No.2 for slot No.0.

[Navigation window] ⇨ [Parameter] ⇨ [System Parameter] ⇨ [I/O Assignment] tab ⇨ [I/O Assignment Setting]



4. In the I/O assignment setting, set the I/O module with diagnostic functions to be mounted.



5. Set the items in "Network Required Setting" of "CPU Parameter" as follows.

[Navigation window] ⇨ [Parameter] ⇨ [RJ72GF15-T2 (LR)] ⇨ [CPU parameter] ⇨ [Network Required Setting]

Setting Item

Item	Setting
Title Setting	
Title	1
Comment Setting	
Comment	1

6. Set the items for the input module with diagnostic functions and the output module with diagnostic functions as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RX40NC6B(S2M)] ⇨ [Basic Settings] ⇨ [Wiring input selection]

Setting Item

Item	X00	X01	X02	X03	X04
LED display settings during an error	**Set the LED display method during an error condition**				
LED display settings during an error	Do not display I/O error				
Input response time	**Set the input response time of input signals in increments of one point.**				
Input response time	10ms	10ms	10ms	10ms	10ms
Transmission interval monitoring time	**Set the transmission interval monitoring time for safety data.**				
Transmission interval monitoring time	400 ms				
Wiring input selection	**Set the wiring method of inputs in increments of one point.**				
Wiring input selection	Redundant (NC/NC)	Not used	Not used	Not used	Not used

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RY40PT5B(S2M)] ⇨ [Basic Settings] ⇨ [Wiring output selection]

Setting Item

Item	Y00	Y01	Y02	Y03	Y04
LED display settings during an error	**Set the LED display method during an error condition**				
LED display settings during an error	Do not display I/O error				
Transmission interval monitoring time	**Set the transmission interval monitoring time for safety data.**				
Transmission interval monitoring time	400 ms				
Wiring output selection	**Set the wiring method of outputs in increments of one point.**				
Wiring output selection	Double wiring(Source/Source)	Not used	Not used	Not used	Not used

7. Write the set parameters to the remote head module, and reset or power off and on the remote head module.

[Online] ⇨ [Write to PLC]

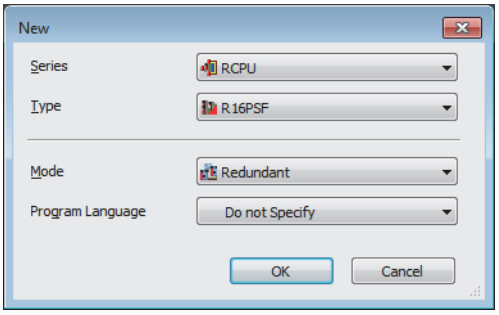
8. Save the project.

Master station setting

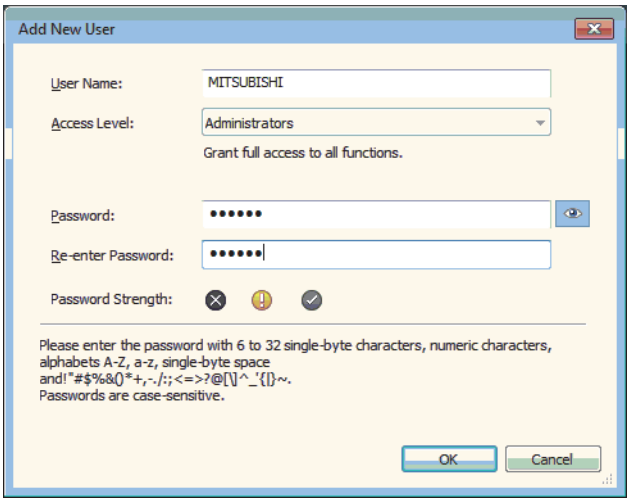
Connect the engineering tool to the SIL2 Process CPU on the control system, and set the parameters.
In a system using the SIL2 Process CPU, the same program and parameter are written to both systems. A new project does not need to be created for the standby system.

1. In the following window, set the SIL2 Process CPU.

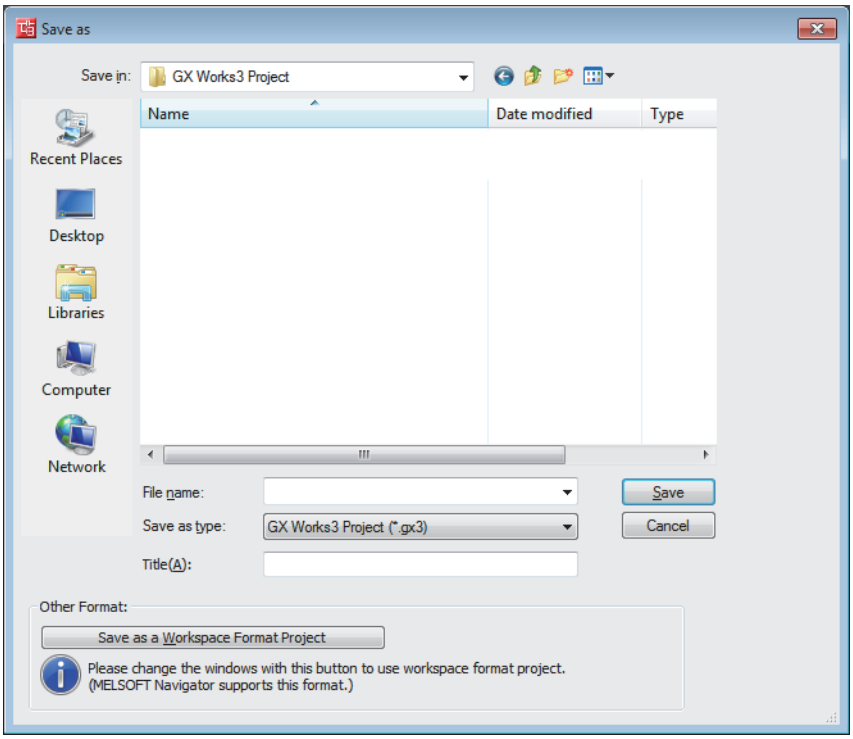
[Project] ⇨ [New]



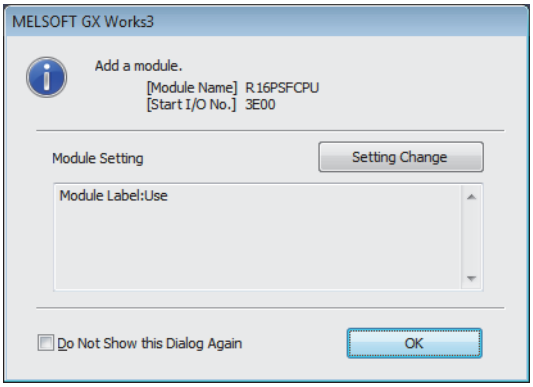
2. In the following window, enter a password and re-enter password, and click the [OK] button.



3. In the following window, enter a file name, and click the [Save] button.

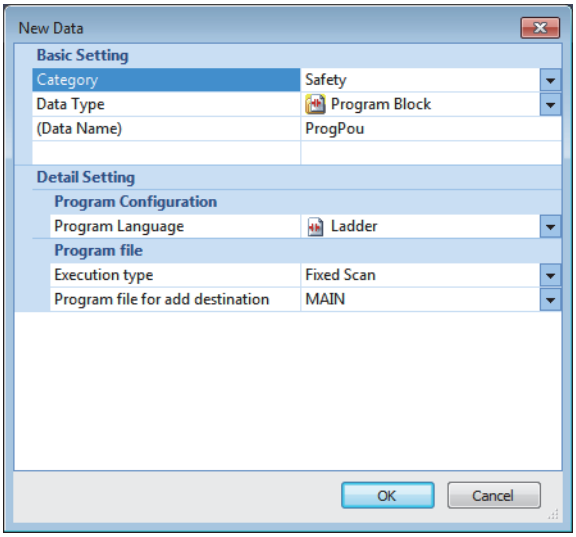


4. In the following window, click the [OK] button to add a module label of the SIL2 Process CPU.



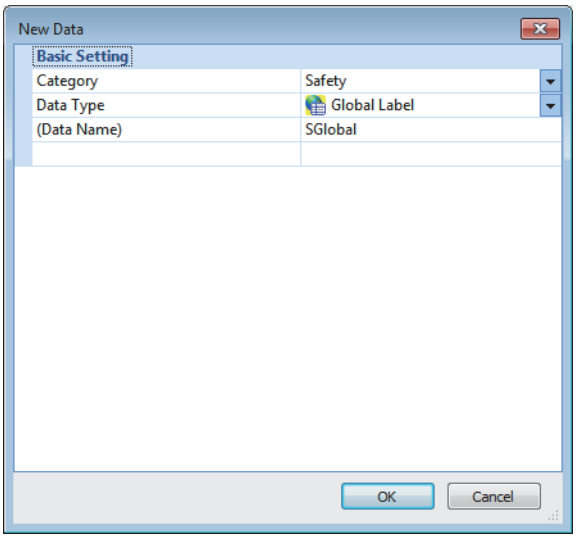
5. In the following window, add a safety program.

[Navigation window] ⇨ [Program] ⇨ [Fixed Scan] ⇨ Right-click ⇨ [Add New Data]



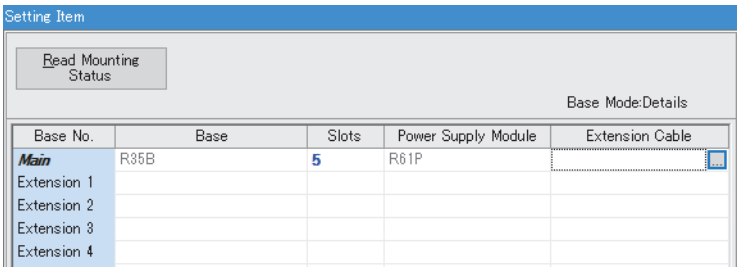
6. Add the safety global label in the following item.

[Navigation window] ⇨ [Label] ⇨ [Global Label] ⇨ Right-click ⇨ [Add New Data]



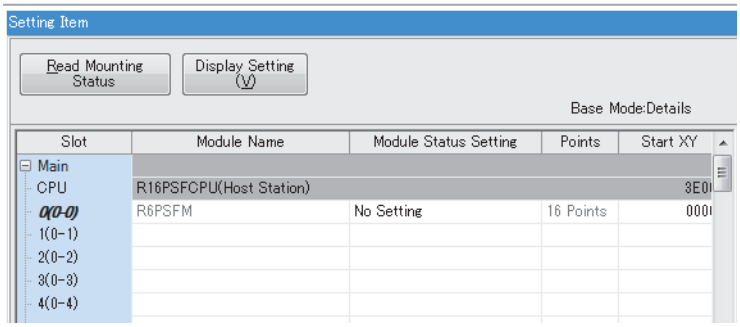
7. In the following window, set the items for Base/Power/Extension Cable Setting.

[Navigation window] ⇨ [Parameter] ⇨ [System Parameter] ⇨ [I/O Assignment] tab ⇨ [Base/Power/Extension Cable Setting]

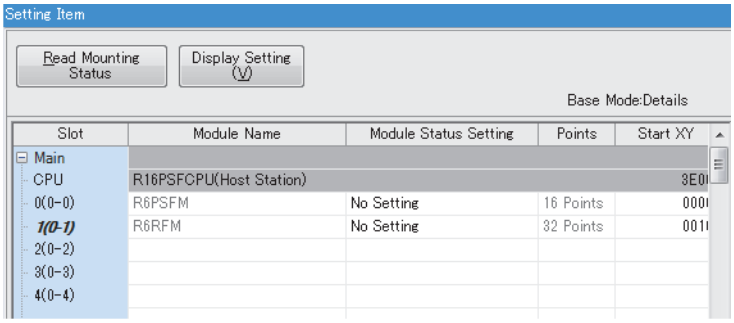


8. In the I/O assignment setting, set the SIL2 function module for slot No.0.

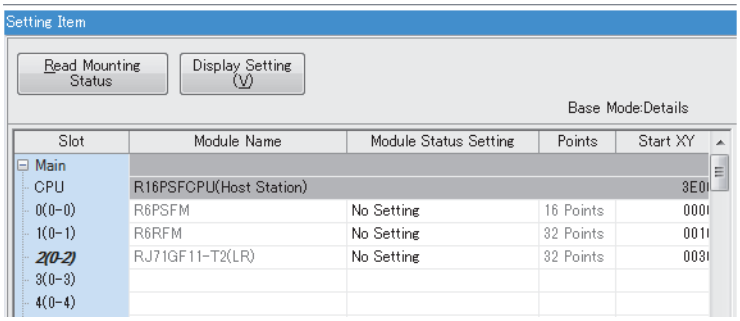
[Navigation window] ⇨ [Parameter] ⇨ [System Parameter] ⇨ [I/O Assignment] tab ⇨ [I/O Assignment Setting]



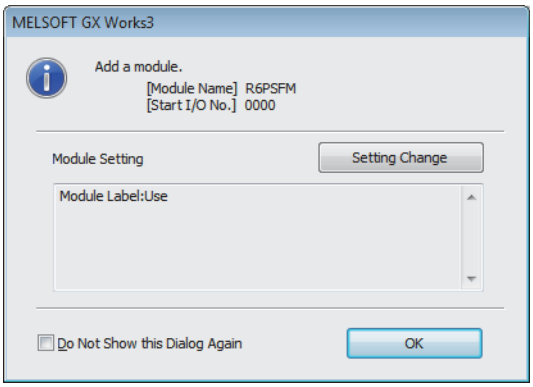
9. Add the redundant function module for slot No.1.



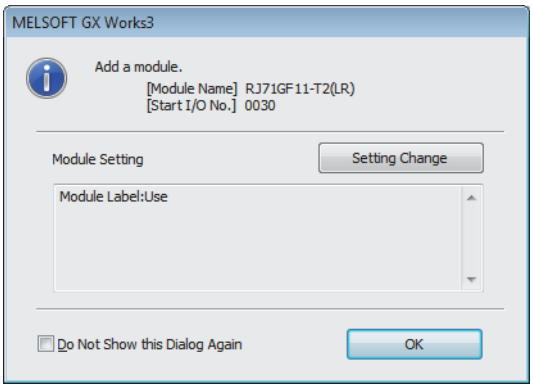
10. Set the master/local module for slot No.2.



11. In the following window, click the [OK] button to add a module label of the SIL2 function module.



12. In the following window, click the [OK] button to add a module label of the RJ71GF11-T2.



13. Set the items in "Required Settings" as follows.

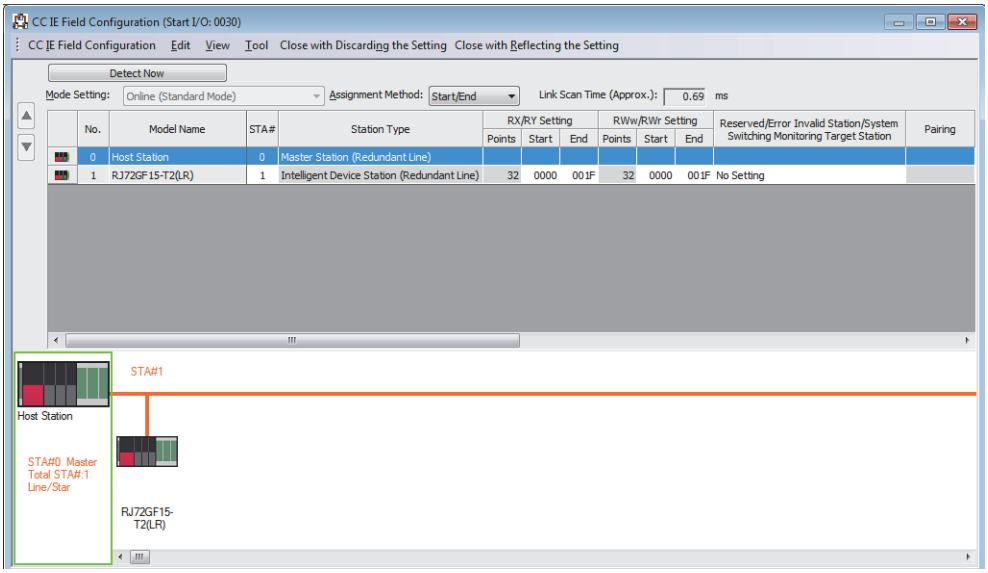
[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2(LR)] ⇨ [Required Settings]

Setting Item

Item	Setting
Station Type	
Station Type	Master Station (Redundant Line)
Network No.	
Network No.	1
Station No.	
Setting Method	Parameter Editor
Station No.	0
Parameter Setting Method	
Setting Method of Basic/Application Settings	Parameter Editor

14. Set the network configuration as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2(LR)] ⇨ [Basic Settings] ⇨ [Network Configuration Settings]



15. Set the refresh settings as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2(LR)] ⇨ [Basic Settings] ⇨ [Refresh Settings]

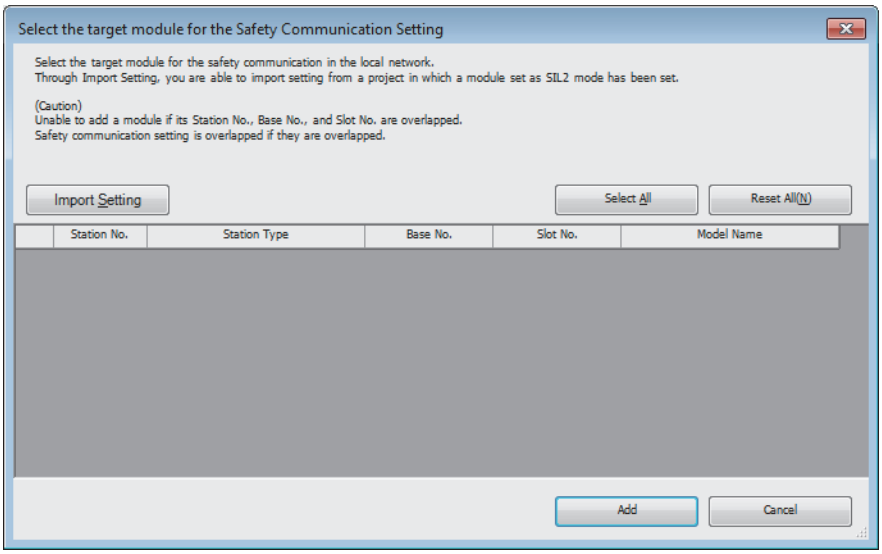
No.	Link Side					CPU Side				
	Device Name	Points	Start	End		Target	Device Name	Points	Start	End
-	SB	512	00000	001FF		Module Lab				
-	SW	512	00000	001FF		Module Lab				
1	RX	64	00000	0003F		Specify Dev	X	64	01000	0103F
2	RY	64	00000	0003F		Specify Dev	Y	64	01000	0103F
3	RWr	64	00000	0003F		Specify Dev	W	64	00000	0003F
4	RWw	64	00000	0003F		Specify Dev	W	64	01000	0103F
5										

16. Set "To Use or Not to Use the Safety Communication Setting" to "Use".

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2(LR)] ⇨ [Application Settings] ⇨ [Safety Communication Setting] ⇨ [To Use or Not to Use the Safety Communication Setting]

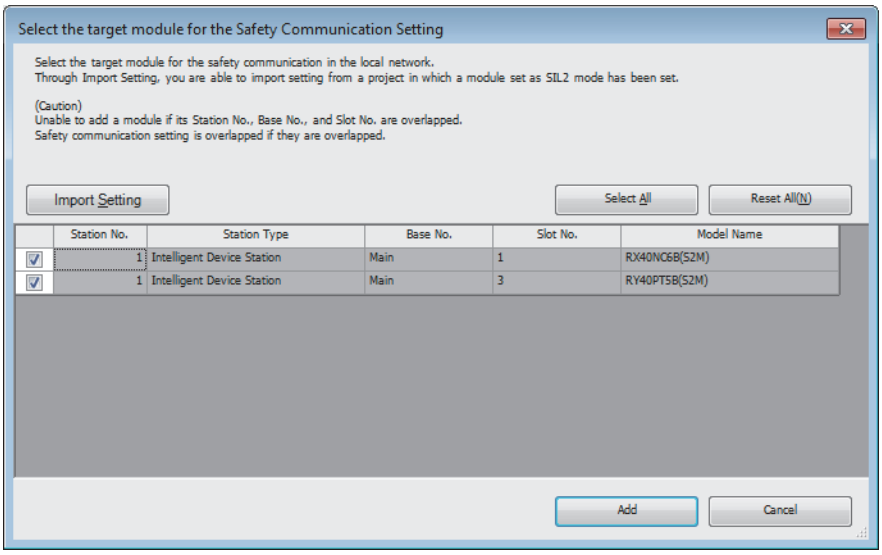
17. Select "Local Network" from "Communication Destination" in "Safety Communication Setting" window and display the "Select the target module for the Safety Communication Setting" window.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2(LR)] ⇨ [Application Settings] ⇨ [Safety Communication Setting] ⇨ [Safety Communication Setting]



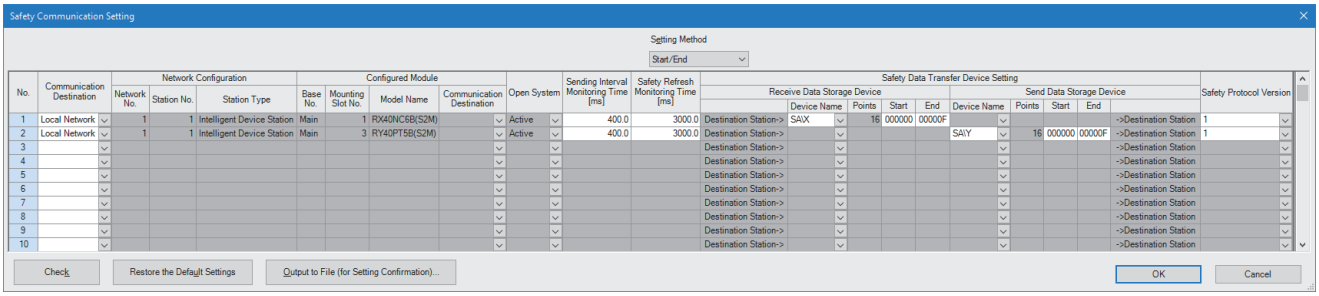
18. Click the [Import Setting] button to import the project of the remote head module.

19. Select the checkbox of the target module for the safety communication setting, and click the [Add] button.



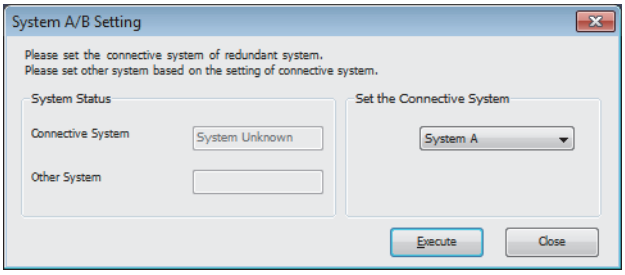
20. Set the safety communication setting of the added module in the "Safety Communication Setting" window. The setting values are as follows.

Item			No.1	No.2
Communication Destination			Local Network	Local Network
Network Configuration	Network No.		1	1
	Station No.		1	1
	Station Type		Intelligent Device Station	Intelligent Device Station
Configured Module	Base No.		Main	Main
	Mounting Slot No.		1	3
	Model Name		RX40NC6B(S2M)	RY40PT5B(S2M)
	Communication Destination		—	—
Open System			Active	Active
Sending Interval Monitoring Time [ms]			400.0	400.0
Safety Refresh Monitoring Time [ms]			3000.0	3000.0
Safety Data Transfer Device Setting	Receive Data Storage Device	Device Name	SA\X	—
		Points	16	—
		Start	000000	—
		End	00000F	—
	Send Data Storage Device	Device Name	—	SA\Y
		Points	—	16
		Start	—	000000
		End	—	00000F
Safety Protocol Version			1	1



21. Set the redundant function module of the own system as the system A in the "System A/B Setting" window, and reset the CPU modules of both systems or power off and on the both systems.

[Online] ⇨ [Redundant PLC Operation] ⇨ [System A/B Setting]



22. Log on to the programmable controller.

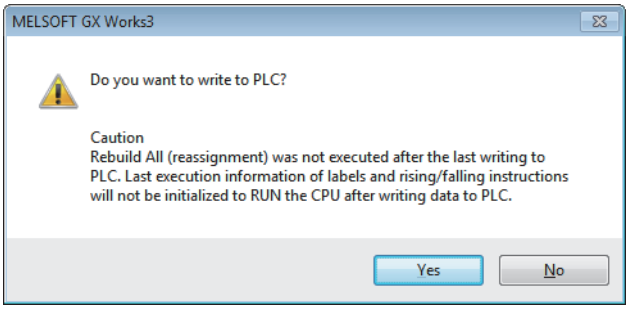
[Online] ⇨ [User Authentication] ⇨ [Log on to PLC]

If logon cannot be performed, writing user information or initializing all information of the programmable controller is required. (GX Works3 Operating Manual)

23. Write the set parameters to the system A CPU module.

[Online] ⇨ [Write to PLC]

24. Click the [Yes] button to write to the CPU modules of both systems.



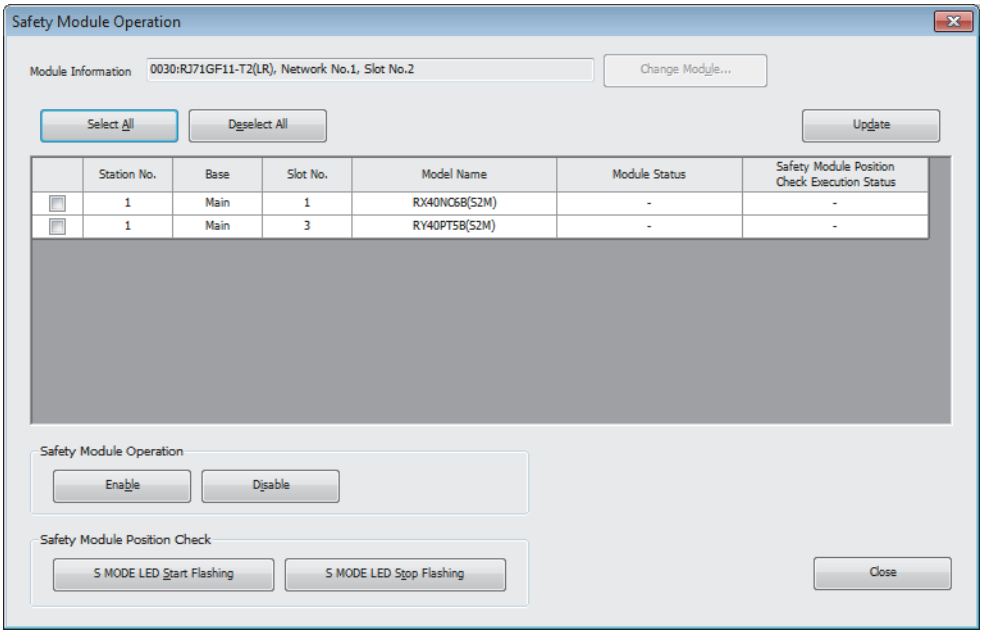
25. Either reset the CPU modules of both systems or power off and on both systems.

Point

In this setting example, default settings are used for parameters that are not shown above. For the parameter setting, refer to the following. (Page 137 PARAMETER SETTINGS)

26. Validate the RX40NC6B(S2M) and the RY40PT5B(S2M) to make them usable in the system using the SIL2 Process CPU.

[Online] ⇨ [Safety PLC Operation] ⇨ [Safety Module Operation]



27. Select the checkbox of the RX40NC6B(S2M) and the RY40PT5B(S2M) to be validated, and click the [S MODE LED Start Flashing] button. Check the flashing of the LEDs on the RX40NC6B(S2M), RX40NC6B(S2S), RY40PT5B(S2M), and RY40PT5B(S2S) to be validated. Following this step allows you to check whether the target module is set properly before starting validation.

28. Check the flashing of the S MODE LEDs on the RX40NC6B (S2M), RX40NC6B (S2S), RY40PT5B (S2M), and RY40PT5B (S2S), and click the [S MODE LED Stop Flashing] button to stop the S MODE LEDs flashing.

29. Click the [Enable] button.

30. Switch the safety operation mode to the SAFETY MODE.

[Online] ⇨ [Safety PLC Operation] ⇨ [Switch Safety Operation Mode]

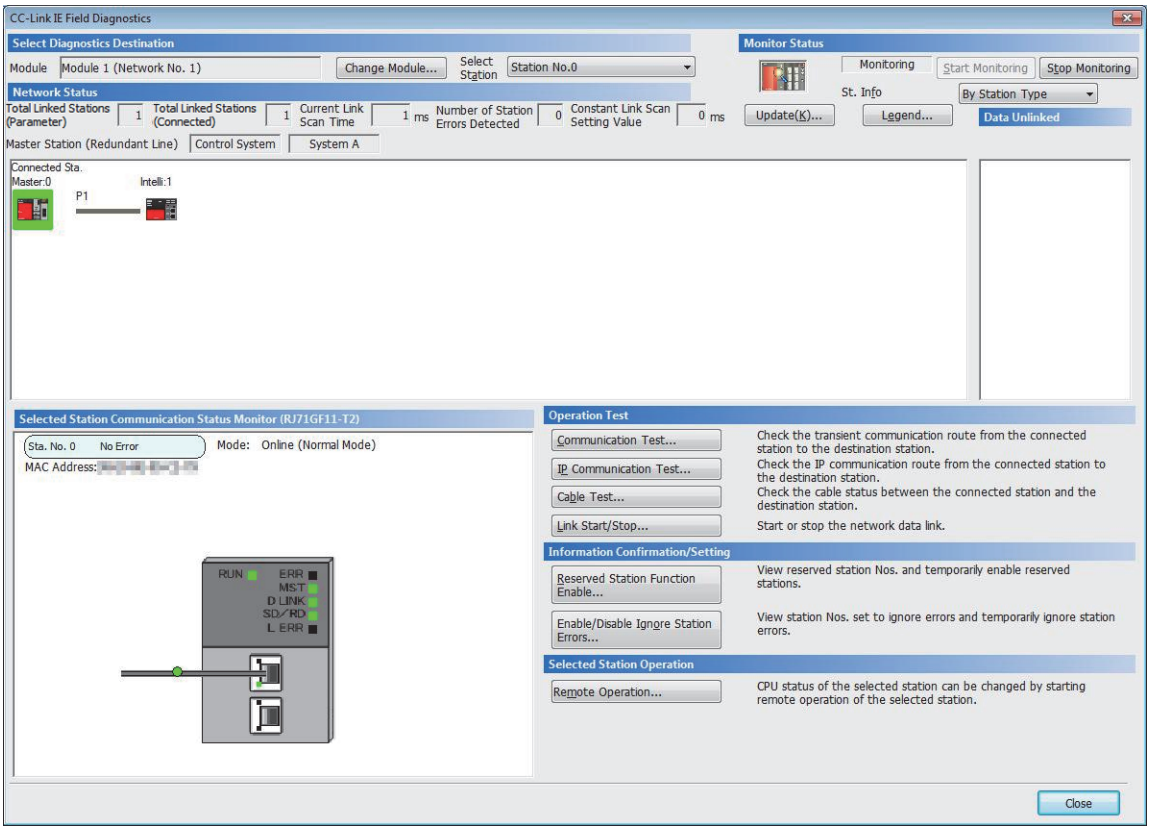
Checking the network status

After starting up the system, check whether data link can be normally performed. For the check, use the CC-Link IE Field Network diagnostics of the engineering tool.

1. Connect the engineering tool to the SIL2 Process CPU of the master station.
2. Start the CC-Link IE Field Network diagnostics.

[Diagnostics] ⇨ [CC-Link IE Field Diagnostics]

If the following display appears, data link is normal.

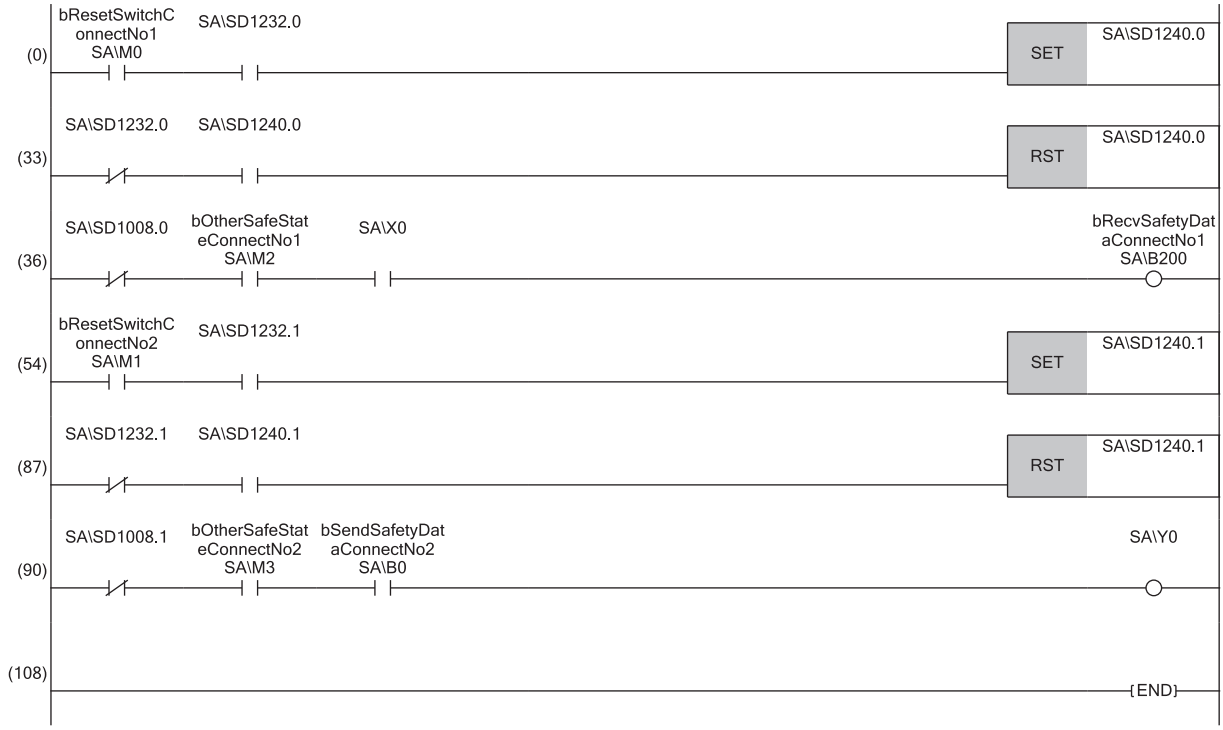


Program examples

The following shows a program example of each station when the safety program and safety global device are used.

Classification	Device	Description
Safety special register	SA\SD1008.0	Safety refresh communication status of each safety connection (1st module) (safety connection No.1)
	SA\SD1008.1	Safety refresh communication status of each safety connection (1st module) (safety connection No.2)
	SA\SD1232.0	Interlock status of each safety connection (1st module) (safety connection No.1)
	SA\SD1232.1	Interlock status of each safety connection (1st module) (safety connection No.2)
	SA\SD1240.0	Interlock release request for each safety connection (1st module) (safety connection No.1)
	SA\SD1240.1	Interlock release request for each safety connection (1st module) (safety connection No.2)
Label to be defined	Define safety global labels as shown below:	

	Label Name	Data Type		Class	Assign (Device/Label)
1	bResetSwitchConnectNo1	Bit	...	VAR_GLOBAL	SA\M0
2	bResetSwitchConnectNo2	Bit	...	VAR_GLOBAL	SA\M1
3	bOtherSafeStateConnectNo1	Bit	...	VAR_GLOBAL	SA\M2
4	bOtherSafeStateConnectNo2	Bit	...	VAR_GLOBAL	SA\M3
5	bSendSafetyDataConnectNo2	Bit	...	VAR_GLOBAL	SA\B0
6	bRecvSafetyDataConnectNo1	Bit	...	VAR_GLOBAL	SA\B200



(0), (33)Processing to release the safety station interlock in safety communications with station No.1 (safety connection No.1)

(36)Processing to send/receive the safety data to/from the station No.1 (safety connection No.1)

(54), (87)Processing to release the safety station interlock in safety communications with station No.1 (safety connection No.2)

(90)Processing to send/receive the safety data to/from the station No.1 (safety connection No.2)

3.6 Communication Example When Adding a Device Station to a Redundant System

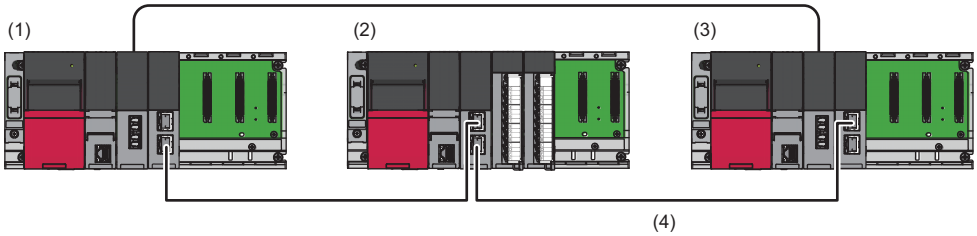
This section describes the communication examples when adding a device station to a redundant system.

Preparation

This section describes the communication examples for before adding a device station.

System configuration

- Power supply module: R61P
- CPU module: R08PCPU (master station), R04CPU (local station)
- Redundant function module: R6RFM
- Master/local module: RJ71GF11-T2
- Input module: RX10
- Output module: RY10R2



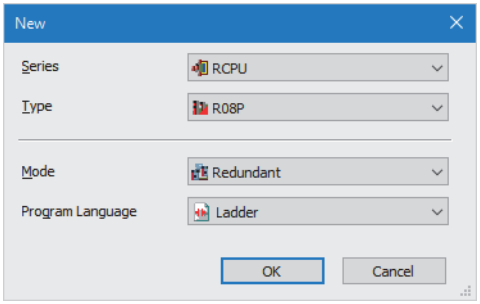
(1)System A (control system) master station (station No.0)
(2)Local station (station No.2)
(3)System B (standby system) submaster station (station No.1)
(4)Network No.1

Setting in the master station

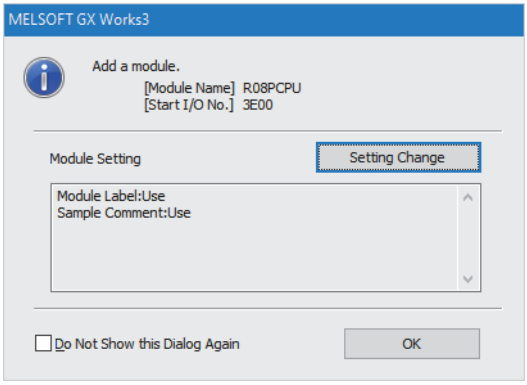
Connect the engineering tool to the CPU module on the control system and set the parameters.
In a redundant system, the same program and parameter are written to both systems. A new project does not need to be created for the standby system.

1. Set the CPU module as follows.

[Project] ⇨ [New]



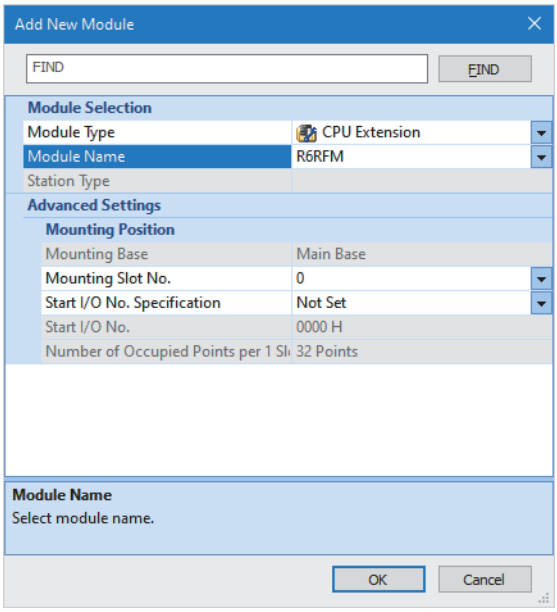
2. Click the [Setting Change] button in the following window and set the item to use module labels.



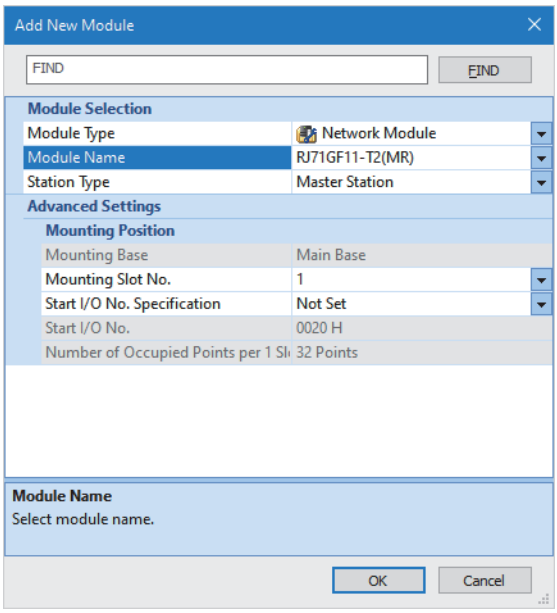
3. Click the [OK] button to add the module labels of the CPU module.

4. In the I/O assignment setting, set the redundant function module for slot No.0.

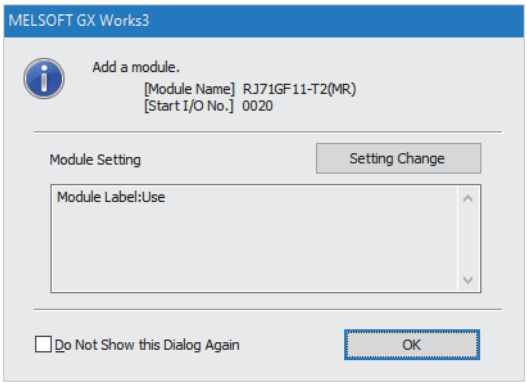
[Navigation window] ⇨ [Parameter] ⇨ [System Parameter] ⇨ [I/O Assignment] tab ⇨ [I/O Assignment Setting]



5. Set the RJ71GF11-T2 for slot No.1.

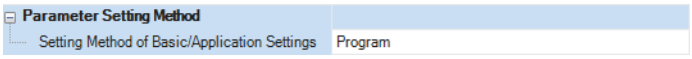


6. Click the [OK] button to add a module label of the RJ71GF11-T2.



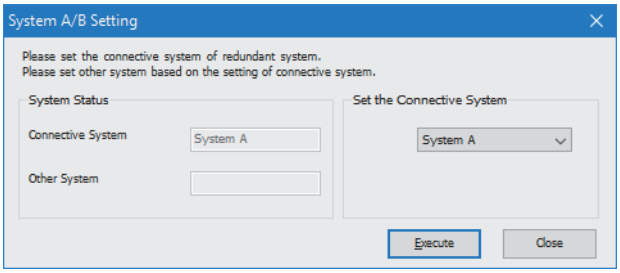
7. Set the parameter setting method as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module information] ⇨ [RJ71GF11-T2(MR)] ⇨ [Required Settings] ⇨ [Parameter Setting Method]



8. Set the redundant function module of the own system as the system A in the "System A/B Setting" window, and reset the CPU modules of both systems or power off and on the both systems.

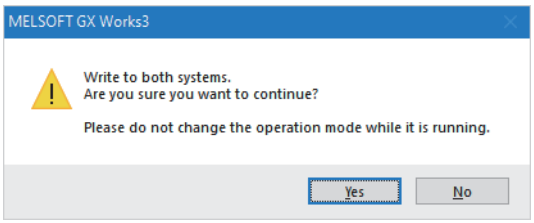
[Online] ⇨ [Redundant PLC Operation] ⇨ [System A/B Setting]



9. Write the set parameters to the system A CPU module.

[Online] ⇨ [Write to PLC]

10. Click the [Yes] button to write to the CPU modules of both systems.



11. Either reset the CPU modules of both systems or power off and on both systems.

Point

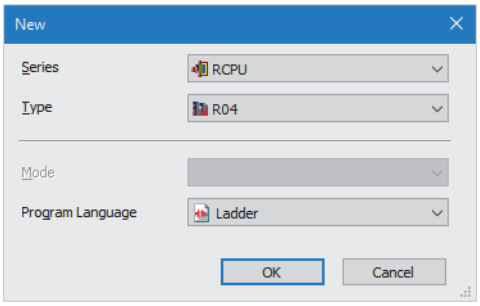
In this setting example, default settings are used for parameters that are not shown above. For the parameter setting, refer to the following. (☞ Page 137 PARAMETER SETTINGS)

Setting in the local station

Connect the engineering tool to the CPU module on the local station and set parameters.

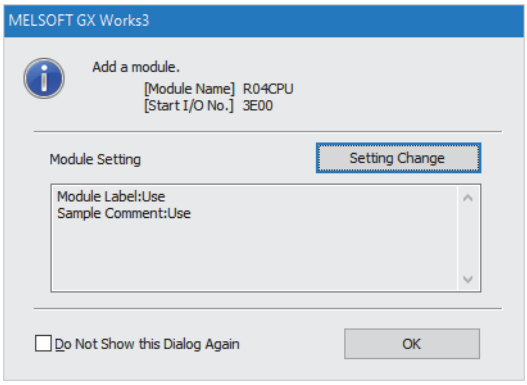
1. Set the CPU module as follows.

[Project] ⇨ [New]



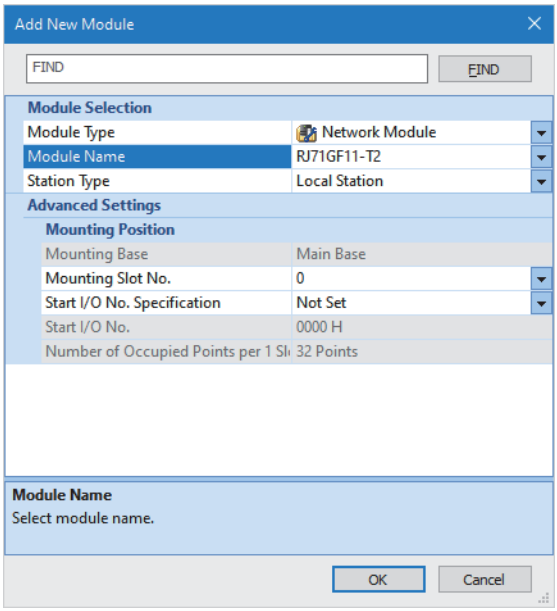
2. Click the [Setting Change] button and set to use module labels.

3. Click the [OK] button to add the module labels of the CPU module.

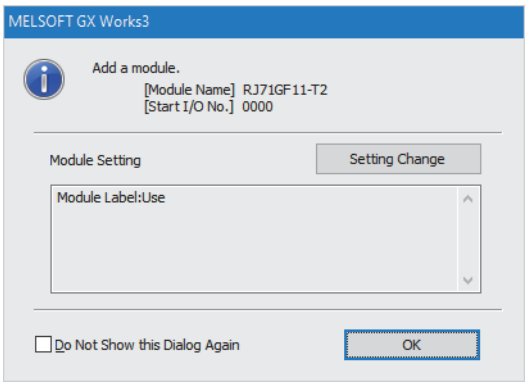


4. Set the RJ71GF11-T2 as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Right-click ⇨ [Add New Module]



5. Click the [OK] button to add a module label of the RJ71GF11-T2.



6. Set "Required Settings" in "Module Parameter" as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2] ⇨ [Module Parameter] ⇨ [Required Settings]

Setting Item

Item	Setting
Station Type	
Station Type	Local Station
Network No.	
Network No.	1
Station No.	
Setting Method	Parameter Editor
Station No.	2
Parameter Setting Method	
Setting Method of Basic/Application Settings	Parameter Editor

7. Write the set parameters to the CPU module. Then reset the CPU module or power off and on the system.

[Online] ⇨ [Write to PLC]

Point

In this setting example, default settings are used for the parameters other than those described. For the parameter setting, refer to the following. (☞ Page 137 PARAMETER SETTINGS)

Program example

■Labels

Classification	Label name
Label to be defined	Define local labels as shown below:

	Label Name	Data Type		Class
1	M_RJ71GF11_SetParameterRedundant_00A_	M+RJ71GF11_SetParameterRedundant_00A	...	VAR
2	b_StartInitial	Bit	...	VAR
3	b_InitialEnd	Bit	...	VAR
4	b_InitialEnFB	Bit	...	VAR
5	b_InitialFBOK	Bit	...	VAR
6	b_InitialFBNG	Bit	...	VAR
7	u_InitialFBErrorCode	Word [Unsigned]/Bit String [16-bit]	...	VAR
8	u_InitialErrorCode	Word [Unsigned]/Bit String [16-bit]	...	VAR
9	u_InitialTotalNumberOfSlaveStations	Word [Unsigned]/Bit String [16-bit]	...	VAR
10	u605_InitialNetworkConfigurationSettingData	Word [Unsigned]/Bit String [16-bit](0..604)	...	VAR
11	u8_InitialReservedStationSettingData	Word [Unsigned]/Bit String [16-bit](0..7)	...	VAR
12	u8_InitialErrorInvalidStationSettingData	Word [Unsigned]/Bit String [16-bit](0..7)	...	VAR
13	u16_InitialRedundantSystemSettingData	Word [Unsigned]/Bit String [16-bit](0..15)	...	VAR

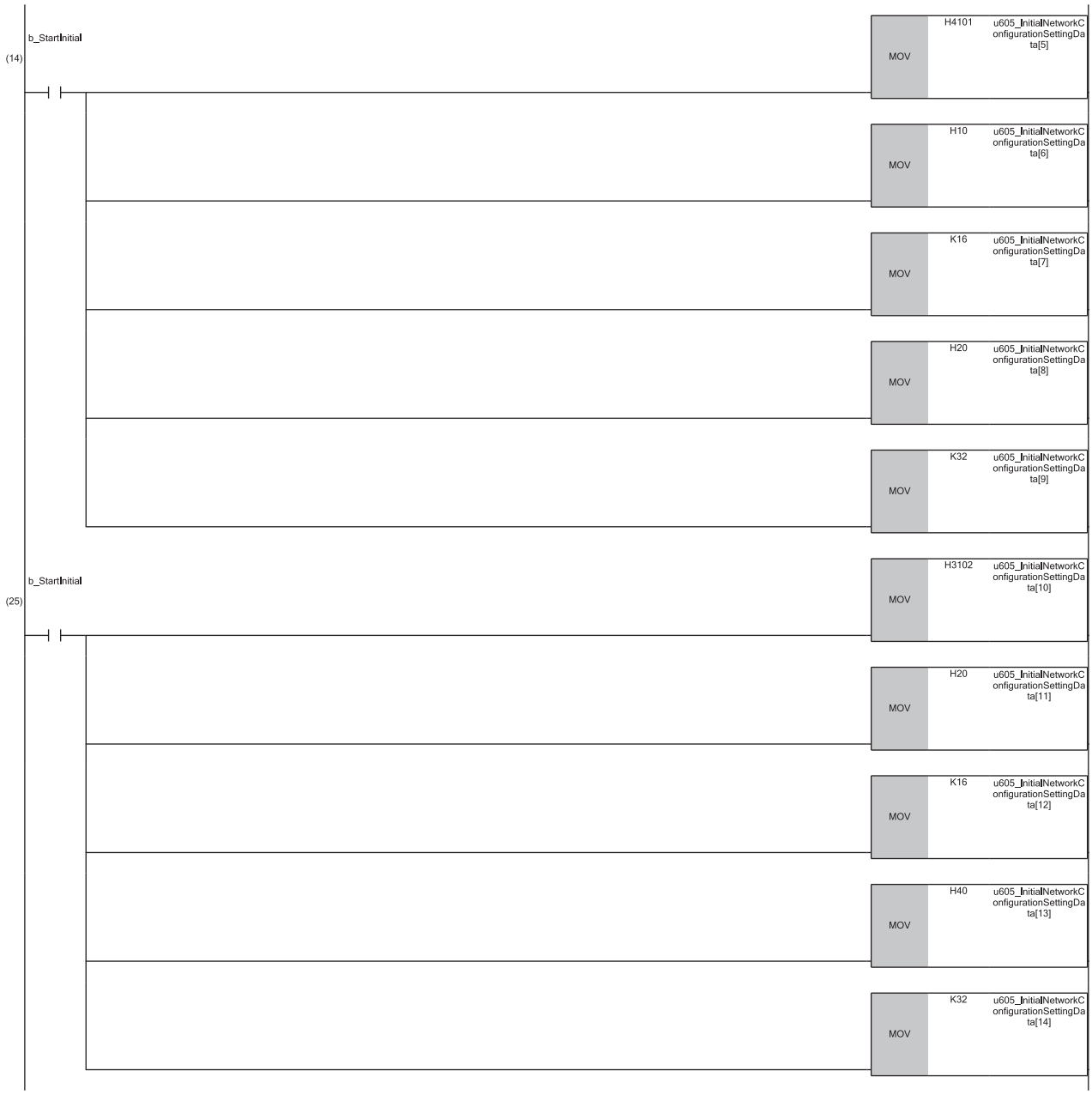
■FBs

The following shows FBs to be used in the program example.

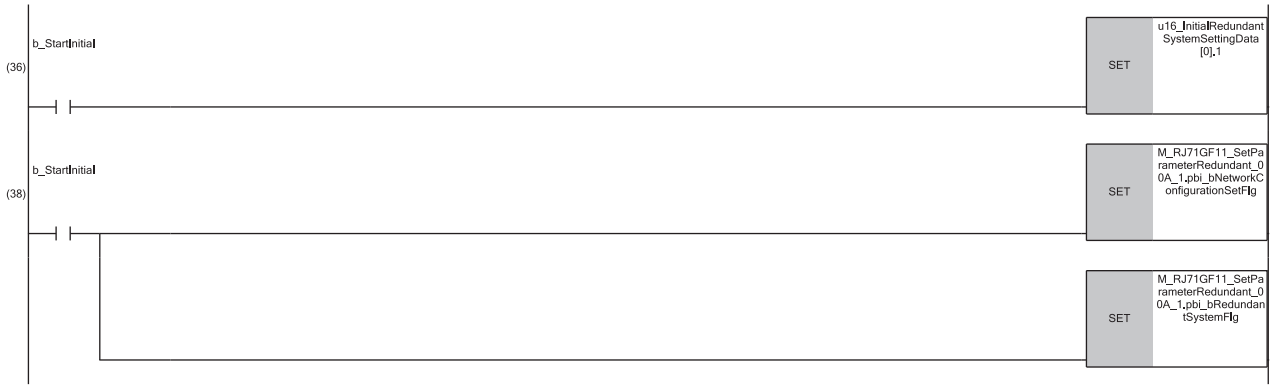
M+RJ71GF11_SetParameterRedundant

■Program

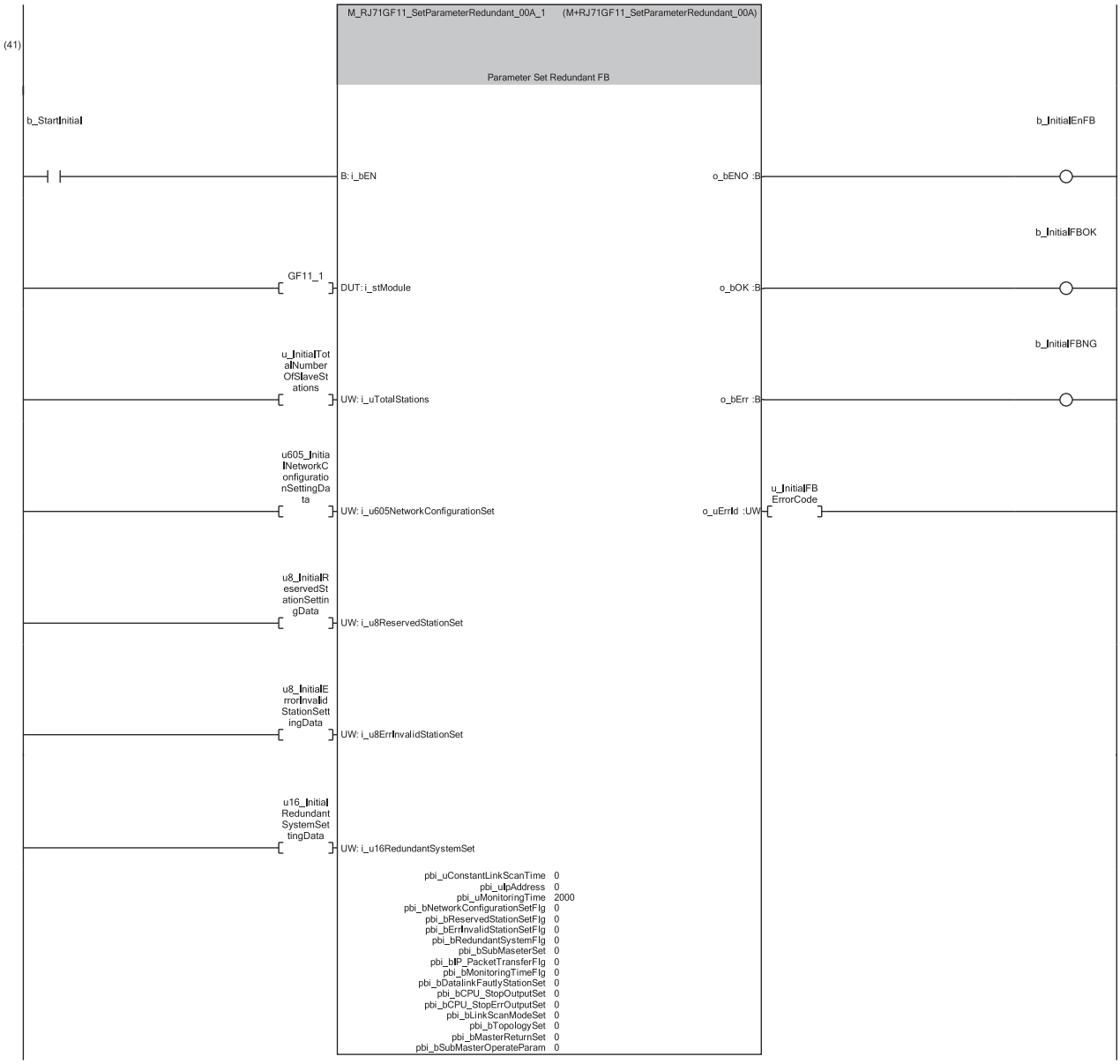
(0) Set the total number of device stations.
(3) Set the network configuration setting data for the first station (master station (station No.0)).



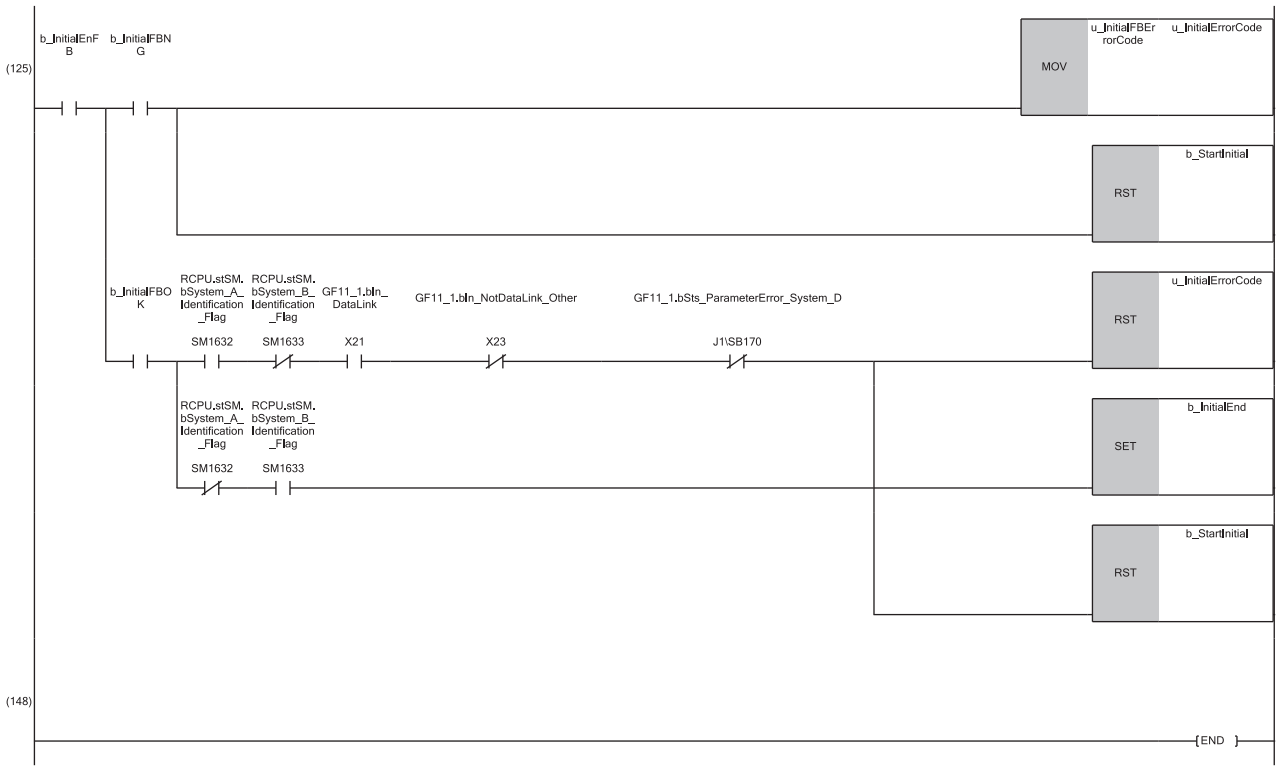
(14)Set the network configuration setting data for the second station (submaster station (station No.1)).
(25)Set the network configuration setting data for the third station (local station (station No.2)).



(36)Set the redundant system setting data.
(38)Set whether network configuration setting data is enabled/disabled and whether redundant system setting data is enabled/disabled.



(41)Execute the FB to set the parameters.



(125)If the parameter setting is completed with an error, store the error code and clear the FB execution for initial processing. When the parameter setting for system A (master station) is completed successfully, if there are no errors in the data link or parameters in the network configuration, clear the error code and initial processing start, and turn on the initial processing completion. When the parameter setting for system B (submaster station) is completed successfully, turn on the initial processing completion and clear the initial processing start.

Program procedure

1. Change the operation mode of the master station to separate mode.

[Online] ⇨ [Redundant PLC Operation] ⇨ [Redundant Operation] ⇨ [Change the Operation Mode]

2. Change the CPU module on the submaster station from STOP to RUN.
3. Connect the engineering tool to the CPU module on the submaster station.
4. Turn on b_StartInitial(0).
5. Check that b_InitialEnd(125) is turned on.
6. Connect the engineering tool to the CPU module on the master station.
7. Turn on b_StartInitial(0).
8. Check that b_InitialEnd(125) is turned on.
9. In CC-Link IE Field Network Diagnostics, check that the network configuration is set according to the system configuration. (☞ Page 246 System configuration)

[Diagnostics] ⇨ [CC-Link IE Field Diagnostics]

Point

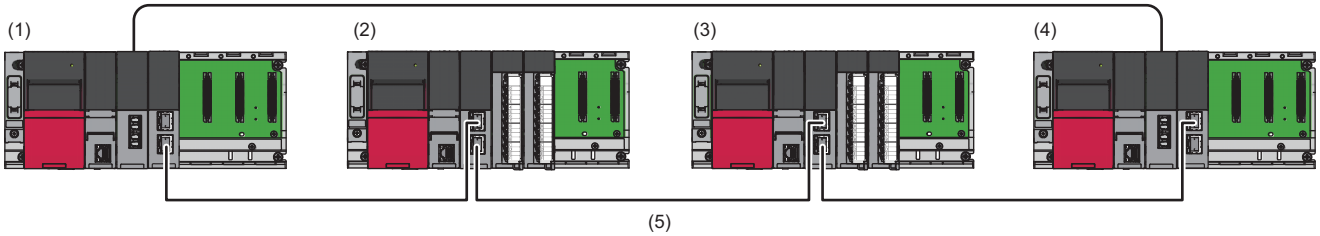
- If one of the systems is powered off after starting up, the CCPASETR instruction must be re-executed the system that is powered off (standby system). Take procedures from 1 to 5 again.
- If the CCPASETR instruction is executed in a program of both systems, the procedures from 1 to 5 can be omitted when one of the systems is powered off at/after starting up the system. In such a case, use the devices or global labels to be targeted tracking for the execution request or the setting data of the CCPASETR instruction.

System configuration example

The following system configuration is used to explain the communication example when adding a device station to a redundant system.

System configuration

- Power supply module: R61P
- CPU module: R08PCPU (master station), R04CPU (local station)
- Redundant function module: R6RFM
- Master/local module: RJ71GF11-T2
- Input module: RX10
- Output module: RY10R2



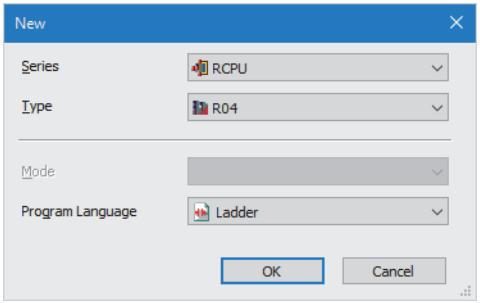
(1)System A (control system) master station (station No.0)
(2)Local station (station No.2)
(3)Local station to be added (station No.3)
(4)System B (standby system) submaster station (station No.1)
(5)Network No.1

Setting in the local station to be added

Connect the engineering tool to the CPU module on the local station and set parameters.

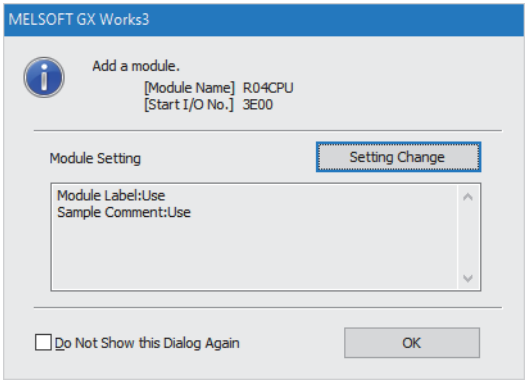
1. Set the CPU module as follows.

[Project] ⇨ [New]



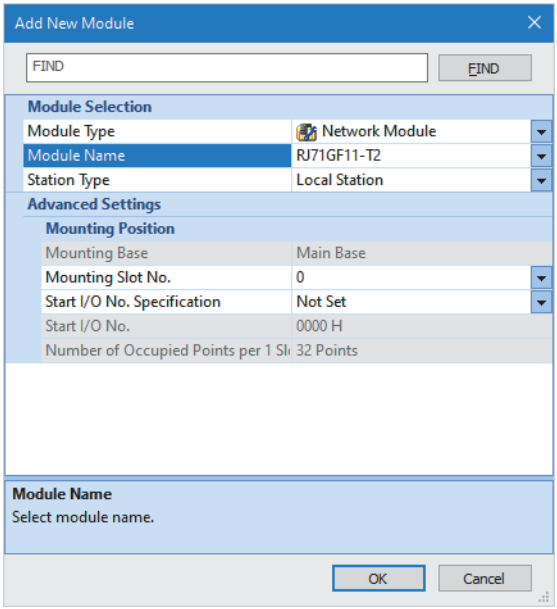
2. Click the [Setting Change] button and set to use module labels.

3. Click the [OK] button to add the module labels of the CPU module.

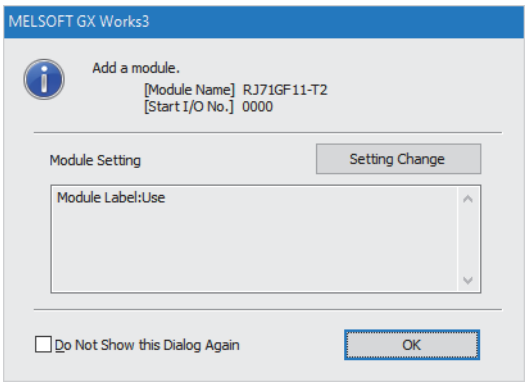


4. Set the RJ71GF11-T2 as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Right-click ⇨ [Add New Module]



5. Click the [OK] button to add a module label of the RJ71GF11-T2.



6. Set "Required Settings" in "Module Parameter" as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2] ⇨ [Module Parameter] ⇨ [Required Settings]

Setting Item

Item	Setting
Station Type	
Station Type	Local Station
Network No.	
Network No.	1
Station No.	
Setting Method	Parameter Editor
Station No.	3
Parameter Setting Method	
Setting Method of Basic/Application Settings	Parameter Editor

Point

For details on how to add a local station (device station), refer to the following.

☞ Page 86 Network configuration change

Program example

Labels

Classification	Label name	Description	Device
Module label	GF11_1.bIn_DataLink	Own station data link status	X1
	GF11_1.bIn_NotDataLink_Other	Other stations data link status	X3
	GF11_1.bReq_SlaveStationAdditionStartFlag_D	Device station addition start flag (direct)	J1\SB14
	GF11_1.bAcpt_SlaveStationAdditionAccept_D	Device station addition acceptance status (direct)	J1\SB81
	GF11_1.bSts_ParameterError_System_D	Parameter error status of each station (direct)	J1\SB170
Label to be defined	Define local labels as shown below:		

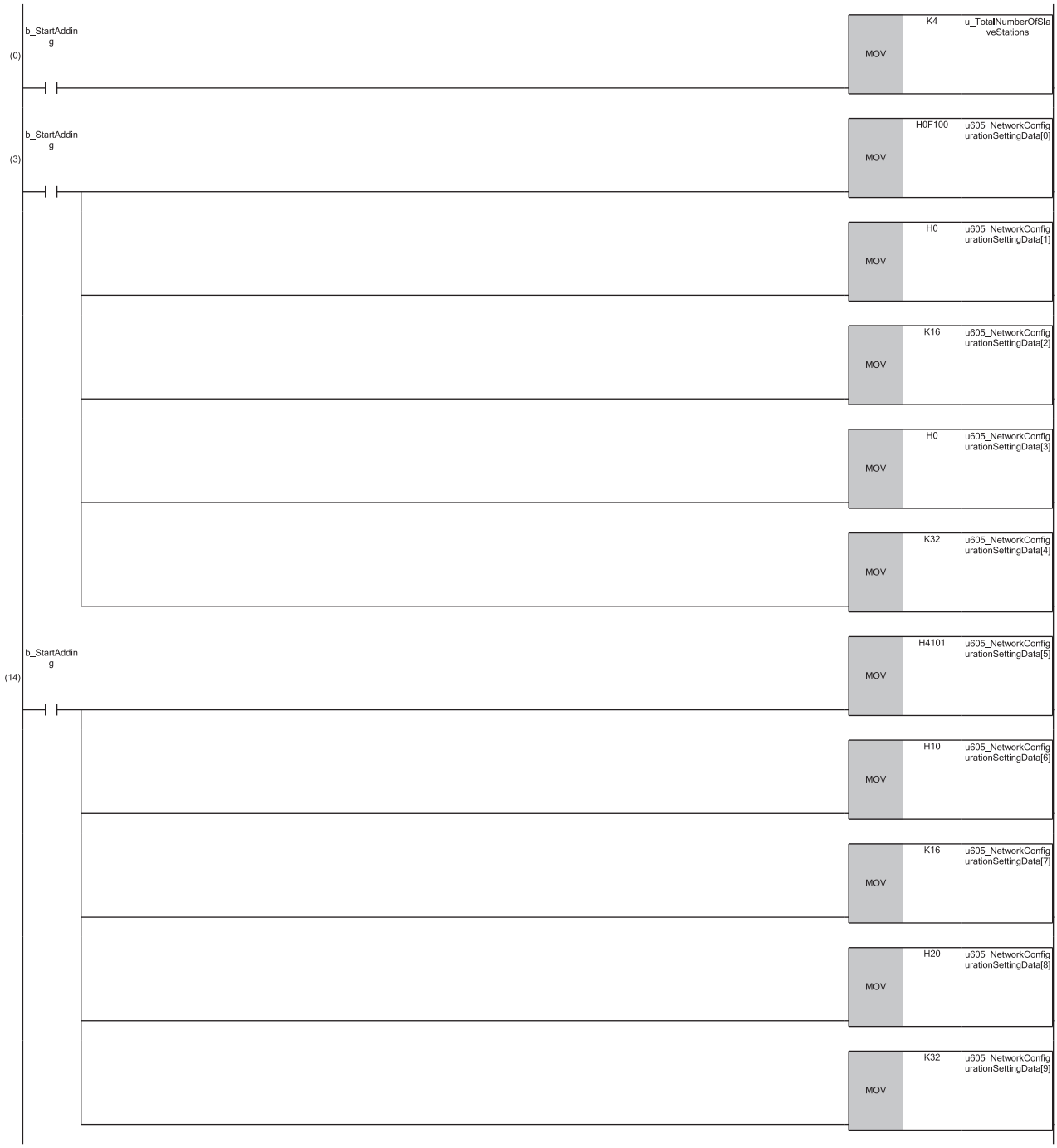
	Label Name	Data Type		Class
1	M_RJ71GF11_SetParameterRedundant_00A_1	M+RJ71GF11_SetParameterRedundant_00A	...	VAR
2	b_StartAdding	Bit	...	VAR
3	b_CompAdding	Bit	...	VAR
4	b_EnFB	Bit	...	VAR
5	b_FBOK	Bit	...	VAR
6	b_FBNG	Bit	...	VAR
7	u_FBErrorCode	Word [Unsigned]/Bit String [16-bit]	...	VAR
8	u_ErrorCode	Word [Unsigned]/Bit String [16-bit]	...	VAR
9	u_TotalNumberOfSlaveStations	Word [Unsigned]/Bit String [16-bit]	...	VAR
10	u605_NetworkConfigurationSettingData	Word [Unsigned]/Bit String [16-bit](0..604)	...	VAR
11	u8_ReservedStationSettingData	Word [Unsigned]/Bit String [16-bit](0..7)	...	VAR
12	u8_ErrorInvalidStationSettingData	Word [Unsigned]/Bit String [16-bit](0..7)	...	VAR
13	u16_RedundantSystemSettingData	Word [Unsigned]/Bit String [16-bit](0..15)	...	VAR

FBs

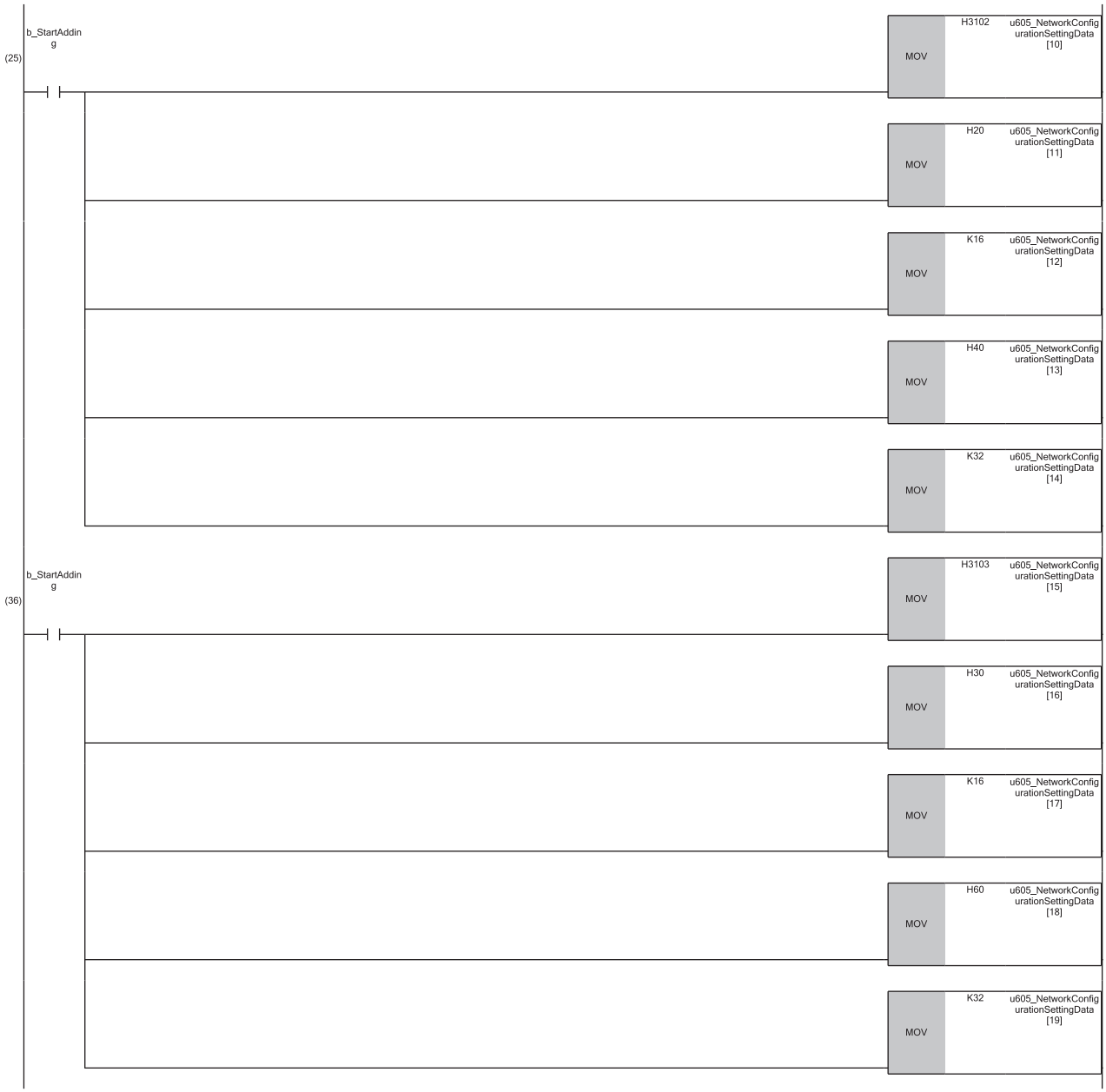
The following shows FBs to be used in the program example.

M+RJ71GF11_SetParameterRedundant

Program

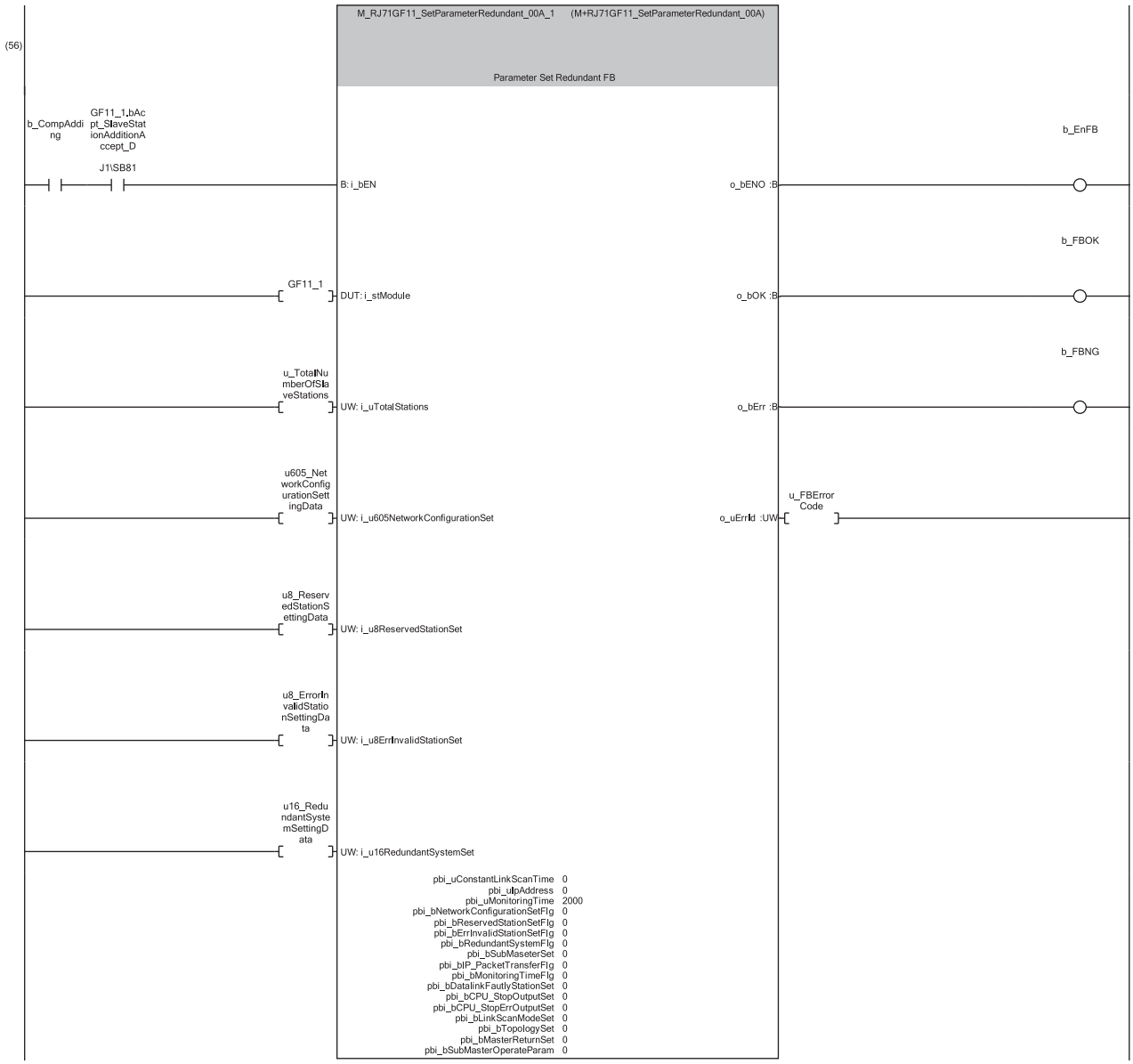


(0) Set the total number of device stations.
(3) Set the network configuration setting data for the first station (master station (station No.0)).
(14)Set the network configuration setting data for the second station (submaster station (station No.1)).

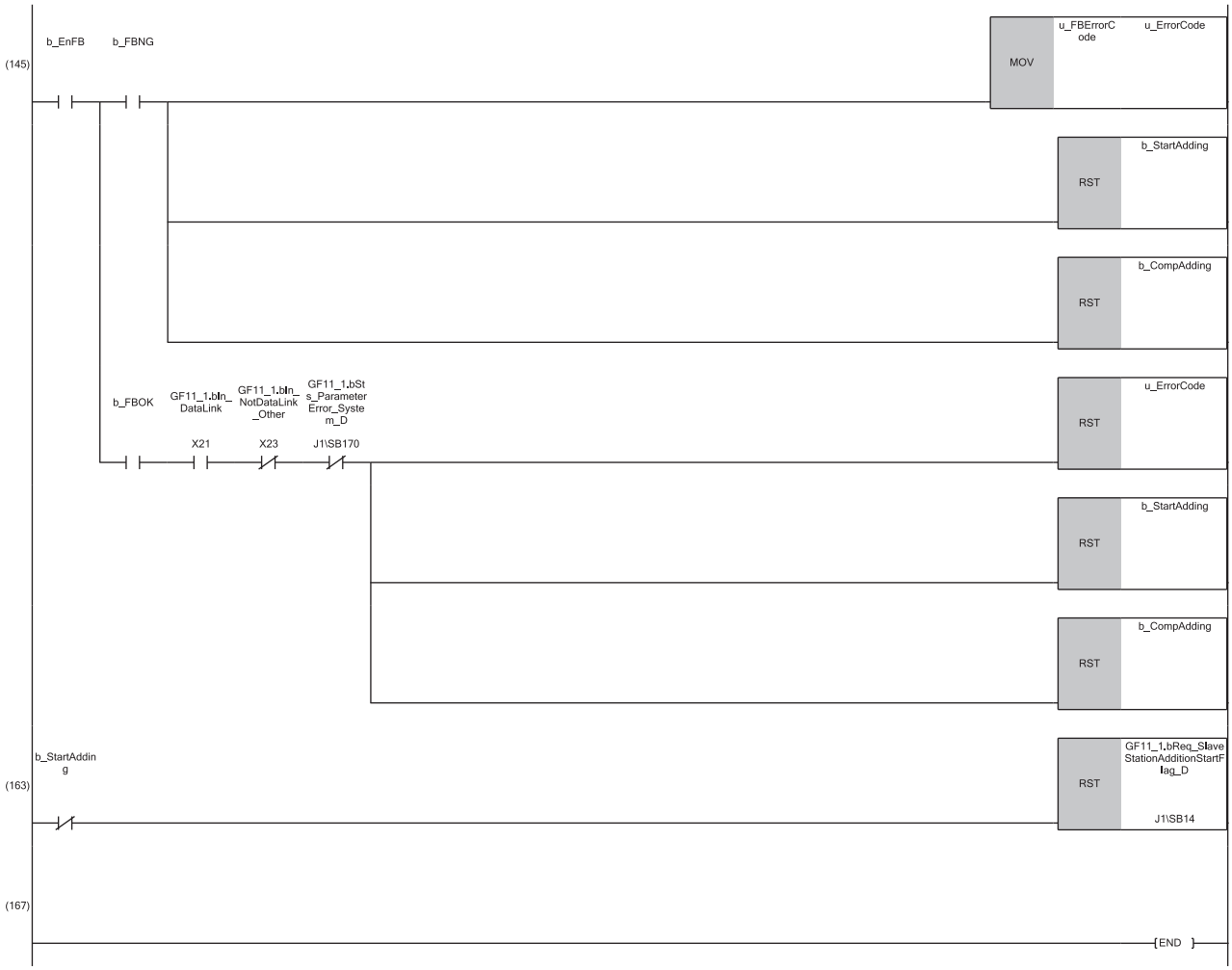


(25)Set the network configuration setting data for the third station (local station (station No.2)).
(36)Set the network configuration setting data for the fourth station (local station (station No.3)).

(47)Set station No.2 as a system switching monitoring target station.
(49)Set the network configuration setting data and redundant system setting to enabled.
(52)Turn on the device station addition start flag.



(56)Check that 'Device station addition acceptance status' (SB0081) is turned on and add the fourth station (local station (station No.3)) to the system configuration. By turning on b_CompAdding, the parameters can be set.



(145)If the parameter setting is completed with an error, store the error code and turn off the device station addition start and device station addition completion. When the parameter setting is completed successfully, if there are no errors in the data link or parameters in the network configuration, clear the error code, and turn off the device station addition start and device station addition completion.

(163)When the device station addition start is turned off, turn off the device station addition start flag.

4 TROUBLESHOOTING

This chapter describes troubleshooting of CC-Link IE Field Network.

4.1 Checking with LED

This section describes troubleshooting using LED.

Error status can be determined by status of the RUN LED and the ERR LED.

RUN LED	ERR LED	Error status*1	Description
Off	On, flashing	Major error	An error such as hardware failure or memory failure. The module stops operating.
On	Flashing	Moderate error	An error, such as parameter error, which affect module operation. The module stops operating.
On	On	Minor error	An error such as communication failure. The module continues operating.

*1 When multiple errors occur, the error status is displayed in the order of major, moderate, and minor.

Point

For the RJ71EN71 or RnENCPU, whether the error occurs in the P1 or P2 can be checked with P ERR LED.

When the RUN LED turns off

When the RUN LED turns off after powering on the master/local module, check the following.

Check item	Action
Is the master/local module mounted correctly?	Securely mount the master/local module on the base unit.

If the above action does not solve the problem, perform the module communication test to check for hardware failure. (☞ Page 273 Module communication test)

When the ERR LED turns on or is flashing

When the ERR LED turns on or is flashing, check the following.

Check item	Action
Does any error occur in the module diagnostics?	Take the actions displayed on the window.
Is the disconnected station displayed in the CC-Link IE Field Network diagnostics?	• Correct "Network Configuration Settings" in "Basic Settings" of the master station in accordance with the device station actually connected. • Perform troubleshooting for when the D LINK LED turns off or is flashing. (☞ Page 268 When the D LINK LED turns off or is flashing)

If the above actions do not solve the problem, perform the following tests to check for an error.

- Module communication test (☞ Page 273 Module communication test)
- Cable test (☞ Page 292 Cable Test)

When the D LINK LED turns off or is flashing

When the D LINK LED turns off or is flashing, check the following.

Check item	Action
Is the master station operating normally?	• If an error has occurred in the CPU module on the master station, eliminate the cause of the CPU module error. (📖 MELSEC iQ-R CPU Module User's Manual (Application)) • Check if the master station is performing data link using CC-Link IE Field Network diagnostics. (☞ Page 275 Checking the Network Status)
	When the master station and submaster station is the module other than the MELSEC iQ-R series, and there is a local station of the MELSEC iQ-R series module, refer to the following. ☞ Page 439 Precautions for When Connecting the Module to the Conventional Product
Is the master station connected to the network?	Check if the master station is performing data link using CC-Link IE Field Network diagnostics. (☞ Page 275 Checking the Network Status)
Do the used Ethernet cables conform to the Ethernet standard?	Replace the cables with the Ethernet cable which conforms the standard. (📖 MELSEC iQ-R Ethernet/CC-Link IE User's Manual (Startup))
Does the station-to-station distance meet the specifications?	Set the station-to-station distance within range. (📖 MELSEC iQ-R Ethernet/CC-Link IE User's Manual (Startup))
Does the cabling condition (bending radius) meet the specifications?	Refer to the manual for the Ethernet cable, and correct the bending radius.
Is any Ethernet cable disconnected?	Replace the Ethernet cable.
Are 121 or more device stations connected?	Change the connection of the device stations to 120 stations or less.
Is a switching hub connected in ring topology?	Configure the network in ring topology without a switching hub.
Are other stations connected to the master/local module operating normally?	• Check if the modules on the other stations are performing data link using CC-Link IE Field Network diagnostics. (☞ Page 275 Checking the Network Status) • Check the operation status of modules on other stations. (📖 User's manual for the module used)
Is the switching hub used operating normally?	• Check if the switching hub which conforms the standard is used. (📖 MELSEC iQ-R Ethernet/CC-Link IE User's Manual (Startup)) • Power off and on the switching hub.
Check that the cables are not connected as described below. • Both P1 and P2 are connected to the same switching hub. • The network is configured in ring topology although "Network Topology" under "Basic Settings" of the master station is set to "Line/Star". • The network is configured in star topology although "Network Topology" under "Basic Settings" of the master station is set to "Ring". • The network is incorrectly configured in ring topology.	Correct the wiring.
	When the system does not contain a switching hub, take any of the following actions: • For line topology, disconnect an Ethernet cable (either P1 or P2) connected to any station on the network. The network topology will become a line topology and data link will start. • For ring topology, set "Network Topology" under "Basic Settings" to "Ring" and rewrite the parameters to the CPU module.
	When the system contains a switching hub, take any of the following actions: • Check if "Network Topology" under "Basic Settings" is set to "Ring". Because the network cannot be configured in ring topology which contains a switching hub, set "Network Topology" to "Line/Star" and rewrite the parameters to the CPU module. When data link starts across the entire network, this procedure is successfully completed. • Disconnect one Ethernet cable connected to the switching hub and power off and on the hub. (Repeat this operation until data link starts over the network.) • When data link starts over the network, check the network configuration using CC-Link IE Field Network diagnostics.
Are station numbers unique?	Change the duplicated station number.
The devices having different network types (Example: CC-Link IE Controller Network and CC-Link IE Field Network or CC-Link IE TSN and CC-Link IE Field Network) are connected to the same network line.	Use separate Ethernet cables for different network types. After taking the above actions, power off and on or reset CPU modules in all stations where the error was detected.

If the above actions do not solve the problem, perform the following tests to check for an error.

- Module communication test (☞ Page 273 Module communication test)
- Cable test (☞ Page 292 Cable Test)

When the L ERR LED turns on

When the L ERR LED turns on, check the following.

Check item	Action
Are the Ethernet cables used normally?	• Check if the Ethernet cable which conforms the standard is used. (📖 MELSEC iQ-R Ethernet/CC-Link IE User's Manual (Startup)) • Check if the station-to-station distance is set within range. (📖 MELSEC iQ-R Ethernet/CC-Link IE User's Manual (Startup)) • Check if the Ethernet cables are not disconnected.
Is the switching hub used operating normally?	• Check if the switching hub which conforms the standard is used. (📖 MELSEC iQ-R Ethernet/CC-Link IE User's Manual (Startup)) • Power off and on the switching hub.
Are other stations connected to the master/local module operating normally?	• Check if the modules on the other stations are performing data link using CC-Link IE Field Network diagnostics. (☞ Page 275 Checking the Network Status) • Check the operation status of modules on other stations. (📖 User's manual for the module used)
Is "Module Operation Mode" under "Application Settings" of the master station set to "Online"?	Set "Module Operation Mode" under "Application Settings" of the master station to "Online".
Is there any source of noise near the module or cables?	Change the location of the module or cables.
Is "Network Topology" under "Basic Settings" of the master station set to "Ring"?	Check if the ring topology is correctly configured for the port where the L ER LED is on. (📖 MELSEC iQ-R Ethernet/CC-Link IE User's Manual (Startup))

If the above actions do not solve the problem, perform troubleshooting for when communication is unstable. (☞ Page 305 When communication is unstable)

When the L ER LED turns on

When the L ER LED turns on, check the following.

Check item	Action
Are the Ethernet cables used normally?	• Check if the Ethernet cable which conforms the standard is used. (📖 MELSEC iQ-R Ethernet/CC-Link IE User's Manual (Startup)) • Check if the station-to-station distance is set within range. (📖 MELSEC iQ-R Ethernet/CC-Link IE User's Manual (Startup)) • Check if the Ethernet cables are not disconnected.
Is the switching hub used operating normally?	• Check if the switching hub which conforms the standard is used. (📖 MELSEC iQ-R Ethernet/CC-Link IE User's Manual (Startup)) • Power off and on the switching hub.
Is there any source of noise near the module or cables?	Change the location of the module or cables.
Is "Network Topology" under "Basic Settings" of the master station set to "Ring"?	Check if the ring topology is correctly configured for the port where the L ER LED is on. (📖 MELSEC iQ-R Ethernet/CC-Link IE User's Manual (Startup))

If the above actions do not solve the problem, perform the following tests to check for an error.

- Module communication test (☞ Page 273 Module communication test)
- Troubleshooting for when communication is unstable (☞ Page 305 When communication is unstable)

When the LINK LED turns off

When the LINK LED turns off, check the following.

Check item	Action
Do the used Ethernet cables conform to the Ethernet standard?	Replace the cables with the Ethernet cable which conforms the standard. (📖 MELSEC iQ-R Ethernet/CC-Link IE User's Manual (Startup))
Does the station-to-station distance meet the specifications?	Set the station-to-station distance within range. (📖 MELSEC iQ-R Ethernet/CC-Link IE User's Manual (Startup))
Does the cabling condition (bending radius) meet the specifications?	Refer to the manual for the Ethernet cable, and correct the bending radius.
Is any Ethernet cable disconnected?	Replace the Ethernet cable.
Is the switching hub used operating normally?	• Check if the switching hub which conforms the standard is used. (📖 MELSEC iQ-R Ethernet/CC-Link IE User's Manual (Startup)) • Power off and on the switching hub.
Are other stations connected to the master/local module operating normally?	• Check if the modules on the other stations are performing data link using CC-Link IE Field Network diagnostics. (☞ Page 275 Checking the Network Status) • Check the operation status of modules on other stations. (📖 User's manual for the module used)

If the above actions do not solve the problem, perform the following tests to check for an error.

- Module communication test (☞ Page 273 Module communication test)
- Cable test (☞ Page 292 Cable Test)

4.2 Checking the Module Status

This section describes troubleshooting for checking the status of the module by diagnostics using the engineering tool or by operation tests.

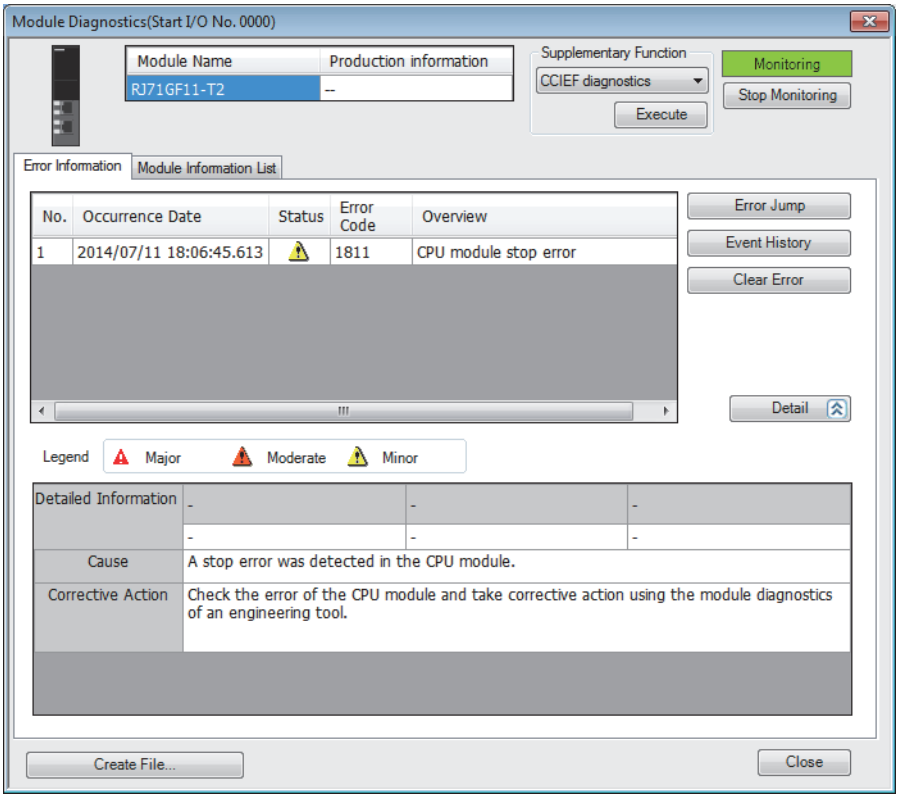
Module diagnostics

The following items can be checked in the "Module Diagnostics" window for the master/local module.

Item		Description
[Error Information] tab		Displays the details of the errors currently occurring and the corrective actions. In "Occurrence Date" of errors that occurred immediately after power-on, "-" may be displayed. To check the date and time that the error occurred, click the [Event History] button and refer to the event history.
[Module Information List] tab		Displays the LED information and individual information of the master/local module.
Supplementary Function	CCIEF diagnostics	Enables checking the cause to resolve the problem when an error occurs in CC-Link IE Field Network. (☞ Page 275 Checking the Network Status)

Error Information

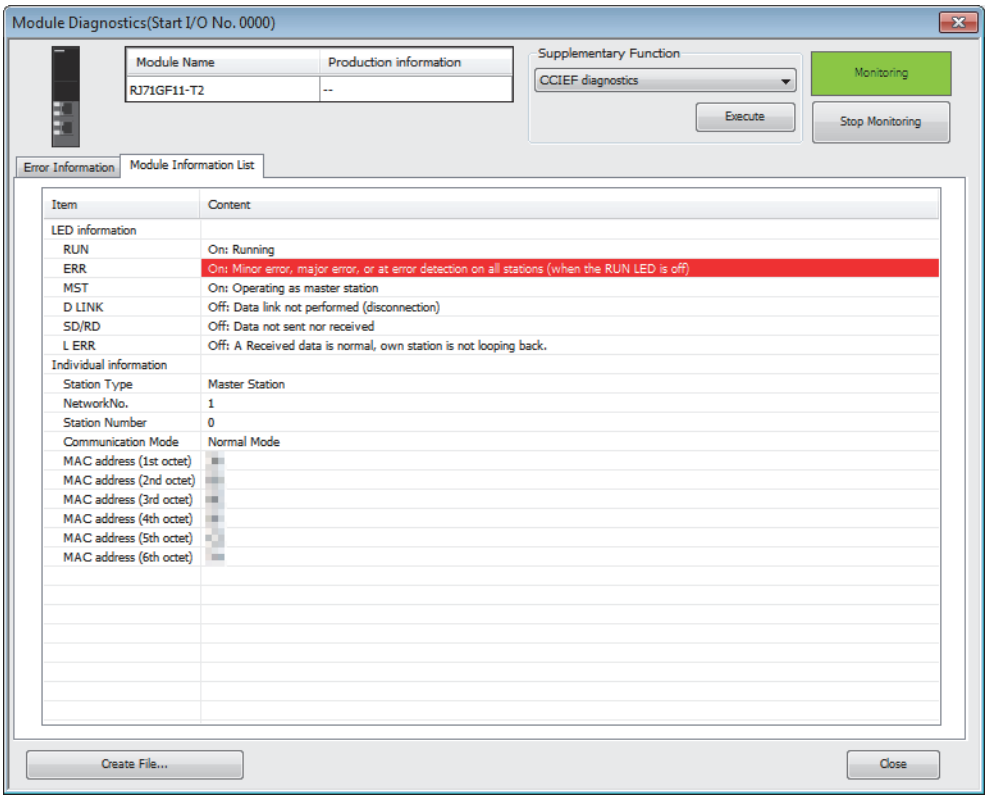
The [Error Information] tab displays the details of the errors currently occurring and the corrective actions.



Item	Description
Status	Major: An error such as hardware failure or memory failure. The module stops operating.
	Moderate: An error, such as parameter error, which affect module operation. The module stops operating.
	Minor: An error such as communication failure. The module continues operating.
Error code	☞ Page 310 List of Error Codes
Detailed Information	Displays detailed information about each error (maximum of 3 pieces).
Cause	Displays the detailed error causes.
Corrective Action	Displays the actions to eliminate the error causes.

Module Information List

The [Module Information List] tab displays the LED information and individual information of the master/local module.



Item		Description
LED information		Displays the LED status of the master/local module.
Individual information	Station Type	Displays the station type set for the selected module.
	Network No.	Displays the network number set for the selected module.
	Station No.	Displays the station number set for the selected module.
	Communication Mode	Displays the communication mode set for the selected module.
	MAC address (1st octet)	Displays the MAC address of the selected module.
	MAC address (2nd octet)	
	MAC address (3rd octet)	
	MAC address (4th octet)	
	MAC address (5th octet)	
	MAC address (6th octet)	

Module communication test

When the communication using the master/local module is unstable, whether a hardware failure occurs or not can be checked.

The following lists the tests performed.

Test item	Description
Internal self-loopback test	Checks whether the communication function of the module can be performed normally.
External self-loopback test	Checks whether the communication can be performed normally with the Ethernet cable connected between two connectors.

Procedure (except for a redundant system)

1. Set the module operation mode to module communication test mode in the following item.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Target module ⇨ [Application Settings] ⇨ [Module Operation Mode]

2. Connect the P1 and P2 of the master/local module with an Ethernet cable.
3. Write the module parameters to the CPU module.
4. Reset or power off and on the CPU module to start the module communication test.

Point

- Do not perform a module communication test while connected to another station. The operation of another station may failed.
- For the RJ71EN71 or RnENCPU, when "Port 1 Network Type" is set to "Ethernet" and "Port 2 Network Type" is set to "CC-Link IE Field", set both of the P1 and P2 to the module communication test mode.

Procedure (for a redundant system)

To perform a module communication test in a redundant system, set the operation mode to separate mode. Before execution, perform system switching in advance so that the module communication test target station operates as the standby system.

The following describes the procedure for executing a module communication test when both systems are in online mode for the system B RJ71GF11-T2.

1. Set the module operation mode of system A to online mode in the following item.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Target module ⇨ [Application Settings] ⇨ [Module Operation Mode]

2. Set the module operation mode of system B to module communication test mode in the following item.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Target module ⇨ [Application Settings] ⇨ [Redundant System Settings] ⇨ [Module Operation Mode (System B)]

3. Connect the P1 and P2 of the system B RJ71GF11-T2 with an Ethernet cable.
4. Set the system B CPU module to the STOP state.
5. Write the module parameters to the system B CPU module.
6. Reset or power off and on the system B CPU module to start the module communication test.

Point

- To perform a module communication test on system A, set the module operation mode of system A to module communication test mode and the module operation mode of system B to online mode.
- When returning the module to a normal operation state after the test, reconnect the Ethernet cable as before the test, and then execute the Process CPU (redundant mode) memory copy to transfer the parameters of the control system to the standby system. (MELSEC iQ-R CPU Module User's Manual (Application))
- Do not perform a module communication test while connected to another station. The operation of another station may failed.

Checking the status and result

The test status and result can be checked with LED indicator of the module.

Test status	LED indication
Test in progress	The dot matrix LED indicates "UCT".
Normal completion	The dot matrix LED indicates "OK".
Abnormal end	The ERR LED turns on and the dot matrix LED indicates "ERR" and error number alternately at intervals of 1 second.

■Error number when the test abnormally ended.

The error number is indicated in the dot matrix LED in the form of "P1 or P2 error number".

For example, "1 3" is displayed when error No.3 occurs in P1.

If the module communication test fails, check the following.

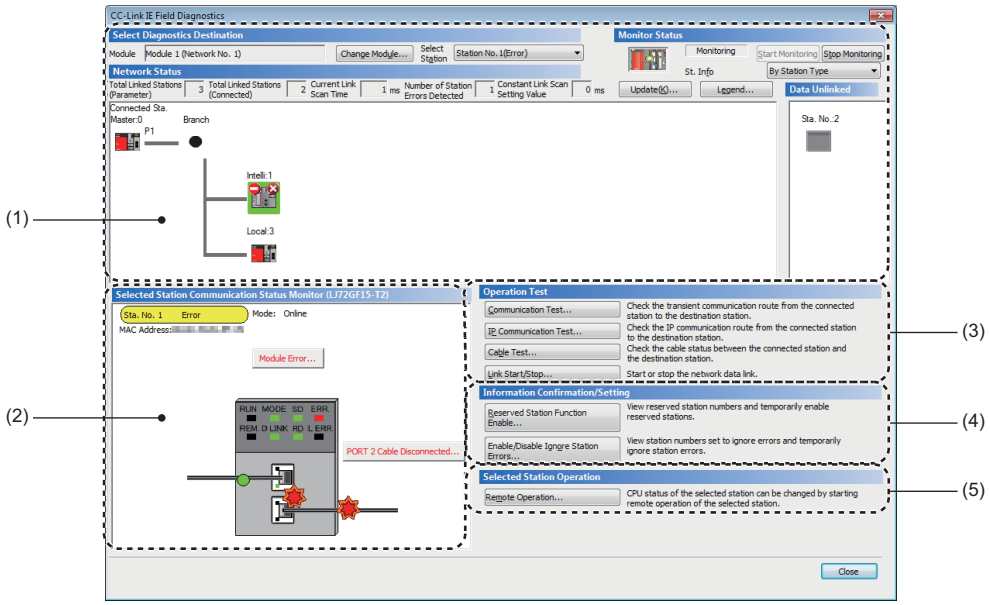
Error number	Description	Action
1	Internal self-loopback test failure	Please consult your local Mitsubishi representative.
2	External self-loopback test connection error	Check the Ethernet cable connection or replace the Ethernet cable, and perform the test again. If the test fails again, please consult your local Mitsubishi representative.
3	External self-loopback test communication error	Replace the Ethernet cable and perform the test again. If the test fails again, Please consult your local Mitsubishi representative.

4.3 Checking the Network Status

Perform the CC-Link IE Field Network diagnostics to check the network status and error details or to perform an operation test for troubleshooting.

Diagnostic items

The following table lists items that can be diagnosed by the CC-Link IE Field Network diagnostics.



■When "No Specification" is specified in "Other Station Setting" on the "Specify Connection Destination Connection" window

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

Item		The engineering tool is connected to:		Restrictions	Reference
		Master station, submaster station	Local station		
(1)	Network map and error status	○	○	—	Page 283 Diagnostics window
	Cable disconnection and disconnected station	○	○		
(2)	Status of the selected station and the error definition	○	○	This item is not displayed when the selected module does not support "Selected Station Communication Status Monitor" of the engineering tool.	
	Station number setting of the device station	○*1	×	—	
(3)	Communication Test	○	○		Page 43 Communication test
	IP Communication Test	○	○		Page 52 IP communication test
	Cable Test	○	○		Page 292 Cable Test
	Link Start/Stop	○*1	△	To start/stop data link of another station, the engineering tool must be connected to the master station (or the master operating station when the submaster function is used).	Page 294 Link Start/Stop
(4)	Reserved Station Function Enable	○*1	△	When the engineering tool is connected to a local station, reserved stations are only displayed (cannot be set).	Page 297 Reserved Station Function Enable
	Enable/Disable Ignore Station Errors	○*1	△	When the engineering tool is connected to a local station, temporary error invalid stations are only displayed (cannot be set).	Page 299 Enable/Disable Ignore Station Errors
(5)	Remote Operation	△*2	△*2	When the selected station is other than MELSEC iQ-R series, this function cannot be executed.	Page 302 Remote Operation

*1 When the own station operates as a submaster operating station, the function cannot be executed.

*2 If the setting on the "Specify Connection Destination Connection" window of the engineering tool is as follows, remote operation cannot be executed with "All Stations Specified".
Connection via Ethernet with the selections "Ethernet Board" for the personal computer-side I/F and "CC IE TSN/Field Module" for the programmable controller-side I/F

■When a setting other than "No Specification" is specified in "Other Station Setting" on the "Specify Connection Destination Connection" window

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

Item		The engineering tool is connected to:		Restrictions	Reference
		Master station, submaster station	Local station		
(1)	Network map and error status	○	○	—	Page 283 Diagnostics window
	Cable disconnection and disconnected station	○	○		
(2)	Status of the selected station and the error definition	○	○	This item is not displayed when the selected module does not support "Selected Station Communication Status Monitor" of the engineering tool.	
	Station number setting of the device station	○*1	×	—	
(3)	Communication Test	×	×	—	—
	IP Communication Test	×	×	—	—
	Cable Test	×	×	—	—
	Link Start/Stop	×	×	—	—
(4)	Reserved Station Function Enable	×	×	—	—
	Enable/Disable Ignore Station Errors	×	×	—	—
(5)	Remote Operation	○	○	When the selected station is other than MELSEC iQ-R series, this function cannot be executed.	Page 302 Remote Operation

*1 When the own station operates as a submaster operating station, the function cannot be executed.

Point

When starting the CC-Link IE Field Network diagnostics with a setting other than "No Specification" in "Other Station Setting" on the "Specify Connection Destination Connection" window, use the engineering tool of the version 1.035M or later.

Starting diagnostics

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

■When "No Specification" is specified in "Other Station Setting" on the "Specify Connection Destination Connection" window

1. Connect the engineering tool to the CPU module.

If a device station cannot be monitored due to an error such as cable disconnection, directly connect the supported engineering tool to the device station.

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

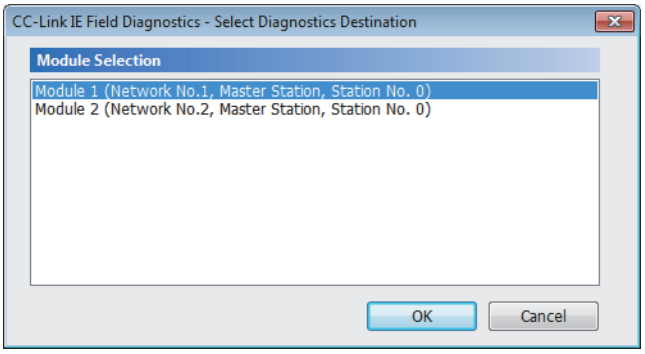
[Diagnostics] ⇨ [CC-Link IE Field Diagnostics]

Point

In a redundant system, the CC-Link IE Field Network diagnostics cannot be started when a system has been specified in "Specify Redundant CPU" of "Target System" in the "Specify Connection Destination Connection" window. Directly connect the engineering tool to the station to be diagnosed, specify the own remote head module (set "Not Specified" in "Specify Redundant CPU"), and start the CC-Link IE Field Network diagnostics.

3. When the following window opens, select the master/local module to be diagnosed and click the [OK] button to start the CC-Link IE Field Network diagnostics.

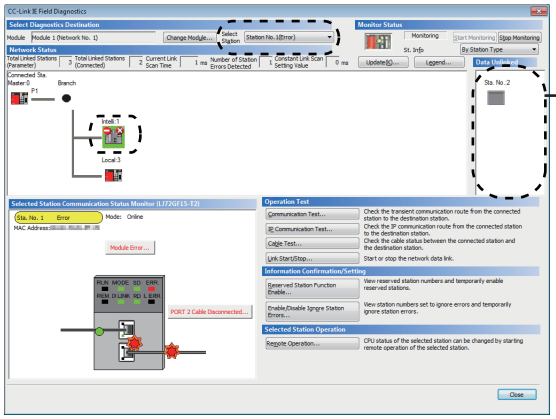
Modules are listed in the order configured in module information.



Point

When multiple master/local modules of the same network number are mounted on the same base unit, the module with the smallest start I/O number is always diagnosed, regardless of setting.

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



- An icon indicating an error is displayed on the module icon of the station where an error occurs.
- A disconnected station that has performed data link is indicated with the "Disconnected Station" icon in the network map. However, a disconnected station in following case is displayed on the right end of the area.

Stations displayed on the right end of the area.

- A station that was reconnected to a network after disconnecting/inserting the cable or powering off and on the system, and remains disconnected
- A disconnected station with the station icon deleted in the network map by clicking the [Update] button

- The "Error" icon 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 the "Error" icon.
- The "Error (Illegal ring connection detected/Execute loopback)" icon is displayed if the network is configured in ring topology although "Network Topology" of "Basic Settings" is set to "Line/Star".
- The "Error (Illegal ring connection detected/Execute loopback)" icon is displayed if the network is configured in star topology although "Network Topology" of "Basic Settings" is set to "Ring".
- The "Error (Illegal ring connection detected/Execute loopback)" icon is displayed if the network is incorrectly configured in ring topology or loopback is performed due to an error such as cable disconnection.*1

*1 Whether icon is displayed or not when loopback is performed depends on the firmware version of the master/local module. (☞ Page 440 Added and Enhanced Functions)

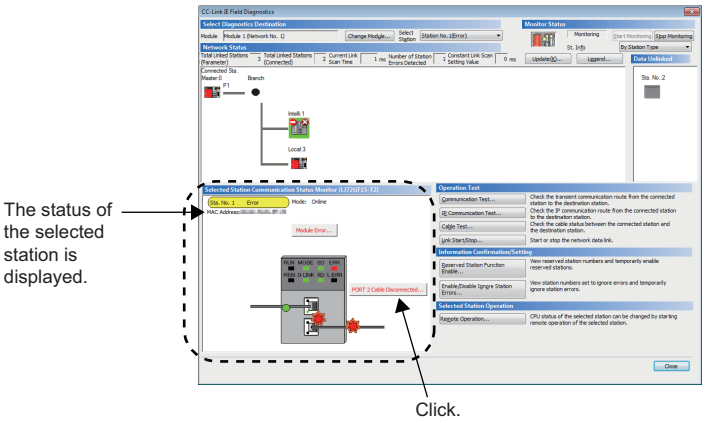
Point

When the station to be diagnosed cannot be selected, the status of network number disparity, control station duplication, or station number duplication cannot be checked using the CC-Link IE Field Network diagnostics. Check the error details by directly connecting the supported engineering tool to the device station where an error occurs, and opening the "System Monitor" window.

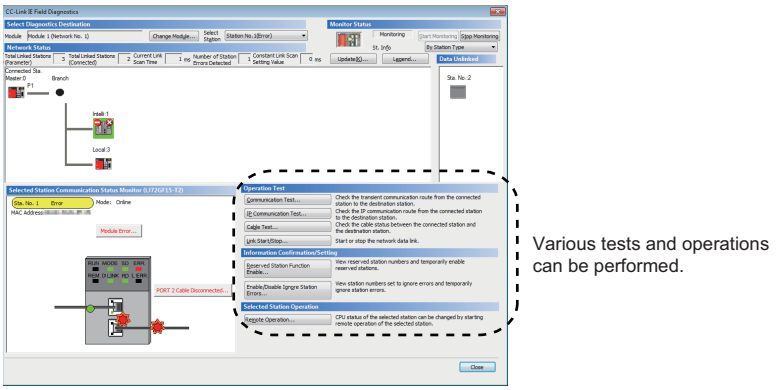
5. The status of a station selected in "Network Status" is displayed in "Selected Station Communication Status Monitor". (☞ Page 283 Diagnostics window)

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

If an error occurs, a button indicating the error such as [PORT2 Communication Error] is displayed in "Selected Station Communication Status Monitor". Click the button to check the error details and actions.



6. Various tests and operations can be performed by clicking the "Operation Test", "Information Confirmation/Setting", or "Selected Station Operation" on the bottom left of the window. (☞ Page 294 Link Start/Stop to Page 302 Remote Operation)



■When a setting other than "No Specification" is specified in "Other Station Setting" on the "Specify Connection Destination Connection" window

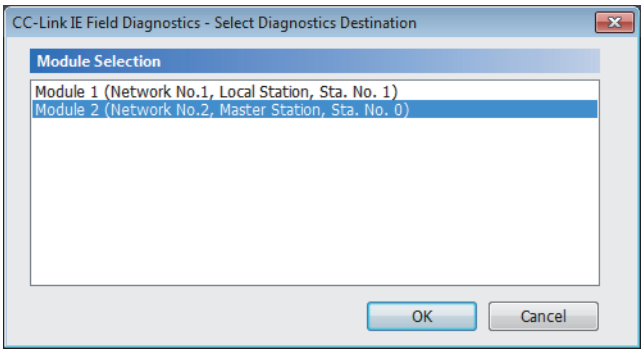
1. Connect the engineering tool to the CPU module.
2. Start the CC-Link IE Field Network diagnostics.

[Diagnostics] ⇨ [CC-Link IE Field Diagnostics]

Point

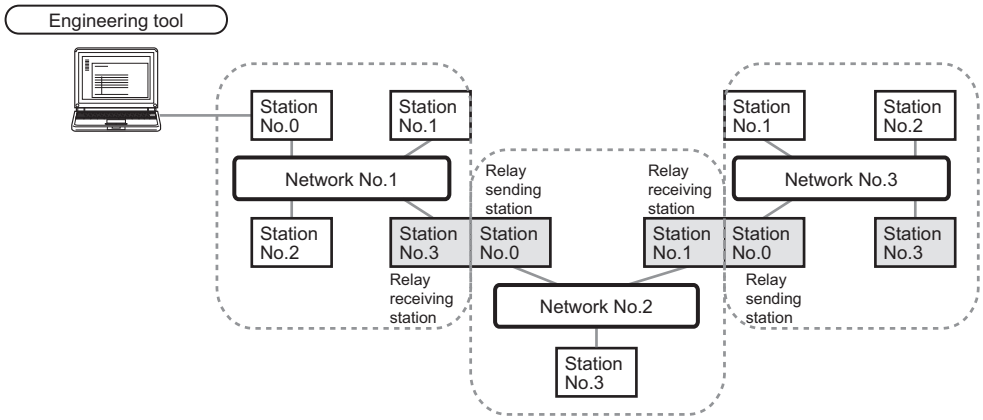
- In a redundant system, the CC-Link IE Field Network diagnostics cannot be started when a system has been specified in "Specify Redundant CPU" of "Target System" in the "Specify Connection Destination Connection" window. Directly connect the engineering tool to the station to be diagnosed, specify the own remote head module (set "Not Specified" in "Specify Redundant CPU"), and start the CC-Link IE Field Network diagnostics.
- The CC-Link IE Field Network diagnostics cannot be started when "Other Station (Co-existence Network)" has been specified in "Other Station Setting" on the "Specify Connection Destination Connection" window and "CC-Link" or "C24" has been specified in "Co-existence Network Route".

3. Select the master/local module of the network number to be diagnosed and click the [OK] button to start the CC-Link IE Field Network diagnostics.



Point

- Although the CC-Link IE Field Network diagnostics of the network to which the relay sending station belongs can be started, that of the network to which the relay receiving station belongs cannot be started.
- To start the CC-Link IE Field Network diagnostics, specify the network number and station number of the relay receiving station or relay sending station for "Network No." and "Station No." in "Network Communication Route" on the "Specify Connection Destination Connection" window. For example, to start the CC-Link IE Field Network diagnostics of the network number 2, specify the network number 1 and station number 3, or the network number 2 and station number 0 in "Network No." and "Station No.".



- The CC-Link IE Field Network diagnostics can be started for stations of up to eight networks ahead (number of relay stations: 7) including the station directly connected to the engineering tool. However, for the stations of five networks ahead (number of relay stations: 4) or later, it can be started only when the firmware version of the master/local module is "18" or later.
- The selected station communication status monitor of the RJ72GF15-T2 cannot be executed in the CC-Link IE Field Network diagnostics for the stations of five networks ahead (number of relay stations: 4) or later.

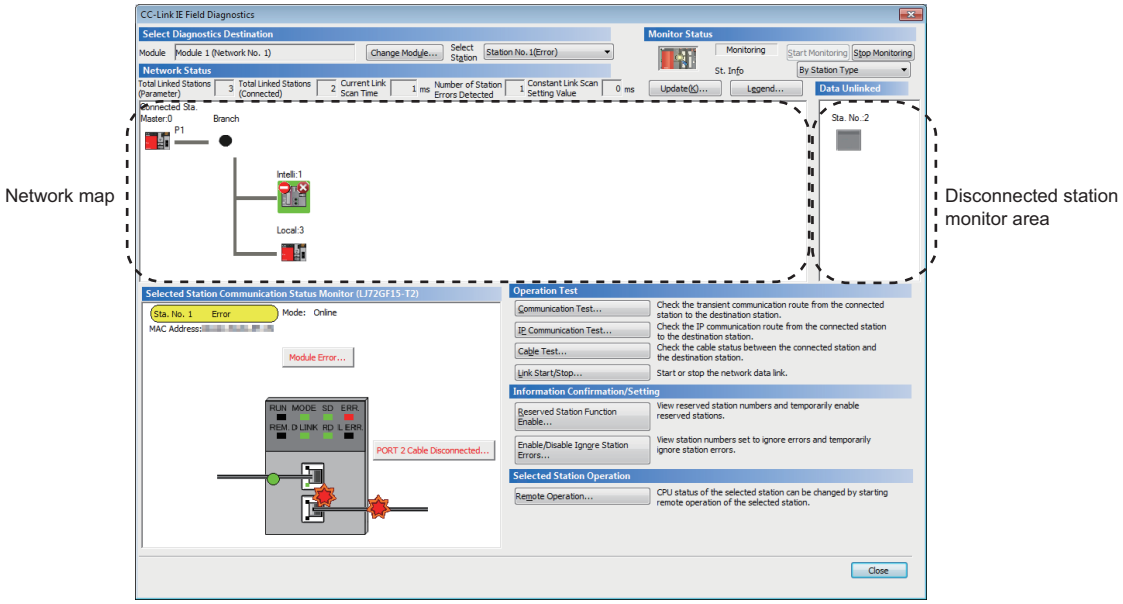
4. Step 4 and later is the same procedure as when "No Specification" is specified in "Other Station Setting" on the "Specify Connection Destination Connection" window. (☞ Page 278 When "No Specification" is specified in "Other Station Setting" on the "Specify Connection Destination Connection" window)

Precautions

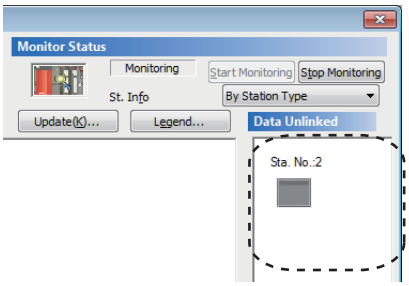
If the communication path includes the following items, the CC-Link IE Field Network diagnostics cannot be started.

- MELSECNET/H
- Multidrop connection with a serial communication module
- Interface board for a personal computer
- GOT (when the transparent function is used)
- MELSEC-Q/L series network module

Diagnostics window



Item		Description
Select Diagnostics Destination	Module	Displays the master/local module being diagnosed.
	[Change Module] button	Allows to change the target module when multiple master/local modules are mounted. However, when multiple master/local modules of the same network number are mounted on the same base unit, the module with the smallest start I/O number is always diagnosed, regardless of setting.
	Select Station	Selects the station number of the station to be diagnosed. A station to be diagnosed can also be selected by clicking the module icon displayed in the network map.
Monitor Status	[Start Monitoring] button	Starts monitoring of the CC-Link IE Field Network diagnostics.
	[Stop Monitoring] button	Stops monitoring of the CC-Link IE Field Network diagnostics.
[Update] button*1*2		• When the firmware version of the master station is "72" or later: Always executes the network map update regardless of whether the actual network configuration matches the network map of the diagnostic window. • When the firmware version of the master station is "05" to "71": Executes the network map update to match them if the actual network configuration and network map of the diagnostic window are inconsistent. A data link error may momentarily occur in all the stations and outputs of the connected device stations may turn off since all stations on the network will be reconnected when executing the network map update. Set output data if needed. (MELSEC iQ-R Ethernet/CC-Link IE User's Manual (Startup)) • When the firmware version of the master station is "04" or earlier: Deletes a disconnected station displayed in the network map. The deleted station is displayed in the disconnected station monitor area.
[Legend] button		Displays the meaning of icons displayed in the CC-Link IE Field Network diagnostics.
St. Info		The display name of the device station can be selected from "By Device Name" and "By Station Type". When "By Device Name" is selected, the information entered in "Alias" of "Network Configuration Settings" under "Basic Settings" is displayed. When selecting "By Device Name", pay attention to the following. • When "Alias" is not entered in "Network Configuration Settings" under "Basic Settings", the station type is displayed. • When "Submaster Parameters" of "Basic Settings" is set to "Operate with Parameter of Host Station" in the project of the submaster station and the submaster station starts to operate as a master operating station, the device name entered in "Network Configuration Settings" under "Basic Settings" of the submaster station is displayed. (The station type is displayed when the device name is not entered.) • When "Submaster Parameters" of "Basic Settings" is set to "Read Parameters of the Master Station" in the project of the submaster station and the submaster station starts to operate as a master operating station, the station type is displayed.

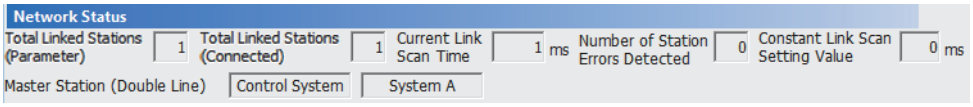
Item		Description
Network Status	Total Linked Stations (Parameter)	Displays the total number of device stations set in "Network Configuration Settings" of "Basic Settings".
	Total Linked Stations (Connected)	Displays the total number of device stations actually performing baton pass on CC-Link IE Field Network.
	Current Link Scan Time	Indicates the link scan time of the displayed network.
	Number of Station Errors Detected	Indicates the number of error stations in the displayed network.
	Constant Link Scan Setting Value	Indicates the setting value of the "Constant Link Scan Time" under "Supplementary Cyclic Settings" of "Application Settings".
	Network map	Indicates the network map and the status of each station. If the status is not displayed, check that there is only one master station in the system and no station number is overlapped. For details on the network map, refer to the following. ☞ Page 287 Network map
	Disconnected station monitor area	Displays a disconnected station that has been set in "Network Configuration Settings" of "Basic Settings" but has not yet performed data link. However, even if a disconnected station had performed data link, it is displayed in this area in the following cases. • A station that was reconnected to a network after disconnecting/inserting the cable or powering off and on the system, and remains disconnected. • A disconnected station with the station icon deleted in the network map by clicking the [Update] button  Disconnected station monitor area The "Other Modules" icon indicates a station that has not yet performed data link. Icons other than "Other Modules" icon indicate stations that had performed data link before disconnection. For details on the displayed icon, click the [Legend] button.
Selected Station Communication Status Monitor		Displays status of the station selected in "Network Status". For details on "Selected Station Communication Status Monitor", refer to the following. ☞ Page 290 Selected Station Communication Status Monitor
Operation Test	[Communication Test] button	Performs a communication test. (☞ Page 43 Communication test)
	[IP Communication Test] button	Performs an IP communication test. (☞ Page 52 IP communication test)
	[Cable Test] button	Performs a cable test. (☞ Page 292 Cable Test)
	[Link Start/Stop] button	Starts or stops cyclic transmission. (☞ Page 294 Link Start/Stop)
Information Confirmation/ Setting	[Reserved Station Function Enable] button	Temporarily cancels a reservation for a device station or reserves the device station again. (☞ Page 297 Reserved Station Function Enable)
	[Enable/Disable Ignore Station Errors] button	Sets a device station as a temporary error invalid station. (☞ Page 299 Enable/Disable Ignore Station Errors)
Selected Station Operation	[Remote Operation] button	Performs remote operation (such as RUN, STOP, or RESET operations) to the CPU module. (☞ Page 302 Remote Operation)

*1 When monitoring the network containing a redundant system, even if a temporary data link error occurs at the time the [Update] button is pressed, a system switching request will not be issued.

*2 For a redundant line configuration, when the [Update] button is pressed, the network maps of other systems will not be updated.

Point

When the CC-Link IE Field Network diagnostics is executed in a redundant line configuration, information about the system being monitored is displayed in "Master Station (Double Line)" under "Network Status" in the diagnostic window.



When the "Error (Illegal ring connection detected/Execute loopback)" icon is displayed

When the "Error (Illegal ring connection detected/Execute loopback)" icon is displayed in "Network Status", take following actions.

■When the system does not contain a switching hub

The network is configured in ring topology although "Network Topology" of "Basic Settings" is set to "Line/Star".
Take any of the following actions.

Action
Disconnect an Ethernet cable connected to any station on the network (either P1 or P2). The network topology will become a line topology and data link will start.
To configure the network in a ring topology, take following action. • Set "Network Topology" of "Basic Settings" to "Ring" and rewrite the parameters to the CPU module. • Check that the master station on the master station supports the loopback function. To check whether the module supports the loopback function, refer to the user's manual for the master/local module used.

■When the system contains a switching hub

The "Error (Illegal ring connection detected/Execute loopback)" icon is displayed due to any of the following causes.

- The network is configured in ring topology although "Network Topology" of "Basic Settings" is set to "Line/Star".
- The network is configured in star topology although "Network Topology" of "Basic Settings" is set to "Ring".
- A switching hub is connected when "Network Topology" of "Basic Settings" is set to "Ring".

Take the following actions.

Action

1. Check if "Network Topology" of "Basic Settings" is different from the network configuration. If so, correct "Network Topology" of "Basic Settings" and rewrite it to the CPU module. When data link starts across the entire network, this procedure is successfully completed.

If data link does not start, perform step 2 and 3.

2. When "Network Topology" of "Basic Settings" is set to "Line/Star", take the following actions.

- Disconnect one Ethernet cable connected to the switching hub and power off and on the hub. (Repeat this operation until data link starts over the network.)
- When data link starts over the network, check the network configuration using CC-Link IE Field Network diagnostics. The procedure is successfully completed. (☞ Page 275 Checking the Network Status)

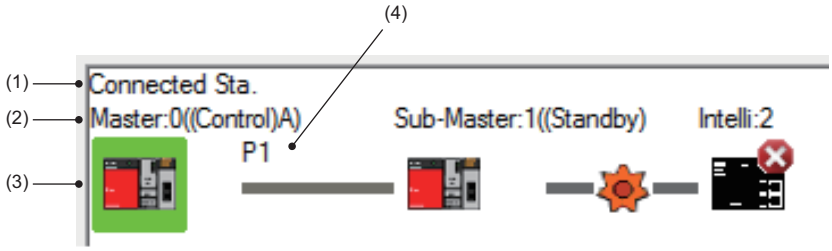
3. When "Network Topology" of "Basic Settings" is set to "Ring", take the following actions.

- Configure the network in ring topology without a switching hub. Connecting a switching hub will cause a problem such as data link failure. (📖 MELSEC iQ-R Ethernet/CC-Link IE User's Manual (Startup))
- Check that the master station on the master station supports the loopback function. To check whether the module supports the loopback function, refer to the user's manual for the master/local module used.

Network map

■Icon

The module type and station number are displayed with an icon.



- Click: Selection
- Right-click: Test or debug execution.
- ↑ ↓ ← → keys on the keyboard: Move the focus to the module to be diagnosed, and determine it with the Space key.

No.	Description
(1)	Displayed the station (own station) where the engineering tool is connected.
(2)	Displayed the station type and station number. "?" is displayed when a station number has not been set. When the background of the text if colored, the relevant station may have been set as a reserved station or an error invalid station. Click the [Legend] button to check the meaning of the background colors. When the networks contain a redundant system (excluding redundant line), one of the system statuses below is displayed for the stations in a redundant system. • Control/Standby: Displayed for the stations of the control system and standby system.*1 • A/B: Displayed for system A and system B stations.
(3)	Module status is displayed. Click the [Legend] button to check the meaning of the icon. When the "Error (Illegal ring connection detected/Execute loopback)" icon is displayed, take actions displayed in "Troubleshooting" of "Error details". (☞ Page 290 When a station where an error has occurred is selected)
(4)	A port to which an Ethernet cable is connected is displayed.

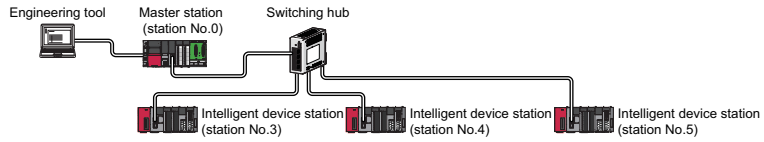
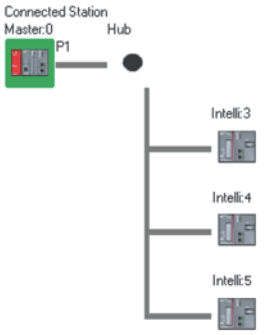
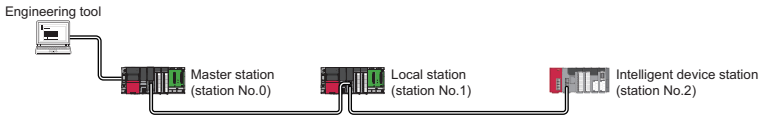
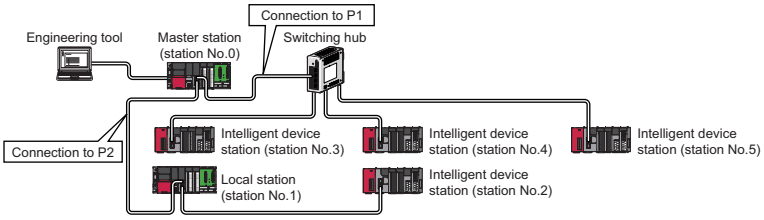
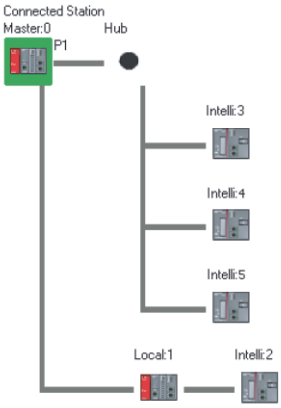
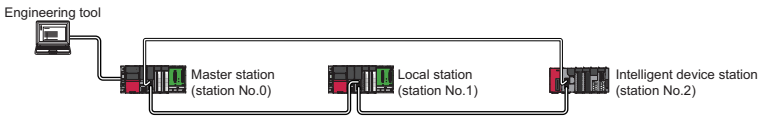
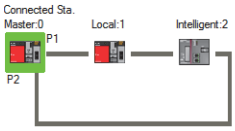
*1 When a stop error occurs in the CPU modules of both systems, both systems are displayed as the standby system.

Point

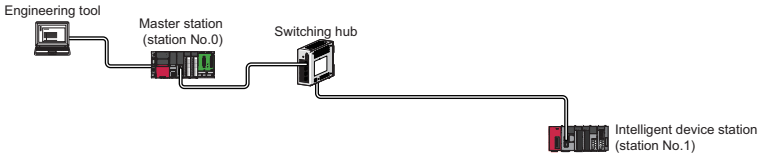
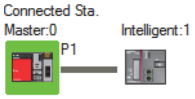
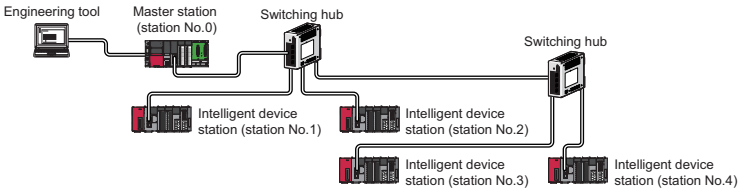
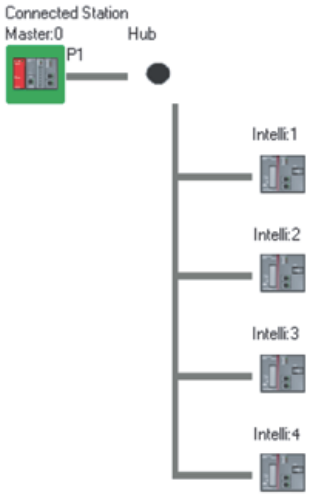
When a redundant system of redundant line is configured, since the networks of system A and system B are wired in the same way, the configuration of either system is displayed on the network map.

■Network map

A network map is displayed according to the connection status.

System configuration	Display of the network map
Star topology 	
Line topology 	
Star and line mixed 	
Ring topology 	

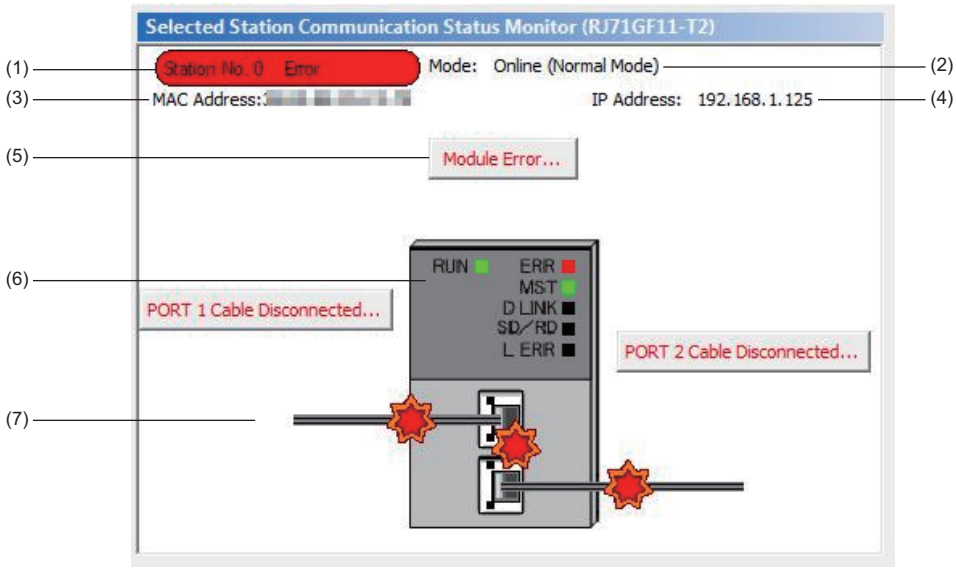
In the following cases, the network map that is different from the actual system configuration is displayed.

System configuration	Display of the network map
Two stations are connected through a switching hub. 	Branches are not displayed in the network map. 
Switching hubs are in cascade connection. 	Only one branch is displayed. 

Selected Station Communication Status Monitor

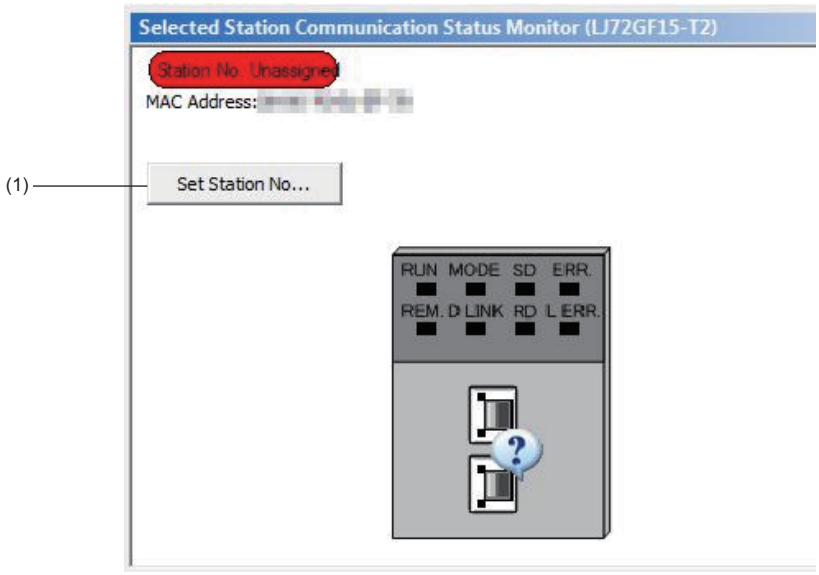
Displays status of the station selected in "Network Status".

■When a station where an error has occurred is selected



No.	Description
(1)	The operating status is displayed. • Station No.☐: Normal operation • Station No.☐ Error (yellow): Error (Data link is continued.) • Station No.☐ Error (red): Error (Data link is stopped.)
(2)	Mode is displayed.
(3)	A MAC address is displayed.
(4)	An IP address is displayed. (only when it is set).
(5)	Click this button to check error details. Take actions following the description displayed in "Error Factor" and "Troubleshooting".
(6)	The LED status of a module and communication status of P1 and P2 is displayed. (📖 MELSEC iQ-R Ethernet/CC-Link IE User's Manual (Startup))
(7)	Status of the cables connected to P1 and P2 is displayed.

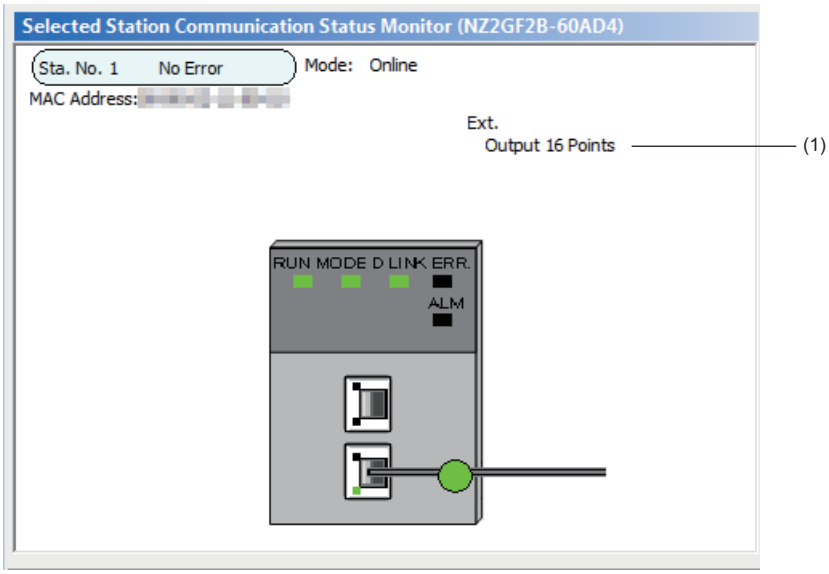
■When a station with no network number nor station number setting is selected



No.	Description
(1)	Sets a station number for a device station to which a station number has not been set. This button is displayed only when a device station meeting all the following conditions has been selected in "Network Status". • The device station supports station number setting from the master station. • A station number has not been set to the device station.*1 When a station set in "Network Configuration Settings" of "Basic Settings" is added, the external device connected to the device station outputs data input from the master station, simultaneously with configuration of the station number setting. Therefore, set the CPU module to STOP or check that outputs from the external device of the device station will not cause a problem beforehand.

*1 For how to clear the station number set for a device station in the CC-Link IE Field Network diagnostics, refer to the manual for the device station used.

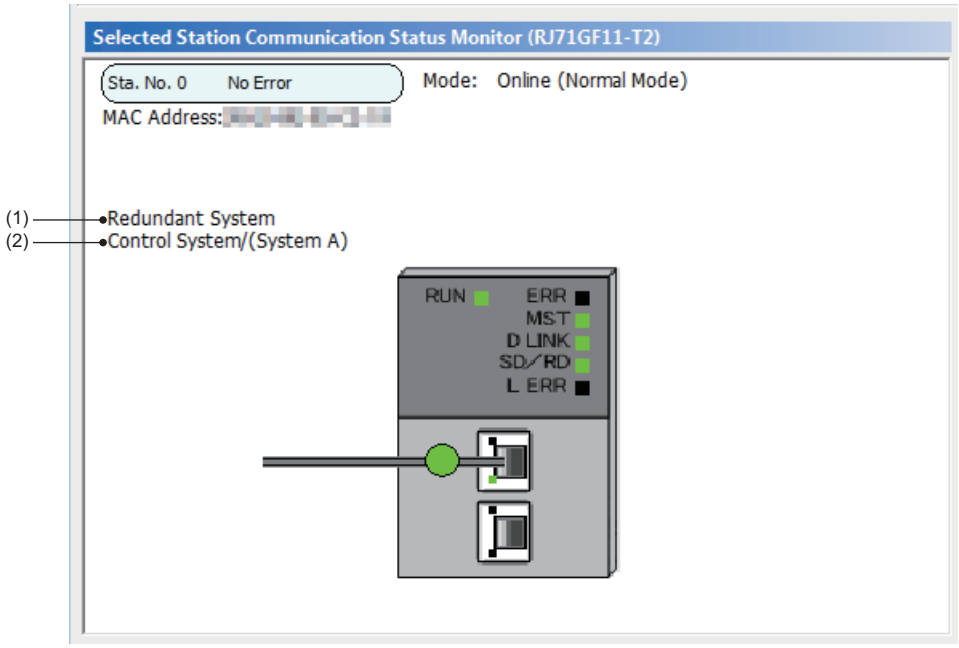
■When a remote device station is selected



No.	Description
(1)	Displays the information of the extension module connected to the remote device station.

■When a redundant system station is selected

When the networks contain a redundant system (excluding redundant line), the system status is displayed for the stations in a redundant system.

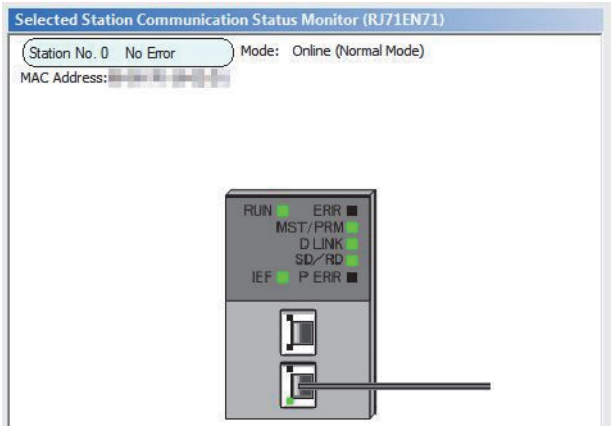


No.	Description
(1)	Indicates that the station is set as a redundant system.
(2)	The status of the selected station in a redundant system (control system/standby system and system A/system B) is displayed.*1

*1 The error of the control system CPU module may be displayed as the standby system depending on the error status.

■When the RJ71EN71 or RnENCPU is selected

When the network type of the RJ71EN71 is set to "E+CCIEF" or the network type of the RnENCPU is set to "E+IEF", status of P1 is not displayed.

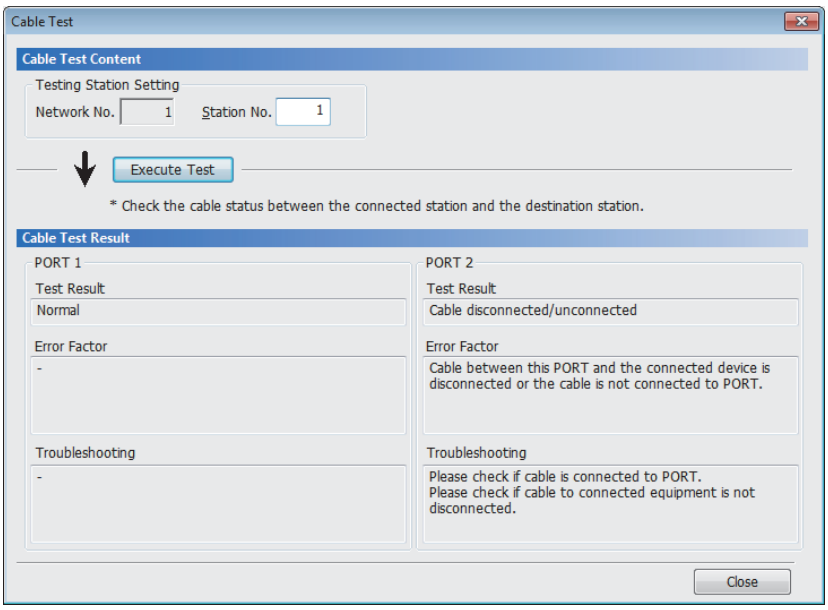


Cable Test

Cable test checks if the Ethernet cables are properly connected.

Only the Ethernet cable connected to the P1 or P2 of the target station is tested. For the whole network status, check the network map or "Selected Station Communication Status Monitor" of the CC-Link IE Field Network diagnostics. (☞ Page 275 Checking the Network Status)

■Procedure



1. Click the [Cable Test] button in the "CC-Link IE Field Diagnostics" window.

"Cable Test" window is displayed.

2. Enter a station number and click the [Execute Test] button to operate the test.

If an error occurs, take actions according to the error message.

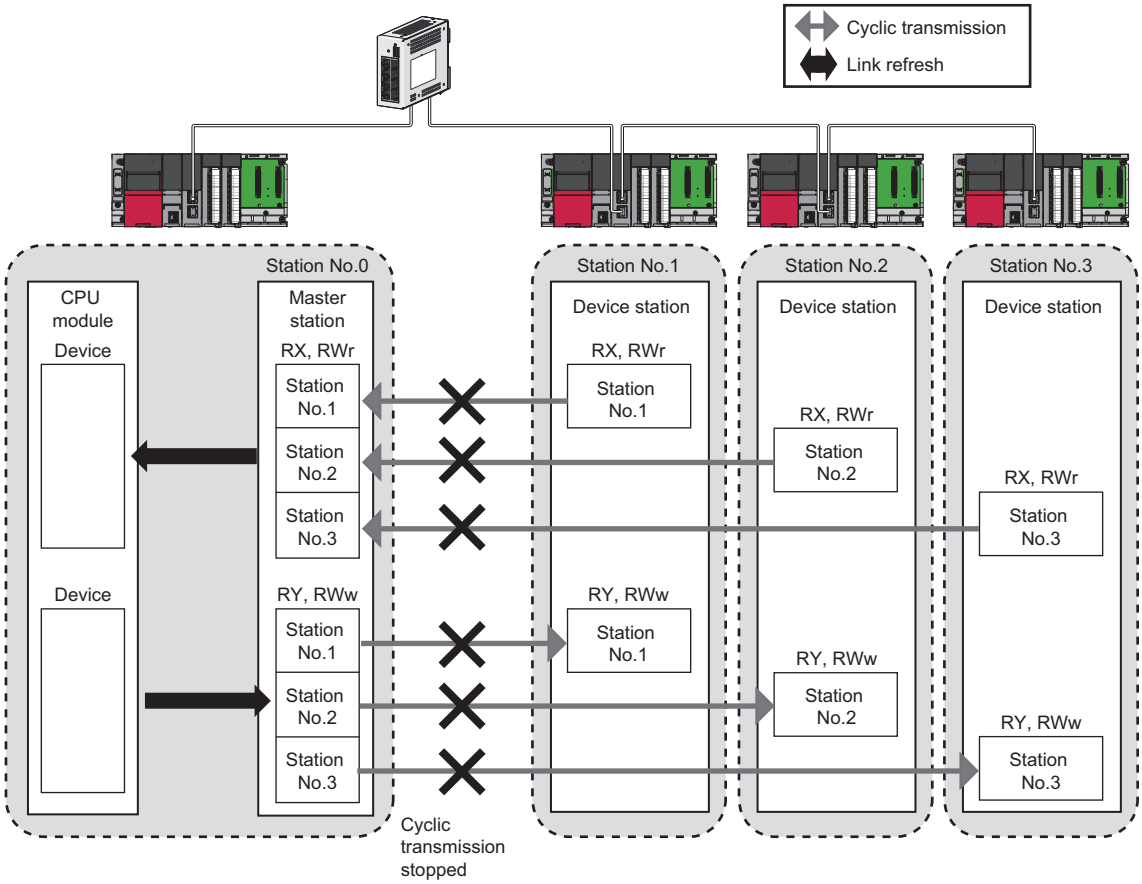
Link Start/Stop

This function stops the cyclic transmission during debugging and other operations. (Data reception from a device station and data sending from the own station are stopped.)

Also, the stopped cyclic transmission is restarted. This function does not stop or restart transient transmission.

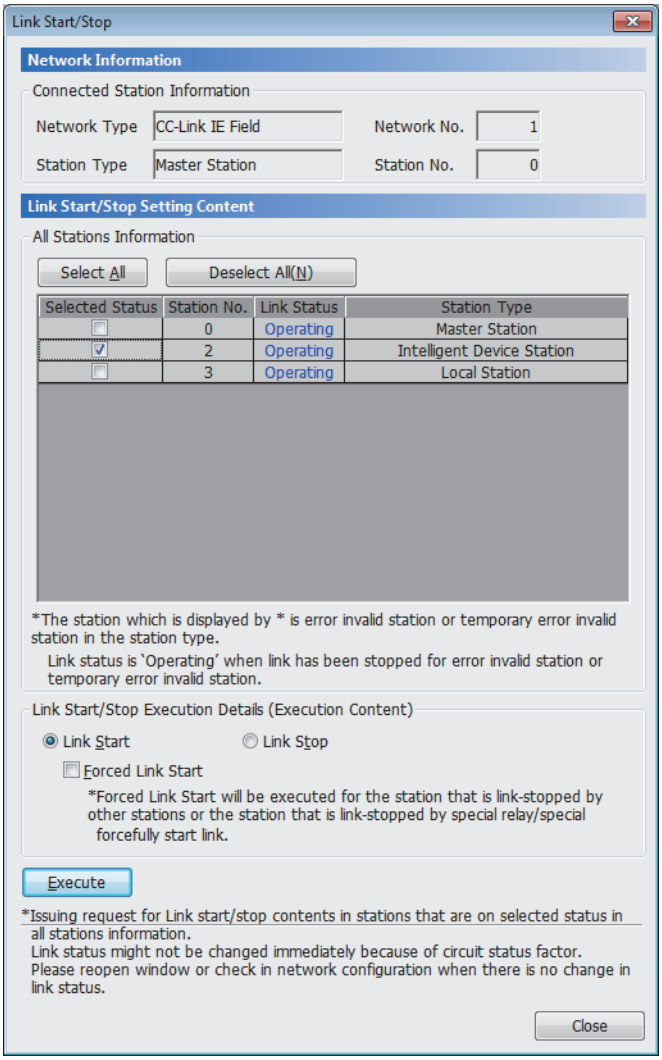
Point

Cyclic transmission can be started and stopped using SB or SW. (☞ Page 348 List of SB, Page 369 List of SW)



■Procedure

The execution status of cyclic transmission can be checked in "Link Status".



1. Click the [Link Start/Stop] button in the "CC-Link IE Field Diagnostics" window. Or right-click a module icon in "Network Status" and click [Link Start/Stop].

"Link Start/Stop" window is displayed.

2. Select a station for starting or stopping cyclic transmission in "Selected Status".

When the engineering tool is connected to a local station, only the own station can be selected. The station to which the engineering tool is connected can be checked in "Connected Station Information".

3. Select whether to start or stop cyclic transmission in "Link Start/Stop Execution Details (Execution Content)".

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 SB or SW.

4. Click the [Execute] button.

■When the CPU module is reset or the system is powered off and on

Even if cyclic transmission has been stopped by this function, it will restart.

■When 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-Link IE Field Network diagnostics window even after data link has been stopped. Check the data link status in 'Data link stop status of own station' (SB0049).

■When the safety communication function is used in a system using the Safety CPU

When the cyclic transmission with the remote device station (safety station) is stopped during safety communications with the remote device station (safety station), safety communications with the remote device station (safety station) where cyclic transmission was stopped is also stopped and an error will occur.

When the cyclic transmission of the master station (safety station) is stopped, safety communications with all the remote device stations (safety stations) is stopped and an error will occur.

■When the safety communication function is used in a system using the SIL2 Process CPU

When the cyclic transmission with the intelligent device station (safety station) is stopped during safety communications with the intelligent device station (safety station), safety communications with the intelligent device station (safety station) where cyclic transmission was stopped is also stopped and an error will occur.

When the cyclic transmission of the master station (safety station) is stopped, safety communications with all the intelligent device stations (safety stations) is stopped and an error will occur.

■Stations to which the link start cannot be executed

The link start cannot be executed to the following stations.

- 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 SB or SW[*1]

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

Reserved Station Function Enable

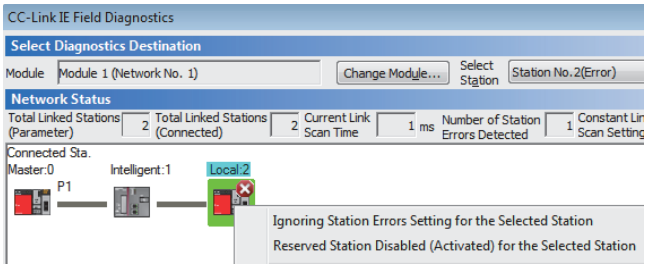
This function temporarily cancels a reservation for a device station. Use this function to cancel the reservation of a device station when it is connected to the network.
Or use to set it as a reserved station again.

Point

The reserved station setting can also be temporarily disabled/enabled using SB or SW of the master station. (☞ Page 348 List of SB, Page 369 List of SW)

■Selecting the target module in "Network Status"

To temporarily cancel a reservation, follow the steps below.

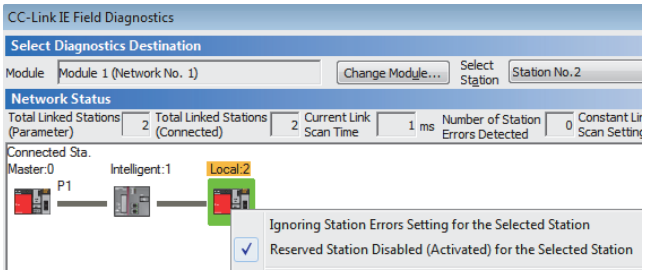


1. Connect a device station specified as a reserved station to the network.
2. In "Network Status" of the "CC-Link IE Field Diagnostics" window, select the icon of the station for which reservation is to be temporarily canceled.
3. Right-click the selected icon, and select "Reserved Station Disabled (Activated) for the Selected Station".

The text background turns orange. The reservation for the device station is temporarily canceled.

4. Debug the device station that has been added.

To reserve the device station again, follow the steps below.



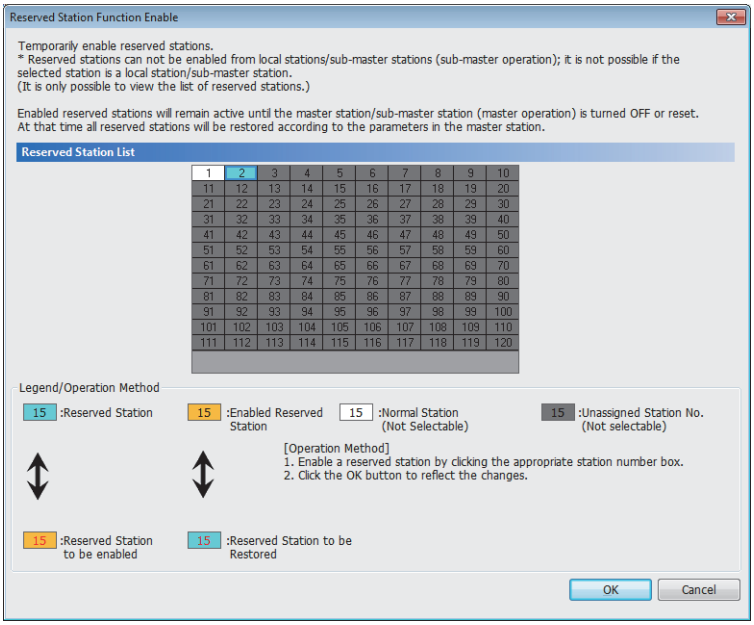
1. In "Network Status" of the "CC-Link IE Field Diagnostics" window, select the icon of the station to be reserved again.
2. Right-click the selected icon, and select "Reserved Station Disabled (Activated) for the Selected Station".

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

■Selecting the target module in the "Reserved Station Function Enable" window

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

To temporarily cancel a reservation, follow the steps below.



1. Connect a device station specified as a reserved station to the network.
2. Click the [Reserved Station Function Enable] button in the "CC-Link IE Field Diagnostics" window.

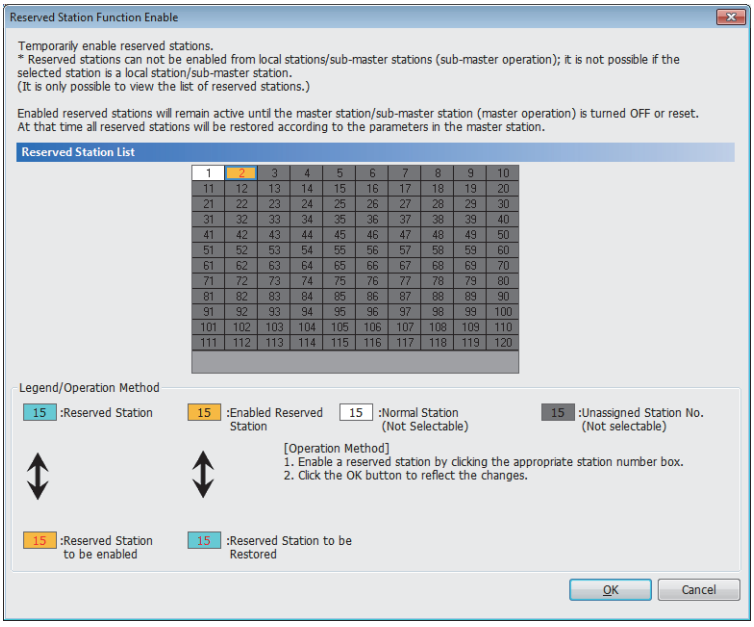
"Reserved Station Function Enable" window is displayed.

3. In "Reserved Station List", click the number of the target station. The text turns red and the background turns orange

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

4. Click the [OK] button to temporarily cancel the reservation.
5. Debug the device station that has been added.

To reserve the device station again, follow the steps below.



1. Open the "Reserved Station Function Enable" window in the same way as described in the procedure for temporarily canceling a reservation.
2. In "Reserved Station List", click the number of the target station. The text turns red and the background turns light blue.

Only stations not specified as a reserved station can be selected.

The background of available modules is orange.

3. Click the [OK] button to set the station as a reserved station again.

■Parameter setting

"Network Configuration Settings" of "Basic Settings" does not reflect the temporary cancellation of reserved station specification.

■When the master station is reset or the system is powered off

The disabled reserved station setting is ignored, and the device station returns to the status set in "Network Configuration Settings" of "Basic Settings" of the master station.

■When a station for which the reserved station setting has been temporarily disabled is disconnected from the network

The following status differs between the master station and local stations after the CPU module on the master station is reset or the system is powered off.

- ERR LED status
- SW00C0 to SW00C7 ('Reserved station setting status') and SW0180 to SW0187 ('Reserved station cancel setting status')

The difference can be corrected by the following procedure.

1. Reconnect the disconnected station.
2. Disable the reserved station setting, and enable the reserved station setting again.

■Checking the station number of a reserved station

The station number of a reserved station can be checked in the "Reserved Station Function Enable" window.

■For execution in a redundant line configuration

Execute temporary cancel of the reserved station setting for stations on the networks of both systems. When this has been executed only for a station on the network of one system, since temporary cancel of the reserved station setting has not been executed for a station on the network of the other system, if system switching occurs, the state of not having executed temporary cancel of the reserved station setting arises.

Enable/Disable Ignore Station Errors

A device station not set as an error invalid station can be temporarily set as an error invalid station. This function is used to temporarily prevent detection of an error in a device station.

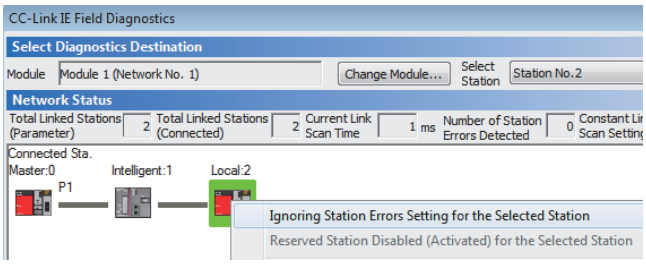
This function also cancels temporary error invalid station setting configured to a device station.

Point

The temporary error invalid station setting can also be configured/canceled using SB or SW of the master station. (☞ Page 348 List of SB, Page 369 List of SW)

■Selecting the target module in "Network Status"

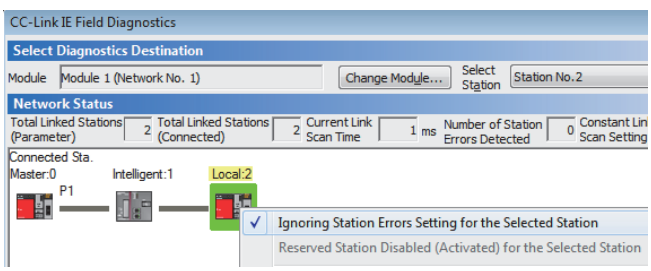
To set a temporary error invalid station, follow the steps below.



1. In "Network Status" of the "CC-Link IE Field Diagnostics" window, select the icon of the station to be temporarily set as an error invalid station.
2. Right-click the selected icon, and select "Ignoring Station Errors Setting for the Selected Station".

The text background turns yellow. The target station is temporarily set as an error invalid station.

To cancel temporary error invalid station setting, follow the steps below.



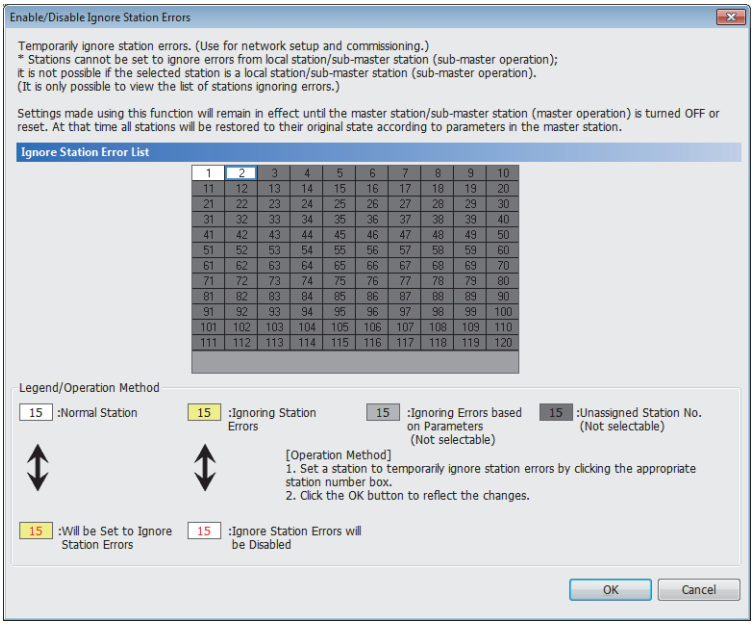
1. In "Network Status" of the "CC-Link IE Field Diagnostics" window, select the icon of the station for which temporary error invalid station setting is to be canceled.
2. Right-click the selected icon, and select "Ignoring Station Errors Setting for the Selected Station".

The text background turns white. The temporary error invalid station setting is canceled.

■Selecting the target module in the "Enable/Disable Ignore Station Errors" window

Temporary error invalid station setting can be configured to multiple device stations through the "Enable/Disable Ignore Station Errors" window all at once.

To set a temporary error invalid station, follow the steps below.



1. Click the [Enable/Disable Ignore Station Errors] button in the "CC-Link IE Field Diagnostics" window.

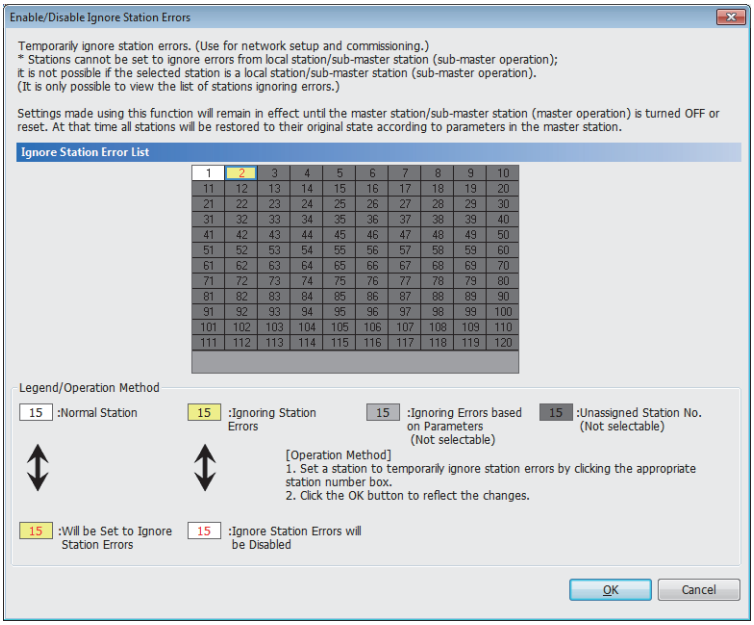
"Enable/Disable Ignore Station Errors" window is displayed.

2. In "Ignore Station Error List", click the number of the target station. The text turns red and the background turns yellow.

Only stations for which temporary error invalid station setting has not been configured can be selected. The background of available modules is white.

3. Click the [OK] button to temporarily set the station as an error invalid station.

To cancel temporary error invalid station setting, follow the steps below.



1. Open the "Enable/Disable Ignore Station Errors" window in the same way as described in the procedure for setting a temporary error invalid station.

2. In "Ignore Station Error List", click the number of the target station. The text turns red and the background turns white.

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

3. Click the [OK] button to cancel temporary error invalid station setting.

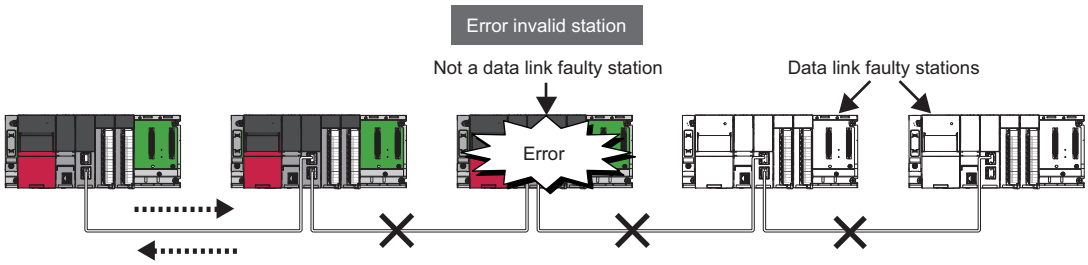
■Stations which cannot be set as a temporary error invalid station

The temporary error invalid station setting is not available for the following stations.

- A device station for which the reserved station setting is temporarily canceled
- A submaster station

■Setting a temporary 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

"Network Configuration Settings" of "Basic Settings" does not reflect temporary error invalid station setting.

■When the master station is reset or the system is powered off

The temporary error invalid station setting is ignored, and the device station returns to the status set in "Network Configuration Settings" of "Basic Settings of the master station.

■When a temporary error invalid station is disconnected from the network

The following status differs between the master station and local stations after the CPU module on the master station is reset or the system is powered off.

- ERR LED status
- SW00E0 to SW00E7 ('Temporary error invalid station setting status')

The difference can be corrected by the following procedure.

1. Reconnect the disconnected station.
2. Configure the temporary error invalid station setting, and cancel the setting.

■Checking the station number of an error invalid station

The station number of an error invalid station can be checked in the "Enable/Disable Ignore Station Errors" window.

■When a system switching monitoring target station is set as temporary error invalid station

The temporary error invalid station setting can also be performed on system switching monitoring target stations. When a system switching monitoring target station is set as a temporary error invalid station, the settings for system switching monitoring target station become invalid and that station will no longer issue a system switching request even if a communication error occurs.

When the temporary error invalid station settings have been disabled, the station starts functioning as a system switching monitoring target station again.

■For execution in a redundant line configuration

Enable/disable temporary error invalid station setting for stations on the networks of both systems. When this has been executed only for a station on the network of one system, since temporary error invalid station setting has not been enabled/disabled for a station on the network of the other system, if system switching occurs, the state of not having enabled/disabled temporary error invalid station setting arises.

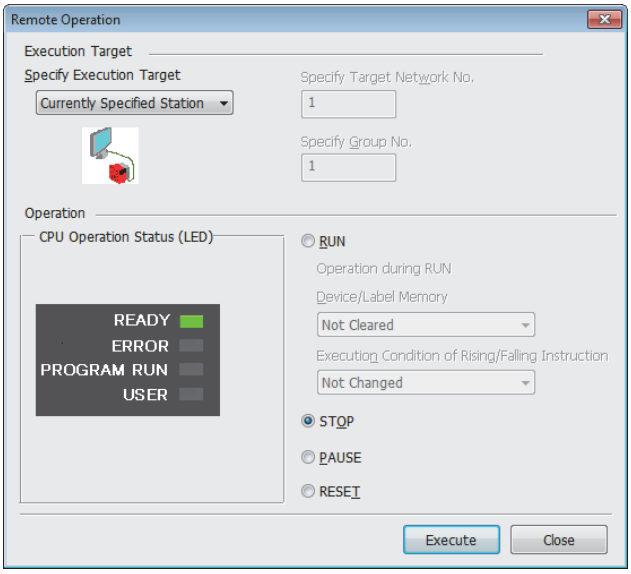
Remote Operation

This function executes remote operations (such as RUN, STOP, and RESET operations) to the station selected on the "CC-Link IE Field Diagnostics" window, from the engineering tool.

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.

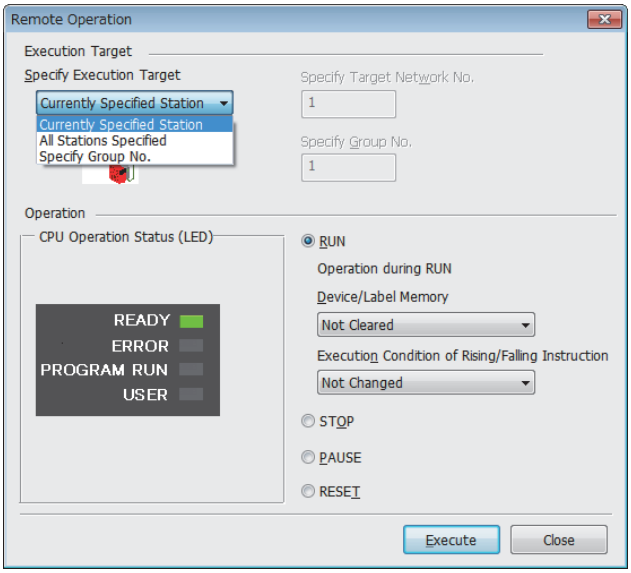
■Procedure

To perform remote operations, follow the steps below.



1. Select the module where the remote operations are performed in the CC-Link IE Field Network diagnostics.
2. Click the [Remote Operation] button in the "CC-Link IE Field Diagnostics" window. Or right-click a module icon in the "Network Status" and click [Remote Operation].

"Remote Operation" window is displayed.



3. Specify the target station in "Specify Execution Target".
   - "Currently Specified Station": The remote operations are performed only to the CPU module on the station selected in the CC-Link IE Field Network diagnostics.
   - "All Stations Specified": The remote operations are performed on all stations on the network selected under "Specify Execution Target".
   - "Specify Group No.": When the target station is on CC-Link IE Field Network, remote operations cannot be performed by selecting this item. If performed, an error will occur.
4. Select a remote operation (RUN, STOP, PAUSE, or RESET) to be performed in "Operation".*1
5. Click the [Execute] button to perform the remote operation.

*1 To perform remote RESET, preset "Remote Reset Setting" under "Operation Related Setting" of "CPU Parameter" to "Enable".

Point

For details on the remote operations, refer to user's manual for the CPU module used.

4.4 Troubleshooting by Symptom

This section describes troubleshooting method by symptom. Perform these troubleshooting if data link cannot be performed even though no error is detected in the master/local module. If an error has occurred in the master/local module, identify the error cause using the engineering tool. (☞ Page 275 Checking the Network Status)

When cyclic transmission cannot be performed

The following lists the actions to be taken if cyclic transmission cannot be performed.

Check item	Action
Is the D LINK LED of the master or device station turned off or flashing?	Perform troubleshooting for when the D LINK LED turns off or is flashing. (☞ Page 268 When the D LINK LED turns off or is flashing)
Is a device station specified as a reserved station in "Network Configuration Settings" of "Basic Settings" of the master station?	Cancel the reserved station setting. (☞ Page 141 Network Configuration Settings)
Is "RX/RY Setting" or "RWw/RWr Setting" for device stations configured in "Network Configuration Settings" under "Basic Settings" of the master station?	Set RX/RY or RWw/RWr range for each device station. (☞ Page 148 Refresh Settings)
Do the station numbers set in "Network Configuration Settings" under "Basic Settings" of the master station match those set for corresponding device stations?	Correct station numbers.
Do the station types set in "Network Configuration Settings" under "Basic Settings" of the master station match those set for the connected device stations?	Correct the station type set in "Network Configuration Settings" under "Basic Settings" of the master station.
Is the range set in "Refresh Settings" of "Basic Settings" correct?	Correct the range setting in "Refresh Settings" of "Basic Settings". (☞ Page 148 Refresh Settings)
Is any refresh target device in "Refresh Settings" of "Basic Settings" overlapped with that of another network module?	Correct the range setting in "Refresh Settings" of "Basic Settings". (☞ Page 148 Refresh Settings)
Are the transfer ranges set in "Interlink Transmission Settings" of "Application Settings" correct?	Correct the transfer ranges set in "Interlink Transmission Settings" of "Application Settings". (☞ Page 161 Interlink Transmission Settings)
Are the source and destination modules set in "Interlink Transmission Settings" of "Application Settings" correct?	Correct the source and destination modules set in "Interlink Transmission Settings" of "Application Settings". (☞ Page 161 Interlink Transmission Settings)
Is the station number of the master/local module duplicated with any of the other stations?	Change the duplicated station number.

If the above action does not solve the problem, perform the module communication test to check for hardware failure. (☞ Page 273 Module communication test)

When transient transmission cannot be performed

The following lists the actions to be taken if transient transmission cannot be performed with the target station, and the engineering tool cannot perform monitoring.

Check item	Action
Is the D LINK LED of the master or device station turned off?	Perform troubleshooting for when the D LINK LED turns off or is flashing. (☞ Page 268 When the D LINK LED turns off or is flashing)
Is the baton pass status of the destination normal?	In the CC-Link IE Field Network diagnostics, identify the cause of the error and take action. (☞ Page 275 Checking the Network Status)
Are the following control data of the dedicated instruction correct? • CPU type of the target module • Target 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.
Is the network number duplicated on the network?	Change the duplicated network number.
Is a communication path by the dynamic routing function is determined?	• Power on the system and start transient transmission after a while. • When "Dynamic Routing" under "Application Settings" of the station on the communication path is set to "Disable", change it to "Enable".
Does the relay station to be passed support the dynamic routing function?	If the relay station to be passed does not support the dynamic routing function, set all the stations on the communication path in "Routing Setting" of "CPU Parameter".
Are multiple link dedicated instructions with same channel setting executed simultaneously?	• Set different channel to each instructions. • Shift the execution timing of the link dedicated instructions.

If the above actions do not solve the problem, perform the following tests to check for an error.

- Module communication test (☞ Page 273 Module communication test)
- Communication Test (☞ Page 43 Communication test)

When a station is disconnected from the network

The following is the 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.
Is a media converter that supports the MAC address learning function being used in a ring topology?	Use a media converter that does not support the MAC address learning function.

If the above actions do not solve the problem, perform the following tests to check for an error.

- Module communication test (☞ Page 273 Module communication test)
- Cable test (☞ Page 292 Cable Test)

When a station is repeatedly disconnected and reconnected

The following lists the actions to be taken when a station in data link is repeatedly disconnected and reconnected.

Check item	Action
Are 1000BASE-T-compliant Ethernet cable used?	Replace the cables with 1000BASE-T-compliant Ethernet cables. (📖 MELSEC iQ-R Ethernet/CC-Link IE User's Manual (Startup))
Is the station-to-station distance 100m or less?	Change the station-to-station distance to 100m or less.
Does the cabling condition (bending radius) meet the specifications?	Refer to the manual for the Ethernet cable, and correct the bending radius.
Is any Ethernet cable disconnected?	Replace the Ethernet cable.
Is the switching hub used operating normally?	• Check if a 1000BASE-T-compliant switching hub is used. (📖 MELSEC iQ-R Ethernet/CC-Link IE User's Manual (Startup)) • Power off and on the switching hub.

If the above actions do not solve the problem, perform the following tests to check for an error.

- Module communication test (☞ Page 273 Module communication test)
- Cable test (☞ Page 292 Cable Test)

When communication is unstable

The following lists the actions to be taken when link scan time or transmission delay time is long or when a transient transmission timeout occurred.

Check item	Action
■RJ71EN71, RnENCPU Is the L ER LED of the master or device station on? ■RJ71GF11-T2 Is the L ERR LED of the master or device station on?	■RJ71EN71, RnENCPU Perform troubleshooting for when the L ER LED turns on. (☞ Page 269 When the L ER LED turns on) ■RJ71GF11-T2 Perform troubleshooting for when the L ERR LED turns on. (☞ Page 269 When the L ERR LED turns on)
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 P1 or P2, perform a cable test and a module communication test.
Is there any noise affecting the system?	Check the wiring condition.

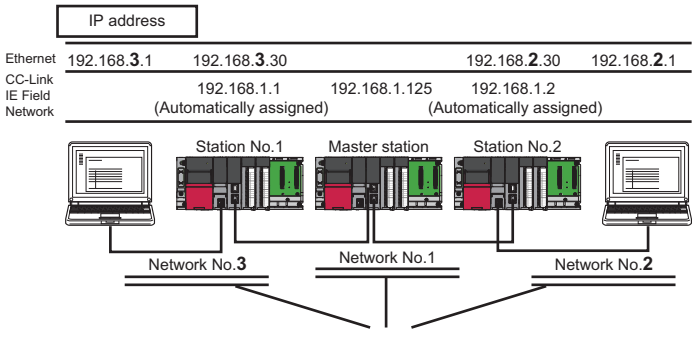
If the above actions do not solve the problem, perform the following tests to check for an error.

- Module communication test (☞ Page 273 Module communication test)
- Cable test (☞ Page 292 Cable Test)

When IP communications cannot be performed using the IP packet transfer function

Before troubleshooting the problem as listed below, perform the IP communication test and take actions according to the error code. (☞ Page 52 IP communication test)

If the problem cannot be solved using the IP communication test, take actions listed below.

Check item	Action
Is the IP address of the connected Ethernet device correct?	Set an IP address meeting the IP address setting rules. (☞ Page 48 Rules for the IP address setting)
Is the IP address already in use?	• For the Ethernet device, set the IP address different from that of other devices on the network, such as an Ethernet-equipped module, master/local module, and Ethernet adapter module. • Disconnect the Ethernet device from the line and execute the PING command to the IP address of the disconnected Ethernet device. If a response is received even though the device is disconnected, the IP address is already in use. Change the IP address.
Has a communication time over error occurred in the IP communication test?	• When "Dynamic Routing" under "Application Settings" is set to "Disable", correct the relay station network number in "Routing Setting" of "CPU Parameter". • When "Dynamic Routing" under "Application Settings" is set to "Enable", check 'Communication path determination status' (Un\G24480 to Un\G24495) to check that the communication path to the transfer destination network number which is set in the third octet of the Ethernet device IP address is determined.
Have the routing parameters correctly been set? (Only when "Dynamic Routing" under "Application Settings" is set to "Disable")	• Correct "Routing Setting" of "CPU Parameter". • When the first and second octets of the IP address are the same for the request source device, request destination device, and modules between them, set the routing parameters so that the third octet of the IP address of the Ethernet device is used as the target station network number.
Is the network number of the Ethernet device side (the third octet of the IP address) the same as that of modules and another Ethernet device? (This applies only when the request source external device, request destination external device, and modules between them have the same first and second octets of the IP address.)	Change the network number of the Ethernet device side (the third octet of the IP address) to the one different from that of modules and another Ethernet device.  Change the network numbers to those not used for other stations.

Check item	Action
Is the CC-Link IE Field Network gateway setting correct? (This applies only when the request source device, request destination device, and modules between them do not have the same first and second octets of the IP address.)	• Check and correct the setting in the module compatible with the CC-Link IE Field Network gateway setting. (📖 Manual for the module compatible with the CC-Link IE Field Network gateway setting used) • When "Dynamic Routing" under "Application Settings" is set to "Disable", set the communication path to the CC-Link IE Field Network gateway setting station in "Routing Setting" of "CPU Parameter". • When "Dynamic Routing" under "Application Settings" is set to "Enable", check 'Communication path determination status' (Un\G24480 to Un\G24495) to check that the communication path to the transfer destination network number which is set in the third octet of the Ethernet device IP address is determined.
Are settings configured in modules connected to the Ethernet device correct? • First and second octets of the IP address • Subnet mask pattern • Default router IP address	Check and correct the setting in the module connected to the Ethernet device.
Is the firewall or proxy server setting enabled on the Ethernet device?	Check and correct the settings on the Ethernet device. (E.g. Is a response to the PING command (ICMP echo request) enabled?)
Is the antivirus software on the Ethernet device blocking the communication?	Check and correct the antivirus software settings on the Ethernet device. • Is the security setting level of the antivirus software low? • Is a response to the PING command (ICMP echo request) enabled in the firewall settings?
When the Ethernet device has two or more Ethernet ports, have different default gateway settings been configured for each Ethernet port?	• Set the same IP address in the default gateway of each Ethernet port. • Set the communication route on the Ethernet device side using the route command so that communications using the IP packet transfer function can be performed via the module connected to the Ethernet device. (This applies only to Ethernet devices that have the route command, such as Microsoft® Windows®.) When the gateway setting is completed, execute the PING command from the Ethernet device to check whether communications can be performed.
Is the switching hub used operating normally?	• If an error has occurred in the switching hub, eliminate the error cause. • If communications cannot be performed although no error has occurred in the switching hub, replace the switching hub.*1
Has any device on the line, such as an Ethernet device, Ethernet-equipped module, Ethernet adapter module, and switching hub, been replaced? (This applies only when the device has been replaced by the one having the same IP address.)	Reset the device on the line.*2

*1 When the device has been reconnected to the switching hub, or the switching hub has been replaced, it may take some time to read the MAC address. If so, retry communication from the Ethernet device again after a while or power on the switching hub again.

*2 A device on Ethernet has a table of IP addresses and their corresponding MAC address, called "ARP cache". When a device on the line is replaced by the one having the same IP address, the MAC address in the ARP cache is different from that of the replaced device; therefore, communications may not be normally performed. The "ARP cache" is updated by resetting the device or after a while. The time varies depending on the device.

If the above actions do not solve the problem, perform the following tests to check for an error.

- Module communication test (☞ Page 273 Module communication test)
- Cable test (☞ Page 292 Cable Test)

Safety communications cannot be performed

The following lists the actions to be taken if safety communications cannot be performed.

Check item	Action
Is a device station (safety station) specified as a reserved station in "Network Configuration Settings" of "Basic Settings" of the master station?	Cancel the reserved station setting of the device station (safety station). (☞ Page 141 Network Configuration Settings)
Do the station number, station type, and model name of communication destination set in "Safety Communication Setting" under "Application Settings" match those set in "Network Configuration Settings" under "Basic Settings" of the master station?	In "Safety Communication Setting" under "Application Settings", set the station number, station type, and model name set in "Network Configuration Settings" under "Basic Settings" of the master station.
Is safety connection set among safety stations that perform safety communication?	Set safety connection among safety stations that perform safety communications in "Safety Communication Setting" under "Application Settings".
Is the same open method set among safety stations that perform safety communication?	Set one of the safety stations "Active" and the other "Passive" in "Safety Communication Setting" under "Application Settings".
Is the setting value of "Sending Interval Monitoring Time" in "Safety Communication Setting" under "Application Settings" correct?	Correct the setting value of "Sending Interval Monitoring Time" in "Safety Communication Setting" under "Application Settings". (☞ Page 406 Transmission interval monitoring time)
Is the setting value of "Safety Refresh Monitoring Time" in "Safety Communication Setting" under "Application Settings" correct?	Correct the setting value of "Safety Refresh Monitoring Time" in "Safety Communication Setting" under "Application Settings". (☞ Page 408 Safety refresh monitoring time)
Does safety station interlock status indicate interlock state?	• Correct the setting value of "Sending Interval Monitoring Time" in "Safety Communication Setting" under "Application Settings". (☞ Page 406 Transmission interval monitoring time) • Correct the setting value of "Safety Refresh Monitoring Time" in "Safety Communication Setting" under "Application Settings". (☞ Page 408 Safety refresh monitoring time) • Release the interlock state by using Interlock release request for each safety connection. (📖 MELSEC iQ-R CPU Module User's Manual (Application))
Is a standard station set for the station number of the communication destination in "Safety Communication Setting" under "Application Settings"?	Set a safety station for the station number of the communication destination in "Safety Communication Setting" under "Application Settings".
Is "Safety Data Transfer Device Setting" in "Safety Communication Setting" under "Application Settings" correctly set?	Correct "Safety Data Transfer Device Setting" set in "Safety Communication Setting" under "Application Settings" among safety stations that perform safety communication.
When safety communications are performed with the remote device station (safety station), is "RWw/RWr Setting" in "Network Configuration Settings" of "Basic Settings" set to a number that is less than the number of points used in the system?	Set "RWw/RWr Setting" in "Network Configuration Settings" of "Basic Settings" to the number of points used in the system. (☞ Page 121 Safety communications between the master station (safety station) and remote device station (safety station))
Has a cyclic transmission stop been executed on the master station?	Restart the stopped cyclic transmission. (☞ Page 294 Link Start/Stop)
When safety communications are performed with the remote device station (safety station), has the safety module validation been performed?	Perform the safety module validation. (📖 Manual for the remote device station used)
Is the safety communication function used in a system containing the submaster station?	Review the system configuration and use the safety communication function in a system not containing the submaster station.
Is the safety connection set to the module set to the SIL2 mode? And is the module mounted on the intelligent device station for performing safety communications with the intelligent device station?	Mount the module set to the SIL2 mode in accordance with the safety connection setting.
Has the safety module validation been performed on the module set to the SIL2 mode and mounted on the intelligent device station for performing safety communications with the intelligent device station?	In "Network Configuration Settings" under "Basic Settings" of the master station, perform the safety module validation of the module that is set to the SIL2 mode and mounted on the target intelligent device station for the safety communications.
Is the target intelligent device station for the safety communications redundant in the redundant master station configuration?	Check the setting of the target intelligent device station for the safety communications in "Network Configuration Settings" under "Basic Settings" of the master station.
When safety communications with the intelligent device station (safety station) are performed, is the safety connection setting of the master station (safety station) different from that of the intelligent device station (safety station)?	Match the setting of the master station (safety station) with that of the intelligent device station (safety station).
Has the momentary power failure occurred on the intelligent device station (safety station)?	• Take measures for momentary power failure. (📖 MELSEC iQ-R Module Configuration Manual) • Check and correct the transmission interval monitoring time. (📖 MELSEC iQ-R CC-Link IE Field Network Remote Head Module User's Manual (Application))
Is the master/local module with firmware version "33" or later being used as the master station for performing safety communications with the MR-J4-_GF_servo amplifier?	Use the master/local module with firmware version "33" or later as the master station.

Check item	Action
Does the required safety protocol version support the Safety CPU, SIL2 Process CPU, RJ71GF11-T2, or external device?	Replace the Safety CPU, SIL2 Process CPU, RJ71GF11-T2, remote device station (safety station), or intelligent device station (safety station) with a product supported by the required safety protocol version, and change the parameters. (☞ Page 441 Combination when the Safety Communication Function Is Used (For a System Using the Safety CPU), ☞ Page 446 Combination when the Safety Communication Function Is Used (For a System Using the SIL2 Process CPU))
Does the setting value of "Safety Protocol Version" in "Safety Communication Setting" under "Application Settings" match that of the communication destination?	Match the setting value of "Safety Protocol Version" in "Safety Communication Setting" under "Application Settings" to that of the communication destination.

If the above action does not solve the problem, perform the module communication test to check for hardware failure. (☞ Page 273 Module communication test)

When redundant system function is used

■Error occurs in a Process CPU (redundant mode) or a SIL2 Process CPU (redundant mode).

If an error occurs in a Process CPU (redundant mode) or a SIL2 Process CPU (redundant mode) in the redundant system, check the following items.

Check item	Action
When making a device station redundant, is the module model name correctly set in "Network Configuration Settings" under "Basic Settings"?	Check the module model name set in "Network Configuration Settings" under "Basic Settings." (☞ Page 141 Network Configuration Settings)
Does the RJ71GF11-T2 used support the redundant system function?	Use the RJ71GF11-T2 supporting the redundant system function. (☞ Page 440 Added and Enhanced Functions)

■System switching cannot be performed

When system switching cannot be performed by a system switching cause of the RJ71GF11-T2, check the following.

Check item	Action
Is the power supply module, Process CPU (redundant mode), or redundant function module of the standby system operating normally?	Perform troubleshooting on the power supply module, Process CPU (redundant mode), or redundant function module of the standby system. (📖 MELSEC iQ-R CPU Module User's Manual (Application))
Is the standby system RJ71GF11-T2 connected to the network?	Check the wiring condition and put the network of the standby system in normal condition.
Has a system switching request been issued to the Process CPU (redundant mode)?	• Check the event history on the RJ71GF11-T2 mounted on the control system Process CPU (redundant mode) to see if a system switching request has been issued. (☞ Page 271 Checking the Module Status) • Check an error on the RJ71GF11-T2 mounted on the control system Process CPU (redundant mode) and correct the error. (☞ Page 271 Checking the Module Status)
For system switching to be triggered by a communication error in a specific device station, is that station set as a system monitoring target station?	Check the system monitoring target station setting in "Network Configuration Settings" under "Basic Settings." (☞ Page 141 Network Configuration Settings)
Is 'Device station addition acceptance status' (SB0081) turned on?	Turn off 'Device station addition start flag' (SB0014).

■Cyclic data is turned off when system switching occurs.

If cyclic data is turned off, or momentarily turned off when system switching occurs, check the following items.

Check item	Action
Is the own station send range within the tracking range?	Check whether the cyclic data send range is included in the tracking target. (📖 MELSEC iQ-R CPU Module User's Manual (Application))
Is the interlock used in the program correct?	Take either of the following action. ■Correct the program to provide an interlock with the following module labels. (☞ Page 174 Cyclic transmission program) • 'Data link error status of own station' (SB0049) • 'Master/submaster function operation status of own station' (SB004E) • 'Redundant system data link error status of each station' (SB01B0) • 'Redundant system data link error status of master station' (SB01B1) • 'Redundant system data link error status of station No.0' (SB01BF) • 'Redundant system data link status of each station' (SW01B0 to SW01B7) ■Check whether "Setting to wait cyclic data receive after system switching" of the CPU parameter is disabled or not. If the setting is disabled, enable it. (📖 MELSEC iQ-R CPU Module User's Manual (Application))

■Data link is not performed with the pairing-set device station.

If data link is not performed with the pairing-set device station, check the following items.

Check item	Action
Does the pairing-set device station support the redundant system function?	Check 'Redundant function information of each station' (Un\G24504 to Un\G24511) and replace the device station not supporting the redundant system function.
Is the pairing-set device station set to the redundant system configuration?	Check 'Pairing setting status of each station' (SW00D8 to SW00DF) and set the pairing-set device station to the redundant system configuration.

Communication path switch at an instantaneous interruption is not enabled.

If the communication path switch at an instantaneous interruption does not become enabled, check the following items.

Check item	Action
Is "Network Topology" in "Basic Settings" set to "Ring"?	Set "Network Topology" in "Basic Settings" to "Ring".
Is the operation performed in the master operating station?	Perform the operation in the master operating station.

Loopback continues even though no cable disconnection or faulty station exists.

If the loopback continues even though no cable disconnection or faulty station exists, check the following item.

Check item	Action
Is the loopback performed by the communication path switch at an instantaneous interruption?	Turn on 'Clear loopback by communication path switch at an instantaneous interruption' (SB0005) to clear the loopback by the function.

Station number is duplicated.

If the station number is duplicated, check the following items.

Check item	Action
Is the station number the same as another station's?	Change the station number of the other station that has the duplicate station number.
When replacing the device station, was any station other than the one being replaced disconnected?	Perform either of the following operations. • Click the [Update] button in the CC-Link IE Field Network diagnostics. (☞ Page 283 Diagnostics window) • Reset the CPU module of the master station or turn off and on the power of the master station. Then, reset the device station whose station number is duplicated or turn off and on its power.
When replacing the device station, was the connection position changed?	
Were the device stations on the same network switched?	

If the above actions do not solve the problem, perform the following tests to check for an error.

- Module communication test (☞ Page 273 Module communication test)
- Cable test (☞ Page 292 Cable Test)

4.5 List of Error Codes

This section lists the error codes, error details and causes, and action for the errors occur in the processings for data communication between master/local module and external devices or caused by processing requests from the CPU module on the own station.

Error codes are classified into major error, moderate error, and minor error, and can be checked in the [Error Information] tab of the "Module Diagnostics" window. (☞ Page 271 Error Information)

Error code (Hex)	Error details and causes	Action	Detailed Information
1080H	The number of writes to the flash ROM has exceeded 100000.	Replace the module.	—
1800H	A connection failure was detected in the network.	Correct the wiring status.	—
1811H	An error was detected in the CPU module.	Check the error of the CPU module and take action using the module diagnostics of the engineering tool.	—
1830H	Number of reception requests of transient transmission (link dedicated instruction) exceeded upper limit of simultaneously processable requests.	Lower the transient transmission usage frequency, and then perform again.	—
1845H	Too many processings of transient transmission (link dedicated instruction) and cannot perform transient transmission.	Correct the transient transmission execution count.	—
1D01H	"Network Synchronous Communication" in "Network Configuration Settings" under "Basic Settings" of the master station does not match the network synchronization communication setting of the controlled device station (synchronization enable/disabled).	• Set the "Network Synchronous Communication" for the corresponding local station to the "Synchronous" in "Network Configuration Settings" under "Basic Settings" of the master station. • Set the corresponding module to the same setting as the master station using the local station's inter-module synchronization setting.	Parameter information • Parameter storage location • Parameter type • I/O No. • Parameter No.
	The device station where the "Network Synchronous Communication" in "Network Configuration Settings" under "Basic Settings" of the master station is set to "Synchronous" does not support "Network Synchronous Communication".	When using "Network Synchronous Communication", use a device that supports the communication. When not using "Network Synchronous Communication", set "Network Synchronous Communication" in "Network Configuration Settings" under "Basic Settings" of the master station to "Asynchronous".	
1D10H	Cyclic transmission skip occurred.	• Increase the value set in "Fixed Scan Interval Setting of Inter-module Synchronization" under "Inter-module Synchronous Setting" in the [Inter-module Synchronous Setting] tab of the "System Parameter" window so that the execution time of synchronization interrupt program does not exceed the inter-module synchronization cycle. • Reduce the program processing time by reducing the program volume so that the execution time of synchronization interrupt program does not exceed the inter-module synchronization cycle. • Reduce the refresh processing time by reducing the data targeted for synchronization refreshing so that the execution time of synchronization interrupt program does not exceed the inter-module synchronization cycle. • Set modules not requiring synchronization to asynchronous so that the execution time of synchronization interrupt program does not exceed the inter-module synchronization cycle.	—
1D20H	The module cannot normally communicate with the synchronized device station on CC-Link IE Field Network.	• Set the inter-module synchronization cycle to longer than the current value in "Fixed Scan Interval Setting of Inter-module Synchronization" under "Inter-module Synchronous Setting" in the [Inter-module Synchronous Setting] tab of the "System Parameter" window. • Check if the switching hub and the cables are connected properly. • After taking the above actions, power on the system again or reset the CPU module.	—

Error code (Hex)	Error details and causes	Action	Detailed Information
20E0H	The module cannot communicate with the CPU module.	The hardware failure of the CPU module may have been occurred. Please consult your local Mitsubishi representative.	—
2220H	The parameter setting is corrupted.	Check the detailed information of the error by executing module diagnostics using the engineering tool, and write the displayed parameter. If the error occurs again even after taking the above, the possible cause is a hardware failure of the module. Please consult your local Mitsubishi representative.	Parameter information • Parameter type
2221H	The set value is out of the range. Or the parameter of the master station that requires the reset of the device station is changed.	• Check the detailed information of the error by executing module diagnostics using the engineering tool, and correct the parameter setting corresponding to the displayed number. • When the parameter No. is "0101", the cycle value which is not applicable to the device station is set in "Fixed Scan Interval Setting of Inter-module Synchronization" under "Inter-module Synchronous Setting" in the [Inter-module Synchronous Setting] tab of the "System Parameter" window. Refer to the manual for the device station used, and correct the setting. When the "Network Synchronous Communication" in "Network Configuration Settings" under "Basic Settings" of the master station is changed, power off and on or reset the device station.	Parameter information • Parameter type • I/O No. • Parameter No. • Network No. • Station No.
24C0H to 24C3H	An error was detected on the system bus.	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the error occurs again even after taking the above, the possible cause is a hardware failure of the module, base unit, or extension cable. Please consult your local Mitsubishi representative.	System configuration information • I/O No. • Base No. • Slot No. • CPU No.
24C6H	An error was detected on the system bus.	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the error occurs again even after taking the above, the possible cause is a hardware failure of the module, base unit, or extension cable. Please consult your local Mitsubishi representative.	—
2600H	The cyclic processing does not finish before the start timing for the next inter-module synchronization cycle.	• Increase the value set in "Fixed Scan Interval Setting of Inter-module Synchronization" under "Inter-module Synchronous Setting" in the [Inter-module Synchronous Setting] tab of the "System Parameter" window so that the link scan time will not exceed the inter-module synchronization cycle. • Reduce the number of cyclic assignment points and the number of connected device modules, and decrease the link scan time.	—
2610H	An inter-module synchronization signal error (synchronization loss) was detected.	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the error occurs again even after taking the above, the possible cause is a hardware failure of the module, base unit, or extension cable. Please consult your local Mitsubishi representative.	—

Error code (Hex)	Error details and causes	Action	Detailed Information
3000H	Any of following items are set in the module which is set as a target in "Inter-module Synchronous Setting" in the [Inter-module Synchronous Setting] tab of the "System Parameter" window. • "Setting Method" under "Station No." in "Required Settings" is set to "Program". • "Setting Method of Basic/Application Settings" under "Parameter Setting Method" in "Required Settings" is set to "Program". • "Station Type" under "Station Type" in "Required Settings" is set to "Submaster Station". • "Network Topology" in "Basic Settings" is set to "Ring". • "Link Scan Mode" under "Supplementary Cyclic Settings" in "Application Settings" is set to "Constant Link Scan" or "Sequence Scan Synchronous Setting". • A station in which "Station Type" is set to "Submaster station" is set in "Network Configuration Settings" of "Basic Settings".	Correct parameter shown in cause.	Parameter information • Parameter type • I/O No. • Parameter No.
	Although a device station in which "Network Synchronous Communication" in "Network Configuration Settings" of "Basic Settings" is set to "Synchronous" exists, the system parameter and control CPU are in the any of following states. • The master/local module is not set as the target module in "Inter-module Synchronous Setting" in the [Inter-module Synchronous Setting] tab of the "System Parameter" window. • The control CPU is a CPU module in which the inter-module synchronization function cannot be used.		
3001H	• A station with the same station number was found in the same network. • Multiple master stations and submaster stations were detected in the same network.	Correct the station number or station type of the station where the error was detected. After taking the above actions, power off and on or reset all stations where the error was detected.	Parameter information • Parameter type • I/O No. • Parameter No.
	A station of CC-Link IE Controller Network (Ethernet cable) was found in the same network.	Divide it into CC-Link IE Controller Network (Ethernet cable) and the network. After taking the above actions, power off and on or reset all stations where the error was detected.	
3004H	The number of points set in "RWw/RWr Setting" in "Network Configuration Settings" of "Basic Settings" for the safety station is less than the number of points used in the system. The number of points used in the system: The number of points used in the safety communications with the version set in "Safety Protocol Version" in "Safety Communication Setting" under "Application Settings".	Refer to the manual for the communication destination and take the following actions. • In "RWw/RWr Setting" in "Network Configuration Settings" of "Basic Settings", set the number of points for the safety station to larger than or equal to the number of points used in the safety communications. • Change the version of "Safety Protocol Version" in "Safety Communication Setting" under "Application Settings" to the same version of the communication destination.	Parameter information • Parameter type • I/O No. • Parameter No. • Network No. • Station No.
3005H	Parameters for the master station and submaster station do not match.	Match the following parameters for the master station and submaster station. • "Network Configuration Settings" in "Basic Settings" • "Network Topology" in "Basic Settings" • "Link Scan Mode" under "Supplementary Cyclic Settings" in "Application Settings" • "Constant Link Scan Time" of "Link Scan Mode" under "Supplementary Cyclic Settings" in "Application Settings" • "Station-based Block Data Assurance" under "Supplementary Cyclic Settings" in "Application Settings" • "IP Address" in "Application Settings" • "Communication Mode" in "Application Settings" • "Redundant System Settings" in "Application Settings"	Parameter information • Parameter type • I/O No. • Parameter No. • Network No. • Station No.

Error code (Hex)	Error details and causes	Action	Detailed Information
3006H	Pairing is not set to the stations in a redundant system.	Check the pairing setting in "Network Configuration Settings" under "Basic Settings" of the master station.	Parameter information • Parameter type • I/O No. • Parameter No. • Network No. • Station No.
3007H	Pairing is set to the stations not included in a redundant system.	Check the pairing setting in "Network Configuration Settings" under "Basic Settings" of the master station.	Parameter information • Parameter type • I/O No. • Parameter No. • Network No. • Station No.
3008H	• "RJ71GF11-T2" is selected for the module name in a redundant system. • "RJ71GF11-T2 (MR)", "RJ71GF11-T2 (SR)", or "RJ71GF11-T2 (LR)" is selected for the module name in a system other than a redundant system.	• When using the module in a redundant system, select "RJ71GF11-T2 (MR)", "RJ71GF11-T2 (SR)", or "RJ71GF11-T2 (LR)" for the module name in the "Add New Module" window. • When using the module in a system other than a redundant system, select "RJ71GF11-T2" for the module name in the "Add New Module" window.	Parameter information • Parameter type • I/O No. • Parameter No. • Network No. • Station No.
301FH	The safety protocol version set in "Safety Communication Setting" is not supported by the network module or CPU module (Safety CPU or SIL2 Process CPU).	• Check whether the safety protocol version setting is correct by referring to the detailed information (safety protocol version information) that displays an applicable safety protocol version for the combination of network module and CPU module (Safety CPU or SIL2 Process CPU) used. • When the setting is correct, replace the network module or CPU module (Safety CPU or SIL2 Process CPU) with a module that supports the set safety protocol version. • When the network module that supports only safety protocol version 1 is used, safety protocol version 0 is displayed on the safety protocol version information in the detailed information, and safety protocol version 1 can only be set.	Parameter information • Parameter type • I/O No. • Parameter No. • Network No. • Station No.
3040H	Response data of the dedicated instruction cannot be created.	• Increase the request interval. • Decrease the number of request nodes. • Wait for a response to the previous request before sending the next request. • Correct the timeout value.	—
31D0	In "Safety Communication Setting" under "Application Settings", safety protocol version 2 is selected for a communication destination that does not support safety protocol version 2.	Check whether safety protocol version 2 is set for a communication destination that supports safety protocol version 1.	Parameter information • Parameter type • I/O No. • Parameter No.
	The number of safety connections with the same communication destination that is set with safety protocol version 2 is set to 17 or more.	To perform safety communications with a communication destination that supports safety protocol version 2, re-import the project with fewer modules in SIL2 mode mounted on the remote head module, so that the number of safety connections with the same communication destination is 16 or fewer connections.	
3600H	The inter-module synchronization cycle setting does not match the master station setting.	Correct the parameter so that all modules performing inter-module synchronization have the same frequency setting.	Parameter information • Parameter type • I/O No. • Parameter No.
3601H	"Network Synchronous Communication" in "Network Configuration Settings" under "Basic Settings" of the master station does not match the inter-module synchronization target module of the own station.	Check the network configuration setting and check if inter-module synchronization is set.	Parameter information • Parameter type • I/O No. • Parameter No.

Error code (Hex)	Error details and causes	Action	Detailed Information
3602H	Inter-module synchronization cycle failure occurred between networks.	• Check the network status using the CC-Link IE Field Network diagnostics of the engineering tool, and take action. • Check if the switching hub and the cables are connected properly. • If the request source is on another network, check if the routing parameters are set correctly, and take action. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
3C00H to 3C03H	A hardware failure has been detected.	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the error occurs again even after taking the above, the possible cause is a hardware failure of the module, base unit, or extension cable. Please consult your local Mitsubishi representative.	—
3C0FH to 3C11H	A hardware failure has been detected.	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the error occurs again even after taking the above, the possible cause is a hardware failure of the module, base unit, or extension cable. Please consult your local Mitsubishi representative.	—
3C14H	A hardware failure has been detected.	Reset the CPU module, and run it again. If the error occurs again even after taking the above, the possible cause is a hardware failure of the error module or CPU module. Please consult your local Mitsubishi representative.	—
3C2FH	An error was detected in the memory.	Reset the CPU module, and run it again. If the error occurs again even after taking the above, the possible cause is a hardware failure of the error module. Please consult your local Mitsubishi representative.	—
3E00H	An error was detected in the network module.	Reset the CPU module, and run it again. If the error occurs again even after taking the above, the possible cause is a hardware failure of the error module. Please consult your local Mitsubishi representative.	—
3E01H	Network type of the own station is unexpected setting.	Rewrite the module parameter using the engineering tool. If the error occurs again even after taking the above, the possible cause is a hardware failure of the error module. Please consult your local Mitsubishi representative.	—
4000H to 4FFFH	Errors detected by the CPU module (📖 MELSEC iQ-R CPU Module User's Manual (Application))		
D000H	An error was detected in the network module.	Please consult your local Mitsubishi representative.	—
D038H	The target station specified in the IP communication test is not connected.	If the own station, target station, or relay station is disconnected from the network, identify the cause of the disconnection and take action.	—
D039H	There is a station that does not support the IP packet transfer function on the communication path of the IP communication test.	Check the station on the communication path of the IP communication test, and check whether the module in the station supports the IP packet transfer function.	—
D03BH	Enabling the remote device test function failed because the operating status of the CPU module is not in STOP state (except for a stop error occurrence).	Enable the remote device test function after the operating status of the CPU module changes to STOP state (except for a stop error occurrence).	—
D041H	The number of communication stations is incorrect.	• Check the network status using the CC-Link IE Field Network diagnostics of the engineering tool, and take action. • If the number of device stations (including a submaster station) per network is more than 120, reduce it to 120 or less.	—
D080H to D083H	An error was detected in the network module.	Please consult your local Mitsubishi representative.	—

Error code (Hex)	Error details and causes	Action	Detailed Information
D0A0H	Transmission response wait timeout has occurred in transient transmission.	• Check the network status using the CC-Link IE Field Network diagnostics of the engineering tool, and take action. • When the own station, target station, or relay station detected an error, identify the cause of the error and take action. • Lower the transient transmission usage frequency, and then perform again. • When "Communication Mode" in "Application Settings" of the master station (submaster station) is set to "High-Speed", change it to "Normal" and retry the operation. • Check if the switching hub and the cables at the request source are connected properly.	—
D0A1H	Transmission completion wait timeout has occurred in transient transmission.	• Check the network status using the CC-Link IE Field Network diagnostics of the engineering tool, and take action. • When the own station, target station, or relay station detected an error, identify the cause of the error and take action. • Lower the transient transmission usage frequency, and then perform again. • When "Communication Mode" in "Application Settings" of the master station (submaster station) is set to "High-Speed", change it to "Normal" and retry the operation. • Check if the switching hub and the cables at the request source are connected properly.	—
D0A2H	Transmission processing wait timeout has occurred in transient transmission.	• Lower the transient transmission usage frequency, and then perform again. • Check if the switching hub and the cables at the request source are connected properly.	—
D0A3H	Send processing of the transient transmission has failed.	• Check the network status using the CC-Link IE Field Network diagnostics of the engineering tool, and take action. • When the own station, target station, or relay station detected an error, identify the cause of the error and take action. • Correct the target station number of transient data, and retry the operation. • When the access destination is a module with a different network number, check if "Routing Setting" of "CPU Parameter" is correctly set.	—
D0A4H to D0A6H	Transient transmission failed.	• Check if the switching hub and the cables at the request source are connected properly. • Connect the cable to the other port on the request source, and retry the operation. • Lower the transient transmission usage frequency, and then perform again.	—
D0C0H	Reserved station specification was performed again during processing of the specification.	Retry the operation after a while.	—
D0C1H	Temporary reserved station cancel specification was performed again during processing of the specification.	Retry the operation after a while.	—
D0C4H	Temporary error invalid station setting was performed again during processing of the setting.	Retry the operation after a while.	—
D0C5H	Temporary error invalid station setting cancel specification was performed again during processing of the specification.	Retry the operation after a while.	—
D0D0H	Station number setting of the other stations has failed.	Retry the operation after a while.	—

Error code (Hex)	Error details and causes	Action	Detailed Information
D200H	When the transient transmission was executed, data was received twice.	• Check the network status using the CC-Link IE Field Network diagnostics of the engineering tool, and take action. • 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 set correctly, and take action.	—
D202H	The send buffer is full.	• Lower the transient transmission usage frequency, and then perform again. • When "Communication Mode" in "Application Settings" of the master station (submaster station) is set to "High-Speed", change it to "Normal" and retry the operation. • Check if the switching hub and the cables at the request source are connected properly.	—
D203H	The number of read data or write address of the transient transmission is incorrect.	Correct the read data or write address at the transient request source, and retry the operation.	—
D204H	The network number of transient transmission is incorrect.	• 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.	—
D205H	The target station number of transient transmission is incorrect.	Correct the target station number at the request source, and retry the operation.	—
D206H	The network number of transient transmission is incorrect.	• 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.	—
D207H	• In transient transmission, the number of relay to other networks exceeded seven. • The transient transmission was performed from the standby system of the redundant system.	• Change the system configuration so that the number of relay stations may be seven or less. • Check if "Routing Setting" of "CPU Parameter" is correctly set. • Perform the transient transmission from the control system.	—
D208H	The network number of transient transmission is incorrect.	• 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.	—
D209H	The target station number of transient transmission is incorrect.	Correct the target station number at the request source, and retry the operation.	—
D20AH	The target station number of transient transmission is incorrect.	Correct the target station number at the request source, and retry the operation.	—
D20BH	When there was no master station, specified master station was specified for transient transmission.	Correct the target station number at the request source, and retry the operation.	—
D20CH	When there was no master station, current master station was specified for transient transmission.	Correct the target station number at the request source, and retry the operation.	—
D20DH	Transmission completion wait timeout has occurred in transient data transmission.	• Check the network status using the CC-Link IE Field Network diagnostics of the engineering tool, and take action. • When the own station, target station, or relay station detected an error, identify the cause of the error and take action. • Lower the transient transmission usage frequency, and then perform again. • When "Communication Mode" in "Application Settings" of the master station (submaster station) is set to "High-Speed", change it to "Normal" and retry the operation. • Check if the switching hub and the cables at the request source are connected properly.	—
D20EH	The header information of transient transmission is incorrect.	Correct the header information at the request source, and retry the operation.	—

Error code (Hex)	Error details and causes	Action	Detailed Information
D20FH	In transient transmission, the command which cannot be requested to all or a group of stations was executed with all stations specification or group specification.	Check that the command can be requested to all or a group of stations at the request source, and retry the operation.	—
D210H	The target station number of transient transmission is incorrect.	Correct the header information at the request source, and retry the operation.	—
D211H	Transient transmission was performed when the station number of the own station has not been set yet.	Set the station number using the UINI instruction, and perform transient transmission again.	—
D212H	Transient transmission failed.	• Check if the switching hub and the cables at the request source are connected properly. • Connect the cable to the other port on the request source, and retry the operation. • Lower the transient transmission usage frequency, and then perform again.	—
D213H	• The command of transient transmission is incorrect. • The CC-Link IE Field Network diagnostics was used for the network to which the relay receiving station belongs.	• Correct the request command at the request source, and retry the operation. • Review the connection destination so that the CC-Link IE Field Network diagnostics is used for the network to which the relay sending station belongs.	—
D214H	The data length of transient transmission is incorrect.	Correct the data length at the transient request source, and retry the operation.	—
D215H	The module operation mode is set to a mode in which transient transmission cannot be executed.	Change "Module Operation Mode" in "Application Settings" to "Online", and retry the operation.	—
D216H	The command of transient transmission is incorrect.	Correct the request command at the request source, and retry the operation.	—
D217H	The command of transient transmission is incorrect.	Correct the request command at the request source, and retry the operation.	—
D218H	The number of read/write data of transient transmission is incorrect.	Correct the number of read or write device data at the request source, and retry the operation.	—
D219H	The attribute code of transient transmission is incorrect.	Correct the attribute code at the request source, and retry the operation.	—
D21AH	The access code of transient transmission is incorrect.	Correct the access code at the request source, and retry the operation.	—
D21BH	A transient transmission error was detected.	• Abnormal transient data were issued from the CPU module. • Replace the CPU module and retry the operation. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D21CH	A transient transmission error was detected.	• Abnormal transient data were issued from the CPU module. • Replace the CPU module and retry the operation. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D21DH	The network number of transient transmission is incorrect.	• 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.	—
D21EH	The target station number of transient transmission is incorrect.	• A communication test cannot be executed on a relay sending station. Correct "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.	—
D21FH	The target station type specification of the dedicated instruction is incorrect.	• The SEND instruction cannot be executed on the target station. • Modify the program to the one without the SEND instruction.	—
D220H	The master station does not exist.	Add the master station to the network.	—
D222H	The command of transient transmission is incorrect.	Correct the request command at the request source, and retry the operation.	—

Error code (Hex)	Error details and causes	Action	Detailed Information
D223H	A transient transmission error was detected.	• Check the network status using the CC-Link IE Field Network diagnostics of the engineering tool, and take action. • Check if the switching hub and the cables are connected properly. • If the request source is on another network, check if the routing parameters are set correctly, and take action. • Check if an external device supporting the iQ Sensor Solution data backup/restoration function is connected to the network. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D224H	A transient transmission error was detected.	• Check the network status using the CC-Link IE Field Network diagnostics of the engineering tool, and take action. • Check if the switching hub and the cables are connected properly. • If the request source is on another network, check if the routing parameters are set correctly, and take action. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D22EH	Station number setting is not available for the target station.	• Although change of the target station number was attempted online from the master station (submaster 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 module supports the function, please consult your local Mitsubishi representative.	—
D22FH	Baton pass has not been performed in the target station.	Check the communication status of the station whose station number is to be changed.	—
D230H	The target station of station number change is incorrectly specified.	• The station number change was attempted for the own station (master station or submaster station). • Check that no station number is set for the target station.	—
D231H	The station number has been already set for the target station of station number change.	• The station number has been already set for the target station. • Check that no station number is set for the target station.	—
D232H	The target station of station number change does not exist.	• The station where the station number change was attempted does not exist. • Check that no station number is set for the target station.	—
D233H	The station number specified for station number change is incorrect.	Set the station number within 1 to 120, and retry the operation.	—
D234H	Baton pass has not been performed.	Check the communication status.	—
D235H	A transient transmission error was detected.	• Check the network status using the CC-Link IE Field Network diagnostics of the engineering tool, and take action. • Check if the switching hub and the cables are connected properly. • If the request source is on another network, check if the routing parameters are set correctly, and take action. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D236H	The TTL of the IP data is incorrect.	Correct the TTL at the IP request source and retry the operation.	—
D237H	The IP address setting is not correctly set.	Correct the IP address of the master station (submaster station).	—

Error code (Hex)	Error details and causes	Action	Detailed Information
D238H	The send queue is full.	• Pause the transient transmission temporarily, and retry the operation. • Lower the transient transmission usage frequency, and then perform again. • Use the COM instruction to increase the frequency of transient transmission. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D239H	SLMP transmission failed.	• Retry the operation after a while. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D23AH	The subheader in the SLMP data is incorrect.	Correct the subheader information at the request source, and retry the operation.	—
D23BH	The network number in the SLMP data is incorrect.	Correct the network number at the request source, and retry the operation.	—
D23CH	The target station number in the SLMP data is incorrect.	Correct the station number at the request source and retry the operation.	—
D23DH	The information of the device station failed to be acquired.	• Set "Network Configuration Settings" under "Basic Settings" correctly, and write it to the CPU module again. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D23EH	The information of the device station failed to be acquired.	• Set "Network Configuration Settings" under "Basic Settings" correctly, and write it to the CPU module again. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D240H	The network number specification of the dedicated instruction is incorrect.	• Execute again after correcting the network number at the request source. • If the request source is on another network, check if the routing parameters are set correctly, and take action.	—
D241H	The target station number of the dedicated instruction is incorrect.	• Execute again after correcting the target station number at the request source. • If the request source is on another network, check if the routing parameters are set correctly, and take action.	—
D242H	The command code of the dedicated instruction is incorrect.	• Execute again after correcting the command code at the request source. • If the request source is on another network, check if the routing parameters are set correctly, and take action.	—
D243H	The channel specified in the dedicated instruction is incorrect.	• Execute again after correcting the used channel within the allowable range at the request source. • If the request source is on another network, check if the routing parameters are set correctly, and take action.	—
D244H	The transient data is incorrect.	• Correct the transient data at the request source, and retry the operation. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D245H	The target station number of the dedicated instruction is incorrect.	• Execute again after correcting the target station number at the request source. • If the request source is on another network, check if the routing parameters are set correctly, and take action.	—
D246H	The transient data is incorrect.	• Correct the transient data at the request source, and retry the operation. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—

Error code (Hex)	Error details and causes	Action	Detailed Information
D247H	When the dedicated instruction was executed, response from the target station was received twice.	• Check the network status using the CC-Link IE Field Network diagnostics of the engineering tool, and take action. • 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 set correctly, and take action.	—
D249H	The target station's CPU type of the dedicated instruction is incorrect.	• Execute again after correcting the CPU type of the target station at the request source. • If the request source is on another network, check if the routing parameters are set correctly, and take action.	—
D24AH	The arrival monitoring time of the dedicated instruction is incorrect.	• Execute again after correcting the arrival monitoring time at the request source. • When the own station, target station, or relay station detected an error, identify the cause of the error and take action. • Lower the transient transmission usage frequency, and then perform again. • When "Communication Mode" in "Application Settings" of the master station (submaster station) is set to "High-Speed", change it to "Normal" and retry the operation. • Check if the switching hub and the cables at the request source are connected properly.	—
D24BH	The number of resends specified in the dedicated instruction is incorrect.	• Execute again after correcting the number of resends at the request source. • When the own station, target station, or relay station detected an error, identify the cause of the error and take action. • Lower the transient transmission usage frequency, and then perform again. • When "Communication Mode" in "Application Settings" of the master station (submaster station) is set to "High-Speed", change it to "Normal" and retry the operation. • Check if the switching hub and the cables at the request source are connected properly.	—
D24CH	The network number specification of the dedicated instruction is incorrect.	• Execute again after correcting the network number at the request source. • If the request source is on another network, check if the routing parameters are set correctly, and take action.	—
D24DH	The channel specified in the dedicated instruction is incorrect.	• Set 1 to 2 for the target channel number in the control data when executing the SEND instruction. • Set 1 to 32 for the channel number when executing the REMFR/REMTO/REMFRD/REMTOD instruction. • Execute again after correcting the number of the channel used by own station in the control data.	—
D24EH	The target station setting in the dedicated instruction is incorrect.	• The value set for the control block of the dedicated instruction is out of range. Execute again after correcting the value. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D24FH	The dedicated instruction was executed when the station number of the own station has not been set yet.	• Specify the station number using the UINI instruction, and execute the instruction again. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—

Error code (Hex)	Error details and causes	Action	Detailed Information
D251H	When the dedicated instruction was executed, arrival check error has occurred.	• Execute again after increasing the number of resends at the request source. • When the own station, target station, or relay station detected an error, identify the cause of the error and take action. • Lower the transient transmission usage frequency, and then perform again. • When "Communication Mode" in "Application Settings" of the master station (submaster station) is set to "High-Speed", change it to "Normal" and retry the operation. • Check if the switching hub and the cables at the request source are connected properly.	—
D252H	Transmission completion wait timeout has occurred when the dedicated instruction was executed.	• Check the network status using the CC-Link IE Field Network diagnostics of the engineering tool, and take action. • Execute again after increasing the number of resends at the request source. • Lower the transient transmission usage frequency, and then perform again. • When "Communication Mode" in "Application Settings" of the master station (submaster station) is set to "High-Speed", change it to "Normal" and retry the operation. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D253H	A response timeout has occurred when the dedicated instruction was executed.	• Check the network status using the CC-Link IE Field Network diagnostics of the engineering tool, and take action. • Execute again after increasing the number of resends at the request source. • Lower the transient transmission usage frequency, and then perform again. • When "Dynamic Routing" in "Application Settings" is set to "Enable", check the 'Communication path determination status' (Un\G24480 to Un\G24495) and check if communication to the target network number is possible. • For the RECV instruction, execute again after correcting the channels used by own station in the control data. • For the RECV instruction, check that 'RECV execution request flag CH1' (SB0030) to 'RECV execution request flag CH8' (SB0037) are on. • If the request destination is on another network, check if the CPU module of the relay station supports the routing setting, and take an action. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D254H	A dedicated instruction which the target station does not support was executed.	• Change the target station at the station that executed the SEND instruction. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D255H	The target station number of the dedicated instruction is incorrect.	• Execute again after correcting the target station number in the control data. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D256H	The execution/error completion type of the dedicated instruction is incorrect.	• Execute again after correcting the execution/error completion type in the control data. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D257H	The request type of the REQ instruction is incorrect.	• Execute again after correcting the request type in the request data. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—

Error code (Hex)	Error details and causes	Action	Detailed Information
D258H	The control station does not exist when the dedicated instruction was executed to the specified control station or current control station.	• Execute again after correcting the target station number in the control data. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D25AH	The dedicated instruction was executed specifying the channel in use.	• Retry the operation after a while. • Change the channels used by own station or the target station's channel in the control data.	—
D25BH	The dedicated instruction was executed specifying the channel in use.	Change the channels used by own station or the target station's channel in the control data.	—
D25CH	The function version specification of the dedicated instruction is incorrect.	• The value set for the control block of the dedicated instruction is out of range. Execute again after correcting the value. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D25DH	The transient data is incorrect.	• Correct the transient data at the request source, and retry the operation. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D25EH	Dedicated instructions which cannot be executed simultaneously were executed.	• Another CC-Link dedicated instruction is in execution. Execute again after a while. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D25FH	The REMFR/REMTO/REMFRD/REMTOD instruction was executed from a module with a station type which cannot execute it.	The REMFR/REMTO/REMFRD/REMTOD instruction can only be used for the master station, local station, and submaster station. Modify the program to the one without the REMFR/REMTO/REMFRD/REMTOD instructions.	—
D260H	The REMTO/REMTOD instruction was executed from the module with a station type which cannot execute it.	The REMTO/REMTOD instruction can only be used for a master operating station.	—
D261H	The CCPASET instruction was executed from the module with a station type which cannot execute it.	Parameter setting using the CCPASET instruction cannot be configured on local stations. Configure the parameter setting on the master station.	—
D262H	The total number of device stations specified in the CCPASET instruction is incorrect.	• Execute again after correcting the total number of device stations in the control data. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D263H	The constant link scan time setting of the CCPASET instruction is incorrect.	• Execute again after correcting the constant link scan time in the control data. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D264H	The station number setting of the CCPASET instruction is incorrect.	• Execute again after correcting the station number in the setting data within 1 to 120. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D265H	The station number specified for the CCPASET instruction is already in use.	• Execute again after correcting the station number in the setting data to a unique value. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D266H	The device station setting information of the CCPASET instruction is incorrect.	• Execute again after correcting the device station setting information in the setting data. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D267H	The station type of the CCPASET instruction is incorrect.	• Execute again after correcting the station type in the setting data. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D268H	The link device range assignment specified for each station in the CCPASET instruction is incorrect.	• Execute again after correcting the offset or size of the device station link device in the setting data. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—

Error code (Hex)	Error details and causes	Action	Detailed Information
D269H	• The station type of the REMFR/REMTO/REMFRD/REMTOD instruction target station is not an intelligent device station/remote device station. • The station type of the SINFTYRD/SINFSTRD instruction target station is not an intelligent device station (remote head module).	• Set an intelligent device station/remote device station as a target station of the REMFR/REMTO/REMFRD/REMTOD instruction. • Set an intelligent device station (remote head module) as a target station of the SINFTYRD/SINFSTRD instruction.	—
D26AH	The target station of the REMFR/REMTO/REMFRD/REMTOD/SINFTYRD/SINFSTRD instruction does not exist.	Return the target station of the REMFR/REMTO/REMFRD/REMTOD/SINFTYRD/SINFSTRD instruction, and retry the operation.	—
D26BH	The network number setting of the CCPASET instruction execution station is incorrect.	Set "Network No." under "Network No." of "Required Settings" to a value within 1 to 239.	—
D26CH	The station type and station number of the CCPASET instruction execution station are incorrect.	Rewrite the module parameter using the engineering tool. If the error occurs again even after taking the above, the possible cause is a hardware failure of the error module. Please consult your local Mitsubishi representative.	—
D26FH	The station number specified for submaster station in the CCPASET instruction is incorrect.	When executing the CCPASET instruction, set a submaster station number in the device station setting information (control data) within 1 to 120.	—
D270H	Multiple submaster stations are set in the CCPASET instruction.	When executing the CCPASET instruction, set one submaster station in the station type in device station setting information (control data).	—
D271H	A submaster station is specified in the reserved station setting of the CCPASET instruction.	When executing the CCPASET instruction, do not set a submaster station number in reserved station specification (control data).	—
D272H	A submaster station is specified in the error invalid station setting of the CCPASET instruction.	When executing the CCPASET instruction, do not set a submaster station number in error invalid station setting (control data).	—
D273H	The request data size of transient transmission is incorrect.	• Correct the request command at the request source, and retry the operation. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D274H	The routing setting is not correctly set.	• 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.	—
D275H	Other dedicated instructions are in execution and the executed instruction cannot be processed.	• Other dedicated instructions are in execution. Execute again after a while. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D276H	The station type of the dedicated instruction target station is incorrect.	• Execute again after correcting the station type of the target station at the request source. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D277H	A dedicated instruction which the network module does not support was executed.	Check the firmware version of the network module used.	—
D278H	The target network number of the SLMPREQ instruction is incorrect.	Set the own network number as the target network number specified by the SLMPREQ instruction.	—
D279H	A dedicated instruction which the network module does not support was executed.	Check the firmware version of the network module used.	—
D27AH	The own station number set in the UINI instruction is incorrect.	• Set the station number of own station in the control data within 1 to 120, and retry the operation. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D280H	The request command of transient transmission is incorrect.	Correct the request command at the request source, and retry the operation.	—
D281H	Transient reception failed.	• Check the network status using the CC-Link IE Field Network diagnostics of the engineering tool, and take action. • 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.	—

Error code (Hex)	Error details and causes	Action	Detailed Information
D282H	The receive queue is full.	• Pause the transient transmission temporarily, and retry the operation. • Lower the transient transmission usage frequency, and then perform again. • Use the COM instruction to increase the frequency of transient transmission. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D283H	Transient transmission failed.	• Check the network status using the CC-Link IE Field Network diagnostics of the engineering tool, and take action. • Connect the cable to the other port on the request source, and retry the operation. • Lower the transient transmission usage frequency, and then perform again.	—
D284H	The target execution module in the SLMP data is incorrect.	Correct the target execution module in the SLMP header, and retry the operation.	—
D2A0H	The receive buffer is full.	• Check the network status using the CC-Link IE Field Network diagnostics of the engineering tool, and take action. • 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.	—
D2A1H	The send buffer is full.	• Lower the transient transmission usage frequency, and then perform again. • Check if the switching hub and the cables at the request source are connected properly.	—
D2A2H	Transmission completion wait timeout has occurred in transient transmission.	• Lower the transient transmission usage frequency, and then perform again. • When "Communication Mode" in "Application Settings" of the master station (submaster station) is set to "High-Speed", change it to "Normal" and retry the operation. • Check if the switching hub and the cables at the request source are connected properly.	—
D2A3H	The data length in the transient transmission frame is incorrect.	Correct the number of data (frame length) at the request source, and retry the operation.	—
D2A4H	The header information in the transient transmission frame is incorrect.	Correct the header information at the request source, and retry the operation.	—
D2A5H	The target station number in the transient transmission frame is incorrect.	Correct the target station number at the request source, and retry the operation.	—
D2A6H	The request source number in the transient transmission frame is incorrect.	Correct the request source number at the request source, and retry the operation.	—
D2A7H	The header information in the transient transmission frame is incorrect.	Correct the header information at the request source, and retry the operation.	—
D2A8H	The header information in the transient transmission frame is incorrect.	Correct the header information at the request source, and retry the operation.	—
D2A9H	The target network number in the transient transmission frame is incorrect.	Correct the target network number at the request source, and retry the operation.	—
D2AAH	The target station number in the transient transmission frame is incorrect.	Correct the target station number at the request source, and retry the operation.	—
D2ABH	The request source network number in the transient transmission frame is incorrect.	Correct the network number of the request source at the request source, and retry the operation.	—
D2ACH	The request source station number in the transient transmission frame is incorrect.	Correct the station number of the request source at the request source, and retry the operation.	—
D2ADH	The data length in the transient transmission frame is incorrect.	Correct the number of data (frame length) at the request source, and retry the operation.	—
D2AEH	The target station number in the transient transmission frame is incorrect.	• The own station received transient data addressed to another station. Correct the network and target station numbers, and retry the operation. • Check if "Routing Setting" of "CPU Parameter" is correctly set, and take action.	—

Error code (Hex)	Error details and causes	Action	Detailed Information
D2AFH	The own station number was specified as the target station number of transient transmission.	• Transient data transmission addressed to the own station was requested. Check the network number and target station number, and retry the operation. • Check if "Routing Setting" of "CPU Parameter" is correctly set, and take action.	—
D2B0H	Transient transmission failed.	• Check if the switching hub and the cables at the request source are connected properly. • Connect the cable to the other port on the request source, and retry the operation. • Lower the transient transmission usage frequency, and then perform again.	—
D2B1H	The receive queue is full.	• Pause the transient transmission temporarily, and retry the operation. • Lower the transient transmission usage frequency, and then perform again. • Use the COM instruction to increase the frequency of transient transmission. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D2E0H	During execution of the IP communication test, the test was retried.	Retry the IP communication test after a while. (Up to four IP communication tests can be simultaneously executed.)	—
D2E1H	The IP communication test was completed with an error (no response to PING).	• Check "Communication Target" of the IP communication test. • Check and correct the status of the cable connection and line between the CC-Link IE Field Network gateway setting station and the communication destination. • Enable a response to the PING command (ICMP echo request) in the firewall settings on the personal computer or antivirus software.	—
D602H	Parameter error	• Write the network parameter to the CPU module again. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D605H	Parameter error	• Write the network parameter to the CPU module again. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D611H	Parameter error (each station device range assignment error (RWw))	• Write the network parameter to the CPU module again. • Execute again after correcting the size of the device station link device in the setting data. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D612H	Parameter error (each station device range assignment error (RWw))	• Write the network parameter to the CPU module again. • Execute again after correcting the offset of the device station link device in the setting data. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D613H	Parameter error (each station device range assignment error (RWr))	• Write the network parameter to the CPU module again. • Execute again after correcting the size of the device station link device in the setting data. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D614H	Parameter error (each station device range assignment error (RWr))	• Write the network parameter to the CPU module again. • Execute again after correcting the offset of the device station link device in the setting data. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—

Error code (Hex)	Error details and causes	Action	Detailed Information
D615H	Parameter error (each station device range assignment error (RY))	• Write the network parameter to the CPU module again. • Execute again after correcting the size of the device station link device in the setting data. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D616H	Parameter error (each station device range assignment error (RY))	• Write the network parameter to the CPU module again. • Execute again after correcting the offset of the device station link device in the setting data. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D617H	Parameter error (each station device range assignment error (RX))	• Write the network parameter to the CPU module again. • Execute again after correcting the size of the device station link device in the setting data. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D618H	Parameter error (each station device range assignment error (RX))	• Write the network parameter to the CPU module again. • Execute again after correcting the offset of the device station link device in the setting data. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D619H	Parameter error	• Write the network parameter to the CPU module again. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D61AH	Parameter error	• Write the network parameter to the CPU module again. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D61BH	Parameter error (device overlap error (RWw))	• Write the network parameter to the CPU module again. • Execute again after correcting the offset or size of the device station link device in the setting data. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D61CH	Parameter error (device overlap error (RWr))	• Write the network parameter to the CPU module again. • Execute again after correcting the offset or size of the device station link device in the setting data. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D61DH	Parameter error (device overlap error (RY))	• Write the network parameter to the CPU module again. • Execute again after correcting the offset or size of the device station link device in the setting data. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D61EH	Parameter error (device overlap error (RX))	• Write the network parameter to the CPU module again. • Execute again after correcting the offset or size of the device station link device in the setting data. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D61FH	Parameter setting by the CCPASET instruction has failed.	Execute again after setting "Setting Method of Basic/Application Settings" under "Parameter Setting Method" in "Required Settings" to "Program".	—
D620H	The transient data is incorrect.	• Correct the transient data at the request source, and retry the operation. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—

Error code (Hex)	Error details and causes	Action	Detailed Information
D621H	Parameter error	• Write the network parameter to the CPU module again. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D622H	Parameter error (error in the total number of device stations)	• Write the network parameter to the CPU module again. • Execute again after correcting the total number of device stations. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D623H	Parameter error (link scan mode error)	• Write the network parameter to the CPU module again. • Execute again after correcting the link scan mode setting. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D624H	Parameter error (constant link scan time setting error)	• Write the network parameter to the CPU module again. • Execute again after correcting the constant link scan time. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D625H	Parameter error (station-based block data assurance setting error)	• Write the network parameter to the CPU module again. • Execute again after correcting the station-based block data assurance setting. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D626H	Parameter error (loopback setting error)	• Write the network parameter to the CPU module again. • Execute again after correcting the loopback function settings. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D628H	Parameter error (station type error)	• Write the network parameter to the CPU module again. • Execute again after correcting the station type in the setting data. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D629H	Parameter error (station number range error)	• Write the network parameter to the CPU module again. • Execute again after correcting the station number in the setting data within 1 to 120. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D62AH	Parameter error (data link faulty station setting error)	• Write the network parameter to the CPU module again. • Execute again after correcting the data link faulty station setting. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D62BH	Parameter error (output setting error during CPU STOP)	• Write the network parameter to the CPU module again. • Execute again after correcting the output settings during CPU STOP. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D630H	Parameter setting of a local station by the CCPASET instruction has failed.	Execute again after setting "Setting Method of Basic/ Application Settings" under "Parameter Setting Method" in "Required Settings" to "Program".	—

Error code (Hex)	Error details and causes	Action	Detailed Information
D634H	Parameter error (error in the number of submaster stations set)	• Write the network parameter to the CPU module again. • Execute again after setting the number of submaster stations set in the station types of each station to 1. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D635H	Parameter error (submaster station error)	• Write the network parameter to the CPU module again. • Set the station number within 1 to 120, and retry the operation. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D636H	The UINI instruction was executed at a station other than local stations.	Use one of the following methods and execute the UINI instruction to the local station again. • Set "Station Type" under "Station Type" in "Required Settings" to "Local Station". • Set "Setting Method" under "Station No." in "Required Settings" to "Program". • Check if the master/local module specified in the argument of the UINI instruction is the local station.	—
D637H	The UINI instruction was executed at a station where the station number has been already set by parameter.	Execute again after setting "Setting Method" under "Station No." in "Required Settings" to "Program".	—
	The UINI instruction was executed in a redundant system.	The station number cannot be set by the UINI instruction in a redundant system.	
D638H	The station number set for the own station by the UINI instruction is already used for the other station.	Correct the station number to be set using the UINI instruction to the station number not used for other stations, and execute the UINI instruction again.	—
D639H	After setting a station number with the UINI instruction, the instruction was executed again.	Station number setting with the UINI instruction is limited to one time only. Execute again after resetting the CPU module.	—
D63DH	Parameter error	• Write the network parameter to the CPU module again. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D63EH	Parameter error	• Write the network parameter to the CPU module again. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D641H	Parameter error (IP address error)	• Write the network parameter to the CPU module again. • Execute again after correcting the IP address in the setting data. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D701H	Temporary error invalid station setting/cancel or reserved station setting cancel/restoration was executed without specifying the target station.	Set the target station(s) in 'Reserved station function disable/temporary error invalid station setting' (SW0010 to SW0017), and retry the operation.	—
D706H	Temporary error invalid station setting/cancel or reserved station setting cancel/restoration was executed from a local station.	Temporary error invalid station setting/cancel or reserved station setting cancel/restoration cannot be executed from a local station. Retry the operation from the master station.	—
D70BH	Temporary error invalid station setting/cancel and reserved station cancel/restoration was executed simultaneously.	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.	—
D720H	Link startup/stop direction is incorrect.	Check the setting, and stop or start data link.	—
D721H	Link start/stop was requested from another station during link start/stop processing.	Retry the operation after the stop or restart of data link is completed.	—
D722H	Link start/stop was requested from the own station during link start/stop processing.	Retry the operation after the stop or restart of data link is completed.	—

Error code (Hex)	Error details and causes	Action	Detailed Information
D723H	System link start/stop was requested during link start/stop processing.	Retry the operation after the stop or restart of data link is completed.	—
D724H	Link startup/stop station specification is incorrect.	Check the setting, and stop or start data link.	—
D725H	System link start/stop was requested from a local station.	A local station cannot start or stop data link of all or multiple stations. Perform these operations from the master station.	—
D726H	The request command of transient transmission is incorrect.	Correct the request command at the request station, and retry the operation.	—
D727H	Link start was requested from a station other than the station which had requested link stop.	• 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 has failed. Forcibly restart the data link.	—
D728H	Data link startup instruction was executed to the station which is performing data link.	Execute the data link startup instruction to the station where data link had been stopped.	—
D729H	Link stop of the own station was instructed in the station with no station number setting.	Specify the station number using the UINI instruction, and execute the instruction again.	—
D731H	Forced master switching command was executed from a station other than the submaster station operating as a master operating station.	Perform the forced master switch to the submaster station operating as a master operating station.	—
D740H	Transient transmission failed.	• If a device station is disconnected from the network, identify the cause of the disconnection and take action. • If data link is stopped in the device station, identify the cause of the data link stop and take action. • Retry the operation after a device station is replaced and new one is added.	—
D741H	A station type error of the execution station was detected.	• Perform the operation after data link starts on the master operating station. • The operation cannot be performed in the local station and submaster operating station. Perform the operation in the master operating station.	—
D742H	Transient transmission failed.	After completion of the transient transmission, retry the operation.	—
D743H	A station type error of the execution station was detected.	The operation cannot be performed on a local station. Perform the operation in the master station and submaster station.	—
D744H	Flash ROM clear failed.	• The flash ROM may be faulty. Check the wire and cable distances and grounding condition of each device, and take measures against noise. • Execute the module communication test. If the error occurs again even after taking the above, the possible cause is a hardware failure of the module. Please consult your local Mitsubishi representative.	—
D783H	A transient transmission error was detected.	• Close the CC-Link IE Field Network diagnostics window in the engineering tool, and perform the diagnostics again. • Check the read request data at the request station, and retry the operation.	—
D784H	A transient transmission error was detected.	• Close the CC-Link IE Field Network diagnostics window in the engineering tool, and perform the diagnostics again. • Check the read request data at the request station, and retry the operation.	—

Error code (Hex)	Error details and causes	Action	Detailed Information
D806H	The receive queue is full.	• Lower the transient transmission usage frequency, and then perform again. • Check if the switching hub and the cables are connected properly. • Use the COM instruction to increase the frequency of transient transmission.	—
D840H	Number of transient request exceeded the upper limit of simultaneously processable requests.	• Pause the transient transmission temporarily, and retry the operation. • Lower the transient transmission usage frequency, and then perform again.	—
D841H	The request data size of memory read/write command is out of range.	Correct the read or write size specification at the transient request source, and retry the operation.	—
D842H	• Routing information to the destination network number is not registered. • In transient transmission, the number of relay to other networks exceeded seven.	• Correct the target network number at the request source, and retry the operation. • Correct the communication path from the transient request source to the destination, and retry the operation. • When the dynamic routing is not used, or the module of the series other than MELSEC iQ-R is included, retry the operation after correcting the routing setting. • Change the system configuration so that the number of relay stations may be seven or less.	—
D843H	The module operation mode is set to a mode in which transient transmission cannot be executed.	After completion of the module communication test, retry the operation.	—
D844H	Incorrect frame is received. • Unsupported pre-conversion protocol • Unsupported frame type • Application header variable part • Application header HDS • Application header RTP • Read command not requiring response	Correct the request data at the transient request source, and retry the operation.	—
D902H	The online test data is incorrect.	• Correct the data at the station that started the online test, and retry the operation. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—
D903H	During execution of the communication test, the test was retried.	After completion of the communication test, retry the operation.	—
D905H	A communication monitoring timeout has occurred in communication test.	• Check the network status using the CC-Link IE Field Network diagnostics of the engineering tool, and take action. Then, retry the operation. • Check if "Routing Setting" of "CPU Parameter" is correctly set, and take action.	—
D906H	Transmission completion wait timeout has occurred in communication test.	• Check the network status using the CC-Link IE Field Network diagnostics of the engineering tool, and take action. Then, retry the operation. • Lower the transient transmission usage frequency, and then perform again. • When "Communication Mode" in "Application Settings" of the master station (submaster station) is set to "High-Speed", change it to "Normal" and retry the operation. • Check if "Routing Setting" of "CPU Parameter" is correctly set, and take action.	—
D909H	The header information of transient transmission is incorrect.	Correct the header information at the request source, and retry the operation.	—
D90AH	During execution of the communication test, the test was retried.	Check the network status using the CC-Link IE Field Network diagnostics of the engineering tool, and take action. Then, retry the operation.	—
D90BH	The number of stations which communicates in the network is out of the range.	• Check the network status using the CC-Link IE Field Network diagnostics of the engineering tool, and take action. • If the number of device stations per network is more than 120, reduce it to 120 or less.	—

Error code (Hex)	Error details and causes	Action	Detailed Information
D90CH	The target station specified for the communication test is incorrect.	• Correct "Target Station" of communication test, and retry the operation. • The own station, relay sending station, and the station which is mounted on the same base unit (main base unit and extension base unit) cannot be specified as the communication test target.	—
D90DH	During execution of the cable test, the test was retried.	After completion of the cable test, retry the operation.	—
D90EH	The IP packet transfer function is not supported.	The transfer destination of the IP data does not support the IP packet transfer function.	—
D90FH	During execution of the IP communication test, the test was retried.	Retry the operation after a while.	—
D910H	The IP address of the own station has not been set.	Check the destination IP address of the IP communication test.	—
D911H	The destination IP address setting of IP communication test is incorrect.	Check the destination IP address of the IP communication test.	—
D912H	Transient transmission failed.	• Lower the transient transmission usage frequency, and then perform again. • When "Communication Mode" in "Application Settings" of the master station (submaster station) is set to "High-Speed", change it to "Normal" and retry the operation. • Check if the switching hub and the cables are connected properly.	—
D913H to D917H	An error was detected in the network module.	Please consult your local Mitsubishi representative.	—
D918H	The IP address of the standby system is set for "Connected Station (Host)" or "Communication Target" for the IP communication test.	Check the IP address set for "Connected Station (Host)" or "Communication Target" for the IP communication test.	—
DA00H	An error was detected in the network module.	Please consult your local Mitsubishi representative.	—
DA01H	An error was detected in the network module.	Please consult your local Mitsubishi representative.	—
DA10H to DA17H	An error was detected in the network module.	Please consult your local Mitsubishi representative.	—
DA19H	An error was detected in the network module.	Please consult your local Mitsubishi representative.	—

4.6 List of Parameter Numbers

This section lists the parameter numbers displayed in the module diagnostics.

Item				Parameter No.
System Parameter	Inter-module Synchronous Setting	Select Inter-module Synchronization Target Module		0101H
		Fixed Scan Interval Setting of Inter-module Synchronization		0101H
Required Settings				7100H
Basic Settings	Network Configuration Settings	No.		A040H
		STA#		A044H
		Station Type		A044H A042H
		RX/RY Setting		A041H A042H
		RWw/RWr Setting		A041H A042H
		Reserved/Error Invalid Station/System Switching Monitoring Target Station		• Reserved Station: A001H • Error Invalid Station: A002H • System Switching Monitoring Target Station: A004H
		Pairing		A003H
		Network Synchronous Communication		A045H
		Alias		A011H
		Comment		A011H
	Refresh Settings			7401H
	Network Topology			A040H
	Submaster Parameters			A042H
	Operation of Master Station after Reconnection			7100H
Application Settings	Supplementary Cyclic Settings	System Switching Monitoring Time		7100H
		Link Scan Mode		A040H
		Station-based Block Data Assurance		A040H
		I/O Maintenance Settings	Output Hold/Clear Setting during CPU STOP	A050H
			Data Link Error Station Setting	A050H
			Output Mode upon CPU Error	7101H
	Interrupt Settings			A014H A015H 7800H
	IP Address			A012H
	Communication Mode			A050H
	Parameter Name			7310H
	Dynamic Routing			A050H
	Event Reception from Other Stations			A016H
	Module Operation Mode			7100H
	Interlink Transmission Settings			7500H
	Safety Communication Setting	To Use of Not to Use the Safety Communication Setting		7100H
		Safety Communication Setting	When the safety communication function is used in a system using the Safety CPU	• For safety protocol version 1: A017H • For safety protocol version 2: A017H, A01BH
			When the safety communication function is used in a system using the SIL2 Process CPU	• For safety protocol version 1: A01AH • For safety protocol version 2: A01AH, A01BH
	Redundant System Settings	Station No. (System B)		7110H
		Module Operation Mode (System B)		7110H

4.7 Event List

This section lists the events which occur in CC-Link IE Field Network.
System and operation are included in the event types.

System

Event code (Hex)	Overview	Cause
00100H	Link-up	Link-up has occurred when the network cable connected to the external device was connected.
00130H	Receive frame error	Receive frame error was detected. Or, the network whose network type is different was connected.
00500H	<<Own station>> Baton pass return (network entry)	Baton pass of the own station was returned from interruption status to normal status.
00501H	<<Another station>> Baton pass return (network entry)	Baton pass of another station was returned from interruption status to normal status.
00502H	All stations baton pass normalization (network entry in all stations)	Baton pass was returned to normal status at all stations.
00510H	<<Own station>> Data link restart (cyclic transmission started)	Data link of the own station was restarted.
00511H	<<Another station>> Data link restart (cyclic transmission started)	Data link of another station was restarted.
00512H	All stations data link normalization (cyclic transmission in all stations started)	Data link was returned to normal status at all stations.
00513H	<<Own station>> Data link start instruction acceptance	Data link startup instruction of the own station was received.
00514H	<<Own station>> Data link stop instruction acceptance	Data link stop instruction of the own station was received.
00520H	<<Own station>> Temporary error invalid station setting instruction acceptance	Temporary error invalid station setting instruction was received.
00521H	<<Own station>> Temporary error invalid station cancel instruction acceptance	Temporary error invalid station cancel instruction was received.
00524H	<<Another station>> Temporary error invalid station setting execution	Temporary error invalid station was set at another station.
00525H	<<Another station>> Temporary error invalid station cancel execution	Temporary error invalid station was canceled at another station.
00530H	<<Own station>> Reserved station cancel setting instruction acceptance	Reserved station cancel setting instruction was received.
00531H	<<Own station>> Reserved station enable setting instruction acceptance	Reserved station enable setting instruction was received.
00534H	<<Another station>> Reserved station cancel setting execution	Reserved station cancel setting was executed at another station.
00535H	<<Another station>> Reserved station enable setting instruction execution	Reserved station enable setting was executed at another station.
00540H	Loopback resolution	Loopback execution status was resolved when using a ring topology (using the loopback function).
00541H	Receive parameter error resolution	A parameter error received from master station/control station was resolved. (Normal parameter was received.)
00542H	<<Own station>> Receive frame error line status caution level	A receive frame error (line status: caution level) has been occurred.
00543H	<<Another station>> Receive frame error line status caution level	A receive frame error (line status: caution level) has been occurred.
00548H	Clear loopback by the communication path switch at an instantaneous interruption (faults in all stations)	Loopback was cleared by the communication path switch at an instantaneous interruption because all stations are faulty.
00549H	Clear loopback by the communication path switch at an instantaneous interruption (Switching the operation to the submaster operating station)	Loopback was cleared by the communication path switch at an instantaneous interruption because the own station operation was switched to submaster operation.
00600H	<<Own station>> Master/submaster switching occurrence	Master station down, or manual switching of the master and submaster station has occurred.
00800H	Link-down	Link-down occurred when network cable connected to the external device was disconnected.

Event code (Hex)	Overview	Cause
00A00H	System switching request issued	A system switching request occurred.
00C00H	<<Own station>> Baton pass interruption (departure from network)	Baton pass of the own station was interrupted.
00C01H	<<Another station>> Baton pass interruption (departure from network)	Baton pass of another station was interrupted.
00C02H	Response error from/to another station	• Abnormal response was returned from another station when accessing another station. • Abnormal response was returned to another station when accessed from another station.
00C10H	<<Own station>> Data link stop (cyclic transmission stopped)	Data link of the own station was stopped.
00C11H	<<Another station>> Data link stop (cyclic transmission stopped)	Data link of another station was stopped.
00C20H	<<Another station>> Parameter error occurrence	A parameter error has occurred in another station.
00C21H	<<Another station>> Error occurrence	An error has occurred in another station.
00C22H	Station already in use	Master station/submaster station duplication, or station number overlap has occurred in the network.
00C23H	Loopback occurrence	Path switching has occurred when using a ring topology (using the loopback function).
00C24H	<<Another station>> Receive frame error occurrence	A receive frame error has occurred at another station.
00C25H	Receive parameter error occurrence	A parameter error received from the master station or control station has been detected.
00C27H	Transient reception failed	Frequency of transient transmission to the own station is too high and transient reception failed.
00C28H	<<Own station>> Receive frame error line status warning level	A receive frame error (line status: warning level) has been occurred.
00C29H	<<Another station>> Receive frame error line status warning level	A receive frame error (line status: warning level) has been occurred.
00C3CH	Instantaneous interruption occurrence	An instantaneous interruption has occurred in the cable.
00C3DH	Loopback occurrence by the communication path switch at an instantaneous interruption	A cable instantaneous interruption has been detected and the loopback was performed by the communication path switch at an instantaneous interruption.

Operation

Event code (Hex)	Overview	Cause
24000H	Data link startup instruction	Data link startup to the own station or another station was instructed.
24001H	Data link stop instruction	Data link stop to the own station or another station was instructed.
24010H	Temporary error invalid station setting instruction	Temporary error invalid station setting was instructed to the device station.
24011H	Temporary error invalid station cancel instruction	Temporary error invalid station cancel was instructed to the device station.
24020H	Reserved station cancel setting instruction	Reserved station cancel setting was instructed to the device station.
24021H	Reserved station enable setting instruction	Reserved station enable setting was instructed to the device station.
24030H*1	The network number, station number setting/change instruction execution	Setting or change of the network number or station number was instructed to the device station.
24031H*2	Network number, station number setting/change execution	Setting or change of the network number or station number of the own station was executed.
24100H	<<Own station>> Parameter change/new parameter acceptance	Parameter was changed. Or new parameter was received at power-on.
24300H	<<Own station>> Enabling remote device test function	Remote device test function was enabled.
24301H	<<Own station>> Failure in enabling remote device test function (the CPU module is not in STOP state, except for a stop error occurrence.)	Enabling the remote device test function failed because the operating status of the CPU module is not in STOP state (except for a stop error occurrence).
24302H	<<Own station>> Failure in enabling remote device test function (Own station is not set to master operation.)	Own station is not set to master operation and enabling remote device test function failed.
24303H	<<Own station>> Disabling remote device test function (SB0016 is turned off.)	Remote device test function was disabled because SB0016 (Remote device forced output request) has been turned off.
24304H	<<Own station>> Disabling remote device test function (the CPU module is in RUN state.)	Remote device test function was disabled because operating status of the CPU module has been changed to RUN.
24305H	<<Own station>> Disabling remote device test function (the CPU module is in stop error.)	Remote device test function was disabled because a stop error has occurred in the CPU module.
24306H	<<Own station>> Disabling remote device test function (Own station switches to submaster operation.)	Remote device test function was disabled because the own station has switched to submaster operation.
2430AH	<<Own station>> Enabling communication path switch at an instantaneous interruption	Communication path switch at an instantaneous interruption was enabled.
2430BH	<<Own station>> Failure in enabling communication path switch at an instantaneous interruption ("Network Topology" is not set to "Ring".)	Enabling communication path switch at an instantaneous interruption failed because "Network Topology" is not set to "Ring".
2430CH	<<Own station>> Failure in enabling communication path switch at an instantaneous interruption (Own station does not operate as the master operating station.)	Enabling communication path switch at an instantaneous interruption failed because the own station does not operate as the master operating station.
2430DH	<<Own station>> Clear loopback by the communication path switch at an instantaneous interruption (SB0005 is on.)	SB0005 was turned on to clear the loopback by the communication path switch at an instantaneous interruption.
24F00H	<<Another station>> CPU operating status change detection	Operating status of the CPU module on another station was changed.

*1 Only occurs in the master station.
*2 Only occurs in the local station.

APPENDICES

Appendix 1 Module Label

The I/O signals, buffer memory, SB, and SW of the master/local module can be set using module label.

Structure of the module label

The module label name is defined with the following structure.

"Instance name"_"Module number"."Label name"

"Instance name"_"Module number"."Label name"_D

Ex.

GF11_1.bSts_DataLinkError

■Instance name

The following is the instance name of the RJ71GF11-T2.

Model	Instance name
RJ71GF11-T2	GF11

For the instance name of the RJ71EN71 and RnENCPU when the CC-Link IE Field Network function is used, refer to the following.

MELSEC iQ-R Ethernet User's Manual (Application)

■Module number

A sequential number starting with "1" for identifying a module from the one with the same instance name.

■Label name

A label name unique to the module.

■_D

This symbol indicates that the module label is for direct access. The label without "_D" is for link refresh. The following are the differences between link refresh and direct access.

Type	Description	Access timing
Link refresh	The values read/written from/to the module labels are reflected to the module at link refresh. The execution time of the program can be shortened.	At link refresh
Direct access	The values read/written from/to the module labels are reflected to the module immediately. Although the execution time of the program is longer than the one at the link refresh, the responsiveness is improved. For the instruction processing time, refer to the following. MELSEC iQ-R Programming Manual (CPU Module Instructions, Standard Functions/Function Blocks)	At writing to or reading from the module label

Point

When multiple master/local modules of the same network number are mounted and the module labels of SB and SW is used for direct access, the access target is the module which has the smallest slot number.

Appendix 2 I/O Signals

This section describes the I/O signals for the CPU module. The I/O signal assignment of when the start I/O number of the master/local module is "0" is listed below.

List of I/O signals

The following table lists I/O signals. The device X is an input signal from the master/local module to the CPU module. The device Y is an output signal from the CPU module to the master/local module.

Input signals

Device No.	Signal name
X0	Module failure
X1	Own station data link status
X2	Use prohibited
X3	Other stations data link status
X4 to XE	Use prohibited
XF	Module ready
X10 to X1F	Use prohibited

Output signals

Device No.	Signal name
Y0 to Y1F	Use prohibited

Point

Do not use (turn on) any "use prohibited" signals as an input or output signal to the CPU module. Doing so may cause malfunction of the programmable controller system.

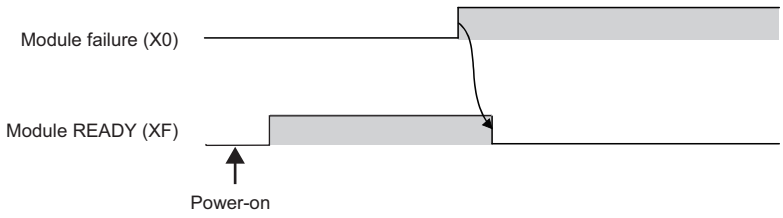
A

Details of I/O signals

Module failure (X0)

This signal is used to check the status of the master/local module.

- Off: Module normal
- On: Module failure



Own station data link status (X1)

This signal is used to check the data link status of the own station.

- Off: Data link stop
- On: Data link in progress

'Data link error status of own station' (SB0049) has the same signal, but when using it in a program, use either X1 or 'Data link error status of own station' (SB0049) only. Also note that the on/off conditions for X1 and SB0049 are reversed. If 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).

Other stations data link status (X3)

This signal is used to check the data link status of other stations.

- Off: All stations normal
- On: Faulty station found

'Data link error status of each station' (SB00B0) has the same signal, but when using it in a program, use either X3 or 'Data link error status of each station' (SB00B0) only.

If an error occurs, the faulty station can be checked by CC-Link IE Field Network diagnostics or with 'Data link status of each station' (SW00B0 to SW00B7).

Module ready (XF)

This signal is used to check the status of module operation preparation.

- Off: Not available for module operation
- On: Available for module operation

For the module ready timing chart, refer to Module failure (X0). (☞ Page 337 Module failure (X0))

Appendix 3 Buffer Memory

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

Point

For the RJ71EN71 and RnENCPU, add the following value to the buffer memory addresses when setting "Port 1 Network Type" to "Ethernet" and "Port 2 Network Type" to "CC-Link IE Field".

- Address (decimal): 2000000
- Address (hexadecimal): 1E8480H

List of buffer memory addresses

Address (decimal)	Address (hexadecimal)	Name		Initial value	Read, write
0 to 1023	0H to 3FFH	Link device area	Remote input (RX)	0	Read
1024 to 2047	400H to 7FFH		Remote output (RY)		Read, write
2048 to 10239	800H to 27FFH		Remote register (RWw)		
10240 to 18431	2800H to 47FFH		Remote register (RWr)		Read
18432 to 18463	4800H to 481FH		Link special relay (SB)		• 18432 to 18433 for read and write • 18434 to 18463 for read only
18464 to 18975	4820H to 4A1FH		Link special register (SW)		• 18464 to 18495 for read and write • 18496 to 18975 for read only
18976 to 19455	4A20H to 4BFFH	System area			
19456	4C00H	RX offset/size information	Station No.1 RX offset	0	Read
19457	4C01H		Station No.1 RX size		
⋮			⋮		
19694	4CEEH		Station No.120 RX offset		
19695	4CEFH		Station No.120 RX size		
19696	4CF0H		Station No.0 RX offset		
19697	4CF1H		Station No.0 RX size		
19698 to 19711	4CF2H to 4CFFH	System area			
19712	4D00H	RY offset/size information	Station No.1 RY offset	0	Read
19713	4D01H		Station No.1 RY size		
⋮			⋮		
19950	4DEEH		Station No.120 RY offset		
19951	4DEFH		Station No.120 RY size		
19952	4DF0H		Station No.0 RY offset		
19953	4DF1H		Station No.0 RY size		
19954 to 19967	4DF2H to 4DFFH	System area			
19968	4E00H	RWw offset/size information	Station No.1 RWw offset	0	Read
19969	4E01H		Station No.1 RWw size		
⋮			⋮		
20206	4EEEH		Station No.120 RWw offset		
20207	4EEFH		Station No.120 RWw size		
20208	4EF0H		Station No.0 RWw offset		
20209	4EF1H		Station No.0 RWw size		
20210 to 20223	4EF2H to 4EFFH	System area			

A

Address (decimal)	Address (hexadecimal)	Name		Initial value	Read, write
20224	4F00H	RWr offset/size information	Station No.1 RWr offset	0	Read
20225	4F01H		Station No.1 RWr size		
⋮			⋮		
20462	4FEEH		Station No.120 RWr offset		
20463	4FEFH		Station No.120 RWr size		
20464	4FF0H		Station No.0 RWr offset		
20465	4FF1H		Station No.0 RWr size		
20466 to 20511	4FF2H to 501FH	System area			
20512	5020H	Own station (network card) information	Manufacturer code	0	Read
20513	5021H		Model type		
20514	5022H		Model code	*1	
20515	5023H		Version	1	
20516 to 20519	5024H to 5027H	System area			
20520	5028H	Own station (controller) information	Controller information valid/invalid flag	0	Read
20521	5029H		Manufacturer code		
20522	502AH		Model type		
20523	502BH		Model code		
20524	502CH		Version		
20525 to 20534	502DH to 5036H		Model name string		
20535 to 20536	5037H to 5038H		Vendor-specific device information		
20537 to 20543	5039H to 503FH	System area			
20544	5040H	Other station (network card) information (station No.1)	Manufacturer code	0	Read
20545	5041H		Model type		
20546	5042H		Model code		
20547	5043H		Version		
20548 to 20551	5044H to 5047H	System area			
20552	5048H	Other station (controller) information (station No.1)	Controller information valid/invalid flag	0	Read
20553	5049H		Manufacturer code		
20554	504AH		Model type		
20555	504BH		Model code		
20556	504CH		Version		
20557 to 20566	504DH to 5056H		Model name string		
20567 to 20568	5057H to 5058H		Vendor-specific device information		
20569 to 20575	5059H to 505FH	System area			
20576 to 24383	5060H to 5F3FH	Other station information (station No.2 to 120)	Same as other station information (station No.1)		
24384 to 24415	5F40H to 5F5FH	Other station information (station No.0)	Same as other station information (station No.1)		
24416 to 24479	5F60H to 5F9FH	System area			
24480	5FA0H	Communication path determination status (network No.1 to 16)		0	Read
24481 to 24495	5FA1H to 5FAFH	Communication path determination status (network No.17 to 239)		0	Read
24496 to 24503	5FB0H to 5FB7H	Redundant system information	Setting status of system switching monitoring target station	0	Read
24504 to 24511	5FB8H to 5FBFH		Redundant function information of each station	0	Read
24512 to 24519	5FC0H to 5FC7H		Separate mode status of each station	0	Read
24520 to 29961	5FC8H to 7509H	System area			
29962	750AH	Specification for use of a media converter in a ring topology	Specification for use of a media converter in a ring topology	0	Read, write
29963 to 29967	750BH to 750FH	System area			

Address (decimal)	Address (hexadecimal)	Name		Initial value	Read, write
29968	7510H	PORT1 line error occurrence rate (max.)	Station No.1	0	Read
29969 to 30087	7511H to 7587H		Station No.2 to 120	0	Read
30088	7588H		Station No.0	0	Read
30089 to 30095	7589H to 758FH	System area			
30096	7590H	PORT1 line error occurrence rate (present)	Station No.1	0	Read
30097 to 30215	7591H to 7607H		Station No.2 to 120	0	Read
30216	7608H		Station No.0	0	Read
30217 to 30223	7609H to 760FH	System area			
30224	7610H	PORT2 line error occurrence rate (max.)	Station No.1	0	Read
30225 to 30343	7611H to 7687H		Station No.2 to 120	0	Read
30344	7688H		Station No.0	0	Read
30345 to 30351	7689H to 768FH	System area			
30352	7690H	PORT2 line error occurrence rate (present)	Station No.1	0	Read
30353 to 30471	7691H to 7707H		Station No.2 to 120	0	Read
30472	7708H		Station No.0	0	Read
30473 to 65535	7709H to FFFFH	System area			

*1 The initial value varies depending on the master/local module used because a model code of a master/local module is stored as an initial value.

Point

- Do not write data to "System area". Doing so may cause malfunction of the programmable controller system.
- If the value in an area of one word becomes equal to or higher than 65536, the count stops at 65535 (FFFFH).

A

Details of buffer memory addresses

Link device area

The RX, RY, RWw, and RWr values are stored.

■Remote input (RX) (Un\G0 to Un\G1023)

The RX value is stored. The RX start number and number of points for each station number can be checked by the RX offset/size information (Un\G19456 to Un\G19695). (☞ Page 343 RX offset/size information)

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G0	RXF	RXE	RXD	RXC	RXB	RXA	RX9	RX8	RX7	RX6	RX5	RX4	RX3	RX2	RX1	RX0
⋮																
Un\G1023	RX3FFF	RX3FFE	RX3FFD	RX3FFC	RX3FFB	RX3FFA	RX3FF9	RX3FF8	RX3FF7	RX3FF6	RX3FF5	RX3FF4	RX3FF3	RX3FF2	RX3FF1	RX3FF0

Each bit corresponds to 1 bit of RX.

■Remote output (RY) (Un\G1024 to Un\G2047)

The RY value is stored. The RY start number and number of points for each station number can be checked by the RY offset/size information (Un\G19712 to Un\G19951). (☞ Page 343 RY offset/size information)

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G1024	RYF	RYE	RYD	RYC	RYB	RYA	RY9	RY8	RY7	RY6	RY5	RY4	RY3	RY2	RY1	RY0
⋮																
Un\G2047	RY3FFF	RY3FFE	RY3FFD	RY3FFC	RY3FFB	RY3FFA	RY3FF9	RY3FF8	RY3FF7	RY3FF6	RY3FF5	RY3FF4	RY3FF3	RY3FF2	RY3FF1	RY3FF0

Each bit corresponds to 1 bit of RY.

■Remote register (RWw) (Un\G2048 to Un\G10239)

The RWw value is stored. The RWw start number and number of points for each station number can be checked by the RWw offset/size information (Un\G19968 to Un\G20207). (☞ Page 344 RWw offset/size information)

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G2048	RWw0															
Un\G2049	RWw1															
⋮																
Un\G10239	RWw1FFF															

■Remote register (RWr) (Un\G10240 to Un\G18431)

The RWr value is stored. The RWr start number and number of points for each station number can be checked by the RWr offset/size information (Un\G20224 to Un\G20463). (☞ Page 344 RWr offset/size information)

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G10240	RWr0															
Un\G10241	RWr1															
⋮																
Un\G18431	RWr1FFF															

■Link special relay (SB) (Un\G18432 to Un\G18463)

The SB value is stored.

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G18432	SBF	SBE	SBD	SBC	SBB	SBA	SB9	SB8	SB7	SB6	SB5	SB4	SB3	SB2	SB1	SB0
⋮																
Un\G18463	SB1FF	SB1FE	SB1FD	SB1FC	SB1FB	SB1FA	SB1F9	SB1F8	SB1F7	SB1F6	SB1F5	SB1F4	SB1F3	SB1F2	SB1F1	SB1F0

Each bit corresponds to 1 bit of SB.

■Link special register (SW) (Un\G18464 to Un\G18975)

The SW value is stored.

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G18464	SW0															
Un\G18465	SW1															
⋮																
Un\G18975	SW1FFF															

RX offset/size information

■RX offset/size information (Un\G19456 to Un\G19697)

The start number and the number of points of RX for each station are stored.

Address	Description
Un\G19456	Station No.1 offset
Un\G19457	Station No.1 size (in units of words)
Un\G19458	Station No.2 offset
Un\G19459	Station No.2 size (in units of words)
⋮	
Un\G19694	Station No.120 offset
Un\G19695	Station No.120 size (in units of words)
Un\G19696	Station No.0 offset
Un\G19697	Station No.0 size (in units of words)

The offset and size of buffer memory areas for each station number (other than a station number 0) can be calculated using the following formulas:

- Offset buffer memory address = 19456 + (station No. - 1) × 2
- Size buffer memory address = 19457 + (station No. - 1) × 2

RY offset/size information

■RY offset/size information (Un\G19712 to Un\G19953)

The start number and the number of points of RY for each station are stored.

Address	Description
Un\G19712	Station No.1 offset
Un\G19713	Station No.1 size (in units of words)
Un\G19714	Station No.2 offset
Un\G19715	Station No.2 size (in units of words)
⋮	
Un\G19950	Station No.120 offset
Un\G19951	Station No.120 size (in units of words)
Un\G19952	Station No.0 offset
Un\G19953	Station No.0 size (in units of words)

The offset and size of buffer memory areas for each station number (other than a station number 0) can be calculated using the following formulas:

- Offset buffer memory address = 19712 + (station No. - 1) × 2
- Size buffer memory address = 19713 + (station No. - 1) × 2

RWw offset/size information

■RWw offset/size information (Un\G19968 to Un\G20209)

The start number and the number of points of RWw for each station are stored.

Address	Description
Un\G19968	Station No.1 offset
Un\G19969	Station No.1 size (in units of words)
Un\G19970	Station No.2 offset
Un\G19971	Station No.2 size (in units of words)
⋮	
Un\G20206	Station No.120 offset
Un\G20207	Station No.120 size (in units of words)
Un\G20208	Station No.0 offset
Un\G20209	Station No.0 size (in units of words)

The offset and size of buffer memory areas for each station number (other than a station number 0) can be calculated using the following formulas:

- Offset buffer memory address = 19968 + (station No. - 1) × 2
- Size buffer memory address = 19969 + (station No. - 1) × 2

RWr offset/size information

■RWr offset/size information (Un\G20224 to Un\G20465)

The start number and the number of points of RWr for each station are stored.

Address	Description
Un\G20224	Station No.1 offset
Un\G20225	Station No.1 size (in units of words)
Un\G20226	Station No.2 offset
Un\G20227	Station No.2 size (in units of words)
⋮	
Un\G20462	Station No.120 offset
Un\G20463	Station No.120 size (in units of words)
Un\G20464	Station No.0 offset
Un\G20465	Station No.0 size (in units of words)

The offset and size of buffer memory areas for each station number (other than a station number 0) can be calculated using the following formulas:

- Offset buffer memory address = 20224 + (station No. - 1) × 2
- Size buffer memory address = 20225 + (station No. - 1) × 2

Own station information

The information of the own station on the network is stored.

■Own station (network card) information (Un\G20512 to Un\G20515)

Address	Name	Description
Un\G20512	Manufacturer code	The master/local module information of the own station is stored.
Un\G20513	Model type	
Un\G20514	Model code	
Un\G20515	Version	

■Own station (controller) information (Un\G20520 to Un\G20536)

Address	Name	Description
Un\G20520	Controller information valid/invalid flag	Whether the value stored in the own station (controller) information is valid or invalid is stored. • 0: Invalid • 1: Valid

Address	Name	Description
Un\G20521	Manufacturer code	The master/local module information of the own station is stored.
Un\G20522	Model type	
Un\G20523	Model code	
Un\G20524	Version	
Un\G20525 to Un\G20534	Model name string	
Un\G20535 to Un\G20536	Vendor-specific device information	

Other station information

The information of other station on the network is stored. These areas can be used in a master station only.

■Other station (network card) information (station No.1) (Un\G20544 to Un\G20547)

Address	Name	Description
Un\G20544	Manufacturer code	The information of the other station (station No.1) is stored.
Un\G20545	Model type	
Un\G20546	Model code	
Un\G20547	Version	

■Other station (controller) information (station No.1) (Un\G20552 to Un\G20568)

Address	Name	Description
Un\G20552	Controller information valid/invalid flag	Whether the value stored in Other station (controller) information (station No.1) is valid or invalid is stored. 0: Invalid 1: Valid
Un\G20553	Manufacturer code	The master/local module information of another station is stored.
Un\G20554	Model type	
Un\G20555	Model code	
Un\G20556	Version	
Un\G20557 to Un\G20566	Model name string	
Un\G20567 to Un\G20568	Vendor-specific device information	

■Other station information (station No.2 to 120) (Un\G20576 to Un\G24383)

The information on station number 2 to station number 120 is stored in the same order as Other station (network card) information (station No.1) and Other station (controller) information (station No.1).

■Other station information (station No.0) (Un\G24384 to Un\G24415)

The information on station number 0 is stored in the same order as Other station (network card) information (station No.1) and Other station (controller) information (station No.1).

Communication path determination status

■Communication path determination status (Un\G24480 to Un\G24495)

The determination information on the communication path for each network number of the destination station is stored.

- 0: Route undetermined
- 1: Route determined

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G24480	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
⋮																
Un\G24494	Empty	239	238	237	236	235	234	233	232	231	230	229	228	227	226	225
Un\G24495	Empty															

The numbers in the table indicate network numbers.

Redundant system information

The information related to the redundant system is stored.

■Setting status of system switching monitoring target station (Un\G24496 to Un\G24503)

The setting status of system switching monitoring target station of each station is stored. These areas can be used in a master station only.

- 0: Station other than a system switching monitoring target station
- 1: System switching monitoring target station

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G24496	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
⋮																
Un\G24503	*1	Empty	Empty	Empty	Empty	Empty	Empty	Empty	120	119	118	117	116	115	114	113

Each number in the table represents a station number.

*1 "1" is stored when there is a system switching monitoring target station on the network.

■Redundant function information of each station (Un\G24504 to Un\G24511)

The redundant system support information of each station (including the own station) is stored.

This register is enabled only for normally operating stations in 'Baton pass status of each station' (SW00A0 to SW00A7).

Reserved stations and stations with a number equal to or greater than the maximum station number are ignored.

- 0: Redundant function not supported
- 1: Redundant function supported

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G24504	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
⋮																
Un\G24511	*1	Empty	*2	*3	Empty	Empty	Empty	Empty	120	119	118	117	116	115	114	113

Each number in the table represents a station number.

*1 "1" is stored when there is a redundant system station on the network.

*2 The redundant function support information of the master operating station is stored.

*3 The redundant function support information of the station No.0 is stored.

■Separate mode status of each station (Un\G24512 to Un\G24519)

The redundant system CPU operating mode of each station (including the own station) is stored.

This areas are enabled when 'Baton pass status of own station' (SB0047) is off. When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.

This register is enabled only for normally operating stations in 'Baton pass status of each station' (SW00A0 to SW00A7).

Reserved stations and stations with a number equal to or greater than the maximum station number are ignored.

"0" is stored for a station other than a redundant system station.

- 0: Backup mode
- 1: Separate mode

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G24512	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
⋮																
Un\G24519	*1	Empty	*2	*3	Empty	Empty	Empty	Empty	120	119	118	117	116	115	114	113

Each number in the table represents a station number.

*1 "1" is stored when there is a separate mode station on the network.

*2 The redundant system CPU operating mode of the master operating station is stored.

*3 The redundant system CPU operating mode of the station No.0 is stored.

Specification for use of a media converter in a ring topology

■Specification for use of a media converter in a ring topology (Un\G29962)

Set whether to use a media converter in a ring topology.

- 0: Not Use
- 1: Use

PORT1 line error occurrence rate (max.)

The receive frame error occurrence rate (maximum value) on the PORT1 side is stored.

Note that no value is stored in the area for the station number of the own station.

■PORT1 line error occurrence rate (max.) (station No.1) (Un\G29968)

The receive frame error occurrence rate (maximum value) of station No.1 is stored.

■PORT1 line error occurrence rate (max.) (station No.2 to 120) (Un\G29969 to Un\G30087)

The receive frame error occurrence rate (maximum value) of station No.2 to 120 is stored.

■PORT1 line error occurrence rate (max.) (station No.0) (Un\G30088)

The receive frame error occurrence rate (maximum value) of station No.0 is stored.

PORT1 line error occurrence rate (present)

The receive frame error occurrence rate (present value) on the PORT1 side is stored.

Note that no value is stored in the area for the station number of the own station.

■PORT1 line error occurrence rate (present) (station No.1) (Un\G30096)

The receive frame error occurrence rate (present value) of station No.1 is stored.

■PORT1 line error occurrence rate (present) (station No.2 to 120) (Un\G30097 to Un\G30215)

The receive frame error occurrence rate (present value) of station No.2 to 120 is stored.

■PORT1 line error occurrence rate (present) (station No.0) (Un\G30216)

The receive frame error occurrence rate (present value) of station No.0 is stored.

PORT2 line error occurrence rate (max.)

The receive frame error occurrence rate (maximum value) on the PORT2 side is stored.

Note that no value is stored in the area for the station number of the own station.

■PORT2 line error occurrence rate (max.) (station No.1) (Un\G30224)

The receive frame error occurrence rate (maximum value) of station No.1 is stored.

■PORT2 line error occurrence rate (max.) (station No.2 to 120) (Un\G30225 to Un\G30343)

The receive frame error occurrence rate (maximum value) of station No.2 to 120 is stored.

■PORT2 line error occurrence rate (max.) (station No.0) (Un\G30344)

The receive frame error occurrence rate (maximum value) of station No.0 is stored.

PORT2 line error occurrence rate (present)

The receive frame error occurrence rate (present value) on the PORT2 side is stored.

Note that no value is stored in the area for the station number of the own station.

■PORT2 line error occurrence rate (present) (station No.1) (Un\G30352)

The receive frame error occurrence rate (present value) of station No.1 is stored.

■PORT2 line error occurrence rate (present) (station No.2 to 120) (Un\G30353 to Un\G30471)

The receive frame error occurrence rate (present value) of station No.2 to 120 is stored.

■PORT2 line error occurrence rate (present) (station No.0) (Un\G30472)

The receive frame error occurrence rate (present value) of station No.0 is stored.

Appendix 4 List of SB

The link special relay (SB) is turned on/off depending on various factors during data link. Any error status of the data link can be checked by using or monitoring it in the program.
By using SB, the status of CC-Link IE Field Network can be checked from HMI (Human Machine Interfaces) as well as the engineering tool.

Refresh

Set SBs in "Refresh Setting" in "Basic Settings" so that they are refreshed to the devices or labels of the CPU module. (☞ Page 148 Refresh Settings)

Ranges

This section describes list of SB when SBs are assigned from SB0000 to SB01FF.

- Turned on/off by users: SB0000 to SB001F
- Turned on/off by the system: SB0020 to SB01FF

Point

Do not turn on or off areas whose numbers are not on the following list or ranges turned on/off by the system. Doing so may cause malfunction of the programmable controller system.

No.	Name	Description	Availability	
			Master station (submaster station)	Local station
SB0000	Link startup of own station	Starts data link (cyclic transmission) of the own station. Off: Startup not requested On: Startup requested (valid at rising edge) (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • For SB0000 to SB0003, only one of the areas can be turned on.	○	○
SB0001	Link stop of own station	Stops data link (cyclic transmission) of the own station. Off: Stop not requested On: Stop requested (valid at rising edge) (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • For SB0000 to SB0003, only one of the areas can be turned on.	○	○
SB0002	System link startup	Starts data link (cyclic transmission) of the entire system. The station where cyclic transmission is started is specified in 'Link startup/stop direction' (SW0000) and 'Link startup/stop station specification' (SW0001 to SB0008). Off: Startup not requested On: Startup requested (valid at rising edge) (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • For SB0000 to SB0003, only one of the areas can be turned on.	○ (Master operating station only)	×
SB0003	System link stop	Stops data link (cyclic transmission) of the entire system. The station where cyclic transmission is stopped is specified in 'Link startup/stop direction' (SW0000) and 'Link startup/stop station specification' (SW0001 to SW0008). Off: Stop not requested On: Stop requested (valid at rising edge) (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • For SB0000 to SB0003, only one of the areas can be turned on.	○ (Master operating station only)	×

No.	Name	Description	Availability	
			Master station (submaster station)	Local station
SB0004	Enabling communication path switch at an instantaneous interruption	Enables the system to switch the communication path at an instantaneous interruption. Off: Enable not requested On: Enable requested (valid at rising edge) • The current enable/disable status can be checked in 'Enable/disable status for communication path switch at an instantaneous interruption' (SB0084). • If this relay is turned on with enabled status, the instruction will be ignored.	○	×
SB0005	Clear loopback by communication path switch at an instantaneous interruption	Clears the loopback by the communication path switch at an instantaneous interruption. Off: Clear not requested On: Clear requested (valid at rising edge) • The current status can be checked in 'Loopback status of communication path switch at an instantaneous interruption' (SB0085). • If this relay is turned on with no loopback performed, the instruction will be ignored.	○	×
SB0006	Clear communication error count	Clears the link special register areas related to communication errors (SW0068 to SW006B, SW0074 to SW0077, SW007C to SW007F, SW0120 to SW015F) to 0. Off: Clear not requested On: Clear requested (valid while on)	○	○
SB000F	Error clear	Clears the error for the device station. Off: No request On: Request issued (Conditions) This relay is enabled only for device stations supporting 'Error clear' (SB000F).	○ (Master operating station only)	×
SB0010	Temporary error invalid station setting request	Sets the station specified in 'Reserved station function disable/temporary error invalid station setting' (SW0010 to SW0017) as a temporary error invalid station. Off: No request On: Request issued (When this relay is turned off, the error definition stored in 'Temporary error invalid station setting result' (SW0054) is cleared.)	○ (Master operating station only)	×
SB0011	Temporary error invalid station setting cancel request	Cancels the temporary error invalid station setting for the station specified in 'Reserved station function disable/temporary error invalid station setting' (SW0010 to SW0017). Off: No request On: Request issued (When this relay is turned off, the error definition stored in 'Temporary error invalid station setting cancel result' (SW0055) is cleared.)	○ (Master operating station only)	×
SB0012	Reserved station function disable request	Temporarily cancels the reserved station specification for the station specified in 'Reserved station function disable/temporary error invalid station setting' (SW0010 to SW0017). Off: No request On: Request issued (When this relay is turned off, the error definition stored in 'Result of reserved station function disable request' (SW0056) is cleared.)	○ (Master operating station only)	×
SB0013	Reserved station specification enable request	Enables the reserved station specification for the station specified in 'Reserved station function disable/temporary error invalid station setting' (SW0010 to SW0017). (This can only be requested for the stations whose reserved station setting is temporarily canceled) Off: No request On: Request issued (When this relay is turned off, the error definition stored in 'Result of reserved station function enable request' (SW0057) is cleared.)	○ (Master operating station only)	×

No.	Name	Description	Availability	
			Master station (submaster station)	Local station
SB0014	Device station addition start flag	Notifies that the addition of a device station is started or completed. Off: Device station addition completed On: Device station addition start (Conditions) This relay is enabled in a redundant master station or redundant line configuration. Turning on 'Device station addition start flag' (SB0014) after the parameter setting for the master station is completed turns on 'Device station addition acceptance status' (SB0081).	○ (Master station only)*2	×
SB0016	Remote device forced output request	Enables the remote device test function. Off: No request On: Request issued	○ (Master operating station only)	×
SB0019	Forced master switching command	Switches the operation of the master station to master operation when submaster station is operating as a master. Off: Switch not requested On: Switch requested (valid at rising edge) (Conditions) • This relay is enabled only when the submaster station is operating as a master. • This relay disabled in the case of the redundant system.	○ (Only for the submaster station operating as a master)	×
SB0030	RECV execution request flag CH1	Stores the data reception status of own station channel 1. Off: No data received On: Data received (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○	○
SB0031	RECV execution request flag CH2	Stores the data reception status of own station channel 2. Off: No data received On: Data received (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○	○
SB0032	RECV execution request flag CH3	Stores the data reception status of own station channel 3. Off: No data received On: Data received (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○*1	○*1
SB0033	RECV execution request flag CH4	Stores the data reception status of own station channel 4. Off: No data received On: Data received (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○*1	○*1
SB0034	RECV execution request flag CH5	Stores the data reception status of own station channel 5. Off: No data received On: Data received (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○*1	○*1

No.	Name	Description	Availability	
			Master station (submaster station)	Local station
SB0035	RECV execution request flag CH6	Stores the data reception status of own station channel 6. Off: No data received On: Data received (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○*1	○*1
SB0036	RECV execution request flag CH7	Stores the data reception status of own station channel 7. Off: No data received On: Data received (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○*1	○*1
SB0037	RECV execution request flag CH8	Stores the data reception status of own station channel 8. Off: No data received On: Data received (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○*1	○*1
SB0040	Network type of own station	Stores the network type of the own station. On: CC-Link IE Field Network	○	○
SB0043	Module operation mode of own station	Stores the module operation mode of the own station. Off: Online mode On: Other than online mode	○	○
SB0044	Station setting 1 of own station	Stores the station type of the own station. Off: Device station (other than the master station) On: Master station	○	○
SB0045	Station setting 2 of own station	Stores whether the station is local station or not when the own station is a device station. Off: Other than a local station (submaster station, remote device station, intelligent device station) On: Local station (Conditions) • This relay is enabled when 'Station setting 1 of own station' (SB0044) is off.	○ (Submaster station only)	○
SB0046	Station number setting status of own station	Stores the station number setting status. Off: Station number set On: Station number not set If parameters are set using the engineering tool, this relay is always OFF.	○	○
SB0047	Baton pass status of own station	Stores the baton pass status (transient transmission availability) of the own station. Off: Normal On: Error When this relay is turned on, the cause of the error can be checked with 'Baton pass status of own station' (SW0047) and 'Cause of baton pass interruption' (SW0048). Depending on the link refresh timing, the update of 'Baton pass status of own station' (SW0047) and 'Cause of baton pass interruption' (SW0048) may be offset by one sequence scan.	○	○

No.	Name	Description	Availability	
			Master station (submaster station)	Local station
SB0049	Data link error status of own station	Stores the data link error status of the own station. Off: Normal On: Error When this relay is turned on, the cause of the error can be checked with 'Cause of data link stop' (SW0049). Depending on the link refresh timing, the update of 'Cause of data link stop' (SW0049) may be offset by one sequence scan. (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○	○
SB004A	CPU minor error status of own station	Stores the minor error occurrence status of the CPU module on the own station. Off: No minor error On: Minor error	○	○
SB004B	CPU moderate/major error status of own station	Stores the moderate/major error occurrence status of the CPU module on the own station. Off: No moderate/major error On: Moderate/major error	○	○
SB004C	CPU operating status of own station	Stores the operating status of the CPU module on the own station. Off: RUN On: STOP, PAUSE, or moderate/major error	○	○
SB004D	Received parameter error	Stores the status of received parameter. (For the master station, this relay stores the parameter status of the own station) Off: Normal On: Error	○	○
SB004E	Master/submaster function operation status of own station	Stores the operation status of the own station when the submaster function is being used. Off: Master operating station On: Submaster operating station (Conditions) This relay is enabled for either of the following. • 'Station setting 1 of own station' (SB0044) is on. • Both 'Station setting 1 of own station' (SB0044) and 'Station setting 2 of own station' (SB0045) are off.	○	×
SB004F	Station number status of the operating station	Stores the station number setting method when the station type of the own station is local station. Off: Set by parameters On: Set by program (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	×	○
SB0050	Link startup request accept status of own station	Stores the acceptance status of 'Link startup of own station' (SB0000). Off: Not accepted (SB0000 is off.) On: Accepted (SB0000 is on.) (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○	○
SB0051	Link startup completion status of own station	Stores the status of link startup processing requested with 'Link startup of own station' (SB0000). Off: Link startup not completed (SB0000, SB0050 are off.) On: Link startup completed (SB0000, SB0050 are on.) (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○	○

No.	Name	Description	Availability	
			Master station (submaster station)	Local station
SB0052	Link stop request accept status of own station	Stores the acceptance status of 'Link stop of own station' (SB0001). Off: Not accepted (SB0001 is off.) On: Accepted (SB0001 is on.) (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○	○
SB0053	Link stop completion status of own station	Stores the link stop processing status requested with 'Link stop of own station' (SB0001). Off: Not completed (SB0001, SB0052 are off.) On: Completed (SB0001, SB0052 are on.) (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○	○
SB0054	System link startup request accept status	Stores the acceptance status of 'System link startup' (SB0002). Off: Not accepted (SB0002 is off.) On: Accepted (SB0002 is on.) (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○ (Master operating station only)	×
SB0055	System link startup completion status	Stores the status of link startup processing requested with 'System link startup' (SB0002). Off: Not completed (SB0002, SB0054 are off.) On: Completed (SB0002, SB0054 are on.) (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○ (Master operating station only)	×
SB0056	System link stop request accept status	Stores the acceptance status of 'System link stop' (SB0003). Off: Not accepted (SB0003 is off.) On: Accepted (SB0003 is on.) (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○ (Master operating station only)	×
SB0057	System link stop completion status	Stores the status of link stop processing requested with 'System link stop' (SB0003). Off: Not completed (SB0003, SB0056 are off.) On: Completed (SB0003, SB0056 are on.) (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○ (Master operating station only)	×
SB0058	Temporary error invalid station setting request accept status	Stores the acceptance status of 'Temporary error invalid station setting request' (SB0010). Off: Not accepted (SB0010 is off.) On: Accepted (SB0010 is on.)	○ (Master operating station only)	×
SB0059	Temporary error invalid station setting request completion status	Stores the status of temporary error invalid station setting processing requested with 'Temporary error invalid station setting request' (SB0010). Off: Not completed (SB0010, SB0058 are off.) On: Completed successfully or ended with an error (SB0010, SB0058 are on.)	○ (Master operating station only)	×

No.	Name	Description	Availability	
			Master station (submaster station)	Local station
SB005A	Temporary error invalid station setting cancel request accept status	Stores the acceptance status of 'Temporary error invalid station setting cancel request' (SB0011). Off: Not accepted (SB0011 is off.) On: Accepted (SB0011 is on.)	○ (Master operating station only)	×
SB005B	Temporary error invalid station setting cancel completion status	Stores the status of temporary error invalid station setting cancellation processing requested with 'Temporary error invalid station setting cancel request' (SB0011). Off: Not completed (SB0011, SB005A are off.) On: Completed successfully or ended with an error (SB0011, SB005A are on.)	○ (Master operating station only)	×
SB005C	Reserved station function disable request accept status	Stores the acceptance status of 'Reserved station function disable request' (SB0012). Off: Not accepted (SB0012 is off.) On: Accepted (SB0012 is on.)	○ (Master operating station only)	×
SB005D	Reserved station function disable completion status	Stores the status of temporary cancellation processing for reserved station specification which is requested with 'Reserved station function disable request' (SB0012). Off: Not completed (SB0012, SB005C are off.) On: Completed successfully or ended with an error (SB0012, SB005C are on.)	○ (Master operating station only)	×
SB005E	Reserved station setting enable request accept status	Stores the acceptance status of 'Reserved station specification enable request' (SB0013). Off: Not accepted (SB0013 is off.) On: Accepted (SB0013 is on.)	○ (Master operating station only)	×
SB005F	Reserved station setting enable completion status	Stores the temporary cancellation processing status for reserved station specification, which is requested with 'Reserved station specification enable request' (SB0013). Off: Not completed (SB0013, SB005E are off.) On: Completed successfully or ended with an error (SB0013, SB005E are on.)	○ (Master operating station only)	×
SB0060	Constant link scan status	Stores the operation status of link scan mode. Off: Link scan mode is not set to constant link scan On: Link scan mode is set to constant link scan (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○	○
SB0065	Loopback status	Stores the loopback status for the loopback function. The station number of the loopback station can be checked with 'Loopback station number 1' (SW0070) and 'Loopback station number 2' (SW0071). Off: Normal (no loopback stations) On: Loopback being performed (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off, or 'Network topology setting' (SB0078) is on. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○ (Master operating station only)	×
SB0066	Forced master switching enable status	Stores whether SB0019 is executable. Off: Not executable On: Executable	○ (Submaster station only)	×
SB0067	Forced master switching acceptance status	Stores the acceptance status of SB0019. Off: Not accepted (SB0019 is off.) On: Accepted (SB0019 is on.)	○ (Submaster station only)	×
SB0068	Forced master switching operation status	Stores the status of forced master switch processing requested with 'Forced master switching command' (SB0019). Off: Not completed (SB0019, SB0067 are off.) On: Completed successfully or ended with an error (SB0019, SB0067 are on.)	○ (Submaster station only)	×

No.	Name	Description	Availability	
			Master station (submaster station)	Local station
SB006A	PORT1 link-down status of own station	Stores the link down status of the own station P1 side. Off: Link-up On: Link-down The time that link-up starts after power-on or Ethernet cable connection may vary. Normally link-up takes several seconds. Depending on device status on the line, a link-up processing is repeated, resulting in the increase in the time.	○	○
SB006B	PORT2 link-down status of own station	Stores the link down status of the own station P2 side. Off: Link-up On: Link-down The time that link-up starts after power-on or Ethernet cable connection may vary. Normally link-up takes several seconds. Depending on device status on the line, a link-up processing is repeated, resulting in the increase in the time.	○	○
SB006C	PORT1 current error frame reception status of own station (1)	Stores if a receive frame error line status caution level is currently occurring in the P1 side of the own station. Off: A receive frame error line status caution level is not occurring. On: A receive frame error line status caution level is occurring.	○	○
SB006D	PORT2 current error frame reception status of own station (1)	Stores if a receive frame error line status caution level is currently occurring in the P2 side of the own station. Off: A receive frame error line status caution level is not occurring. On: A receive frame error line status caution level is occurring.	○	○
SB006E	PORT1 error frame reception detection status of own station (latch) (1)	Stores if a receive frame error line status caution level has occurred in the P1 side of the own station from power-on until the present. Off: A receive frame error line status caution level has not yet occurred. On: A receive frame error line status caution level has occurred.	○	○
SB006F	PORT2 error frame reception detection status of own station (latch) (1)	Stores if a receive frame error line status caution level has occurred in the P2 side of the own station from power-on until the present. Off: A receive frame error line status caution level has not yet occurred. On: A receive frame error line status caution level has occurred.	○	○
SB0070	Master station information	Stores the data link status when the submaster function is being used. Off: Data link by the master station On: Data link by the submaster station	○	○
SB0071	Submaster station information	Stores whether a submaster station exists. Off: No submaster station On: Submaster station exists	○	○
SB0072	Scan mode setting information	Stores the setting status of link scan mode. Off: Asynchronous with sequence scan or constant link scan On: Synchronous with sequence scan	○	○
SB0074	Reserved station specification status	Stores the status of reserved station specification by parameter. The station number of the station set as a reserved station can be checked with 'Reserved station setting status' (SW00C0 to SW00C7). Off: Not specified On: Specified	○	○
SB0075	Error invalid station setting status	Stores the status of error invalid station setting by parameter. The station number of the station set as an error invalid station can be checked with 'Error invalid station setting status' (SW00D0 to SW00D7). Off: Not specified On: Specified	○	○
SB0076	Submaster station setting information	Stores whether a submaster station is set. Off: No setting On: Set	○	×
SB0077	Parameter reception status	Stores the status of parameter reception from the master station. Off: Reception completed On: Reception not completed	○ (Submaster station only)	○

No.	Name	Description	Availability	
			Master station (submaster station)	Local station
SB0078	Network topology setting	Stores the setting status of "Network Topology" in "Basic Settings" for the own station (master operating station). Off: Line topology, star topology, or coexistence of star and line topologies On: Ring topology	○ (Master operating station only)	×
SB0079	Master station return setting information	Stores the setting status of the "Operation of Master Station after Reconnection" in "Basic Settings" for the own station (master station). Off: Return as master operating station On: Return as submaster operating station	○ (Master station only)	×
SB007B	Input data status of data link faulty station	Stores the setting status of "Data Link Error Station Setting" under "I/O Maintenance Settings" in "Supplementary Cyclic Settings" of "Application Settings" for the own station. Off: Clear On: Hold	○	○
SB007C	Line type setting status	Stores the setting status of line types when the redundant system was configured. Off: Redundant master station or redundant device station On: Redundant line The relay is turned off for the configuration other than the redundant system.	○ (Master station only)*2	×
SB007D	Hold/clear status setting for CPU STOP	Stores the setting status of "Output Hold/Clear Setting during CPU STOP" under "I/O Maintenance Settings" in "Supplementary Cyclic Settings" of "Application Settings" for the own station. Off: Hold On: Clear	○	○
SB007F	IP address setting status	Stores the status of the IP address setting by parameter. Off: No setting On: Set For local stations, this relay stores the acceptance status of the IP address from the master station.	○	○
SB0080	Mismatch status of the master operating station IP address	Comparison result of the IP addresses set for the submaster operating station and for the master operating station is stored. Off: Match On: Mismatch	○	×
SB0081	Device station addition acceptance status	Stores the acceptance status of 'Device station addition start flag' (SB0014). When this relay is turned on, system switching due to a data link error or system switching monitoring target station error is inhibited. The relay is turned off under any of the following conditions. • 'Device station addition start flag' (SB0014) is turned off. • Approximately 30 minutes pass after 'Device station addition acceptance status' (SB0081) is turned on. Off: Not accepted On: Accepted	○ (Master station only)*2	×
SB0084	Enabling/disabling status of communication path switch at an instantaneous interruption	Stores the status of the communication path switch at an instantaneous interruption. Off: Disable On: Enable	○	×
SB0085	Loopback status of communication path switch at an instantaneous interruption	Stores the loopback status by the communication path switch at an instantaneous interruption. Off: Not performed On: Performed	○	×
SB0086	Remote device forced output request accept	Stores the acceptance status of remote device test function. Off: Not accepted On: Accepted	○ (Master operating station only)	×
SB0087	Remote device forced output status	Stores the operating status of remote device test function. Off: Not completed On: Completed	○ (Master operating station only)	×

No.	Name	Description	Availability	
			Master station (submaster station)	Local station
SB008C	PORT1 current error frame reception status of own station (2)	Stores if a receive frame error line status warning level is currently occurring in the P1 side of the own station. Off: A receive frame error line status warning level is not occurring. On: A receive frame error line status warning level is occurring.	○	○
SB008D	PORT2 current error frame reception status of own station (2)	Stores if a receive frame error line status warning level is currently occurring in the P2 side of the own station. Off: A receive frame error line status warning level is not occurring. On: A receive frame error line status warning level is occurring.	○	○
SB008E	PORT1 error frame reception detection status of own station (latch) (2)	Stores if a receive frame error line status warning level has occurred in the P1 side of the own station from power-on until the present. Off: A receive frame error line status warning level has not yet occurred. On: A receive frame error line status warning level has occurred.	○	○
SB008F	PORT2 error frame reception detection status of own station (latch) (2)	Stores if a receive frame error line status warning level has occurred in the P2 side of the own station from power-on until the present. Off: A receive frame error line status warning level has not yet occurred. On: A receive frame error line status warning level has occurred.	○	○
SB0098	Network configuration mismatch occurrence status	Stores the match or mismatch status of the actual network configuration and the network map of the CC-Link IE Field Network diagnostics. Off: Match On: Mismatch After return or addition of the device station, SB0098 may be turned on regardless of the actual match/mismatch status.	○ (Master operating station only)	×
SB0099	Number of connected modules over occurrence status	Stores whether the number of device stations (including a submaster station) connected is 120 or less, or 121 or more. Off: 120 or less On: 121 or more Number of connected modules is the total of the device stations (including a submaster station) which are currently connected and the disconnected stations (device stations which were previously connected).	○ (Master operating station only)	×
SB00A0	Baton pass error status of each station	Stores the baton pass status of each station. Off: All stations normal On: Faulty station exists When this relay is turned on, the status of each station can be checked with 'Baton pass status of each station' (SW00A0 to SW00A7). Depending on the link refresh timing, the update of 'Baton pass status of each station' (SW00A0 to SW00A7) may be offset by one sequence scan. (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held. • Reserved stations and stations higher than the maximum station number are ignored.	○	○
SB00A1	Baton pass error status of master station	Stores the baton pass status of the master station (master operating station). Off: Normal On: Error (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○	○

No.	Name	Description	Availability	
			Master station (submaster station)	Local station
SB00AF	Baton pass error status of station No.0	Stores the baton pass status of the station No.0. Off: Normal On: Error (Conditions) • This relay is enabled when the submaster function is used.	○	○
SB00B0	Data link error status of each station	Stores the data link status of each station. Off: All stations normal On: Faulty station exists When this relay is turned on, the status of each station can be checked with 'Data link status of each station' (SW00B0 to SW00B7). Depending on the link refresh timing, the update of 'Data link status of each station' (SW00B0 to SW00B7) may be offset by one sequence scan. If the master station is powered on before device stations, data link may be reconfigured. During the reconfiguration (maximum three seconds), 'Data link error status of each station' (SB00B0) is turned on (error). Starting up the master station last can prevent data link from being reconnected and 'Data link error status of each station' (SB00B0) from being turned on (error). (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held. • Reserved stations and stations higher than the maximum station number are ignored.	○	○
SB00B1	Data link error status of master station	Stores the data link status of the master station (master operating station). Off: Normal On: Error (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○	○
SB00B8	Network connection status of each station	Stores whether a network connected station exists. Off: No network connected station On: Network connected station exists When this relay is turned on, the status of each station can be checked with 'Network connection status' (SW00B8 to SW00BF). Depending on the link refresh timing, the update of 'Network connection status' (SW00B8 to SW00BF) may be offset by one sequence scan.	○	○
SB00BF	Data link error status of station No.0	Stores the data link status of the station No.0. Off: Normal On: Error (Conditions) • This relay is enabled when the submaster function is used.	○	○
SB00C0	Reserved station setting status	Stores whether a reserved station is set. Off: No setting On: Set When this relay is turned on, the status of each station can be checked with 'Reserved station setting status' (SW00C0 to SW00C7). Depending on the link refresh timing, the update of 'Reserved station setting status' (SW00C0 to SW00C7) may be offset by one sequence scan. (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○	○

No.	Name	Description	Availability	
			Master station (submaster station)	Local station
SB00D0	Error invalid station setting current status	Set whether an error invalid station is set. Off: No setting On: Set When this relay is turned on, the status of each station can be checked with 'Error invalid station setting status' (SW00D0 to SW00D7). Depending on the link refresh timing, the update of 'Error invalid station setting status' (SW00D0 to SW00D7) may be offset by one sequence scan. (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○	○
SB00D8	Pairing-set station exists information	Stores the pairing setting status of each station (including the own station). Off: No pairing-set station On: Pairing-set station exists When this relay is turned on, the status of each station can be checked with 'Pairing setting status of each station' (SW00D8 to SW00DF). Depending on the link refresh timing, the update of 'Pairing setting status of each station' (SW00D8 to SW00DF) may be offset by one sequence scan. (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○	○
SB00E0	Temporary error invalid station setting status	Stores whether a temporary error invalid station is set. Off: No setting On: Set When this relay is turned on, the status of each station can be checked with 'Temporary error invalid station setting status' (SW00E0 to SW00E7). Depending on the link refresh timing, the update of 'Temporary error invalid station setting status' (SW00E0 to SW00E7) may be offset by one sequence scan. (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○	○
SB00E8	Station type match status of each station	Stores the station type match status of each station. Off: Station type match in all stations On: Station type mismatch exists When this relay is turned on, the status of each station can be checked with 'Station type match status' (SW00E8 to SW00EF). Depending on the link refresh timing, the update of 'Station type match status' (SW00E8 to SW00EF) may be offset by one sequence scan.	○	○

No.	Name	Description	Availability	
			Master station (submaster station)	Local station
SB00F0	CPU operating status of each station	Stores the operating status of the CPU module on each station. Off: All stations are at RUN or STEP-RUN state On: Station at STOP or PAUSE state, or station with a moderate/major error exists. When this relay is turned on, the status of each station can be checked with 'CPU operating status of each station' (SW00F0 to SW00F7). Depending on the link refresh timing, the update of 'CPU operating status of each station' (SW00F0 to SW00F7) may be offset by one sequence scan. (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○	○
SB00F1	CPU operating status of master station	Stores the operating status of the CPU module on the master station (master operating station). Off: RUN or STEP-RUN state On: STOP state, PAUSE state, or moderate/major error (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○	○
SB00F8	Network number match status	Stores the network number match status of each station. Off: Network number match in all stations On: Network number mismatch station exists When this relay is turned on, the status of each station can be checked with 'Network number match status' (SW00F8 to SW00FF). Depending on the link refresh timing, the update 'Network number match status' (SW00F8 to SW00FF) may be offset by one sequence scan. (Conditions) This relay is enabled when 'Baton pass status of own station' (SB0047) is off.	○	○
SB00FF	CPU operating status of station No.0	Stores the operating status of the CPU module on the station No.0. Off: RUN or STEP-RUN state On: STOP state, PAUSE state, or moderate/major error (Conditions) • This relay is enabled when the submaster function is used.	○	○
SB0100	CPU moderate/major error status of each station	Stores the moderate/major error or stop error occurrence status of each station. When the target station is the master/local module, the occurrence status on the control CPU is stored. Off: No moderate/major error (stop error) On: Station with a moderate/major error (stop error) exists When this relay is turned on, the status of each station can be checked with 'CPU moderate/major error status of each station' (SW0100 to SW0107). Depending on the link refresh timing, the update of 'CPU moderate/major error status of each station' (SW0100 to SW0107) may be offset by one sequence scan. (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○	○

No.	Name	Description	Availability	
			Master station (submaster station)	Local station
SB0101	CPU moderate/major error status of master station	Stores the moderate/major error occurrence status of the CPU module on the master station (master operation station). Off: No moderate/major error On: Moderate/major error (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○	○
SB0108	Station number duplication occurrence status	Stores the station number duplication occurrence status of each station. Off: Station number not duplicated On: Station number duplicated When this relay is turned on, the status of each station can be checked with 'Station number duplication occurrence status' (SW0108 to SW010F). Depending on the link refresh timing, the update of 'Station number duplication occurrence status' (SW0108 to SW010F) may be offset by one sequence scan. (Conditions) This relay is enabled when 'Baton pass status of own station' (SB0047) is off.	○	○
SB010F	CPU moderate/major error status of station No.0	Stores the moderate/major error occurrence status of the CPU module on the station No.0. Off: No moderate/major error On: Moderate/major error (Conditions) • This relay is enabled when the submaster function is used.	○	○
SB0110	CPU minor error status of each station	Stores the minor error or continuation error occurrence status of each station. When the target station is the master/local module, the occurrence status on the control CPU is stored. Off: All stations normal or station with a moderate/major error (stop error) exists. On: Station with a minor error (continuation error) exists. When this relay is turned on, the status of each station can be checked with 'CPU minor error status of each station' (SW0110 to SW0117). Depending on the link refresh timing, the update of 'CPU minor error status of each station' (SW0110 to SW0117) may be offset by one sequence scan. (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○	○
SB0111	CPU minor error status of master station	Stores the minor error occurrence status of the CPU module on the master station (master operating station). Off: No minor errors, or a moderate/major error being occurred On: Minor error (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○	○

No.	Name	Description	Availability	
			Master station (submaster station)	Local station
SB0118	Station of standby system exists information	Stores the CPU operation status (control/standby system) of each station (including the own station). Off: No station of standby system CPU On: Station of standby system CPU exists. This relay is turned off for a station other than a redundant system station. When this relay is turned on, the status of each station can be checked with 'Redundant CPU system status of each station' (SW0118 to SW011F). Depending on the link refresh timing, the update of 'Redundant CPU system status of each station' (SW0118 to SW011F) may be offset by one sequence scan. (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○	○
SB0119	Redundant CPU system status of master station	Stores the redundant CPU system status (control/standby system) of the master station (master operating station). Off: Control system On: Standby system This relay is turned off for a station other than a redundant system station. (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off.	○	○
SB011A	Redundant CPU system status of station No.0	Stores the redundant CPU system status (control/standby system) of the station No.0. Off: Control system On: Standby system This relay is turned off for a station other than a redundant system station. (Conditions) • This relay is enabled when the submaster function is used.	○	○
SB011F	CPU minor error status of station No.0	Stores the minor error occurrence status of the CPU module on the station No.0. Off: No minor errors, or a moderate/major error being occurred On: Minor error (Conditions) • This relay is enabled when the submaster function is used.	○	○
SB0120	PORT1 current error frame reception status (1)	Stores if a receive frame error line status caution level is currently occurring in the P1 side of each station. Off: A receive frame error line status caution level is not occurring in any stations. On: A receive frame error line status caution level is occurring in one or more stations. If a receive frame error line status caution level is occurring, the status of each station can be checked with 'PORT1 current error frame reception status of each station (1)' (SW0120 to SW0127). Depending on the link refresh timing, the update of 'PORT1 current error frame reception status of each station (1)' (SW0120 to SW0127) may be offset by one sequence scan. (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○	○

No.	Name	Description	Availability	
			Master station (submaster station)	Local station
SB0121	PORT1 current error frame reception status of master station	Stores whether the error frame is currently received at the P1 side of the master station (master operating station). Off: Not received On: Currently receiving (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○	○
SB0128	PORT1 current error frame reception status (2)	Stores if a receive frame error line status warning level is currently occurring in the P1 side of each station. Off: A receive frame error line status warning level is not occurring in any stations. On: A receive frame error line status warning level is occurring in one or more stations. If a receive frame error line status warning level is occurring, the status of each station can be checked with 'PORT1 current error frame reception status of each station (2)' (SW0128 to SW012F). Depending on the link refresh timing, the update of 'PORT1 current error frame reception status of each station (2)' (SW0128 to SW012F) may be offset by one sequence scan. (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○	○
SB0129	PORT1 current error frame reception status of station No.0 (2)	Stores if a receive frame error line status warning level is currently occurring in the P1 side of the station No.0. Off: A receive frame error line status warning level is not occurring. On: A receive frame error line status warning level is occurring. (Conditions) • This relay is enabled when the submaster function is used.	○	○
SB012F	PORT1 current error frame reception status of station No.0 (1)	Stores if a receive frame error line status caution level is currently occurring in the P1 side of the station No.0. Off: A receive frame error line status caution level is not occurring. On: A receive frame error line status caution level is occurring. (Conditions) • This relay is enabled when the submaster function is used.	○	○
SB0130	PORT2 current error frame reception status (1)	Stores if a receive frame error line status caution level is currently occurring in the P2 side of each station. Off: A receive frame error line status caution level is not occurring in any stations. On: A receive frame error line status caution level is occurring in one or more stations. If a receive frame error line status caution level is occurring, the status of each station can be checked with 'PORT2 current error frame reception status of each station (1)' (SW0130 to SW0137). Depending on the link refresh timing, the update of 'PORT2 current error frame reception status of each station (1)' (SW0130 to SW0137) may be offset by one sequence scan. (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○	○
SB0131	PORT2 current error frame reception status of master station	Stores whether the error frame is currently received at the P2 side of the master station (master operating station). Off: Not received On: Currently receiving (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○	○

No.	Name	Description	Availability	
			Master station (submaster station)	Local station
SB0138	PORT2 current error frame reception status (2)	Stores if a receive frame error line status warning level is currently occurring in the P2 side of each station. Off: A receive frame error line status warning level is not occurring in any stations. On: A receive frame error line status warning level is occurring in one or more stations. If a receive frame error line status warning level is occurring, the status of each station can be checked with 'PORT2 current error frame reception status of each station (2)' (SW0138 to SW013F). Depending on the link refresh timing, the update of 'PORT2 current error frame reception status of each station (2)' (SW0138 to SW013F) may be offset by one sequence scan. (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○	○
SB0139	PORT2 current error frame reception status of station No.0 (2)	Stores if a receive frame error line status warning level is currently occurring in the P2 side of the station No.0. Off: A receive frame error line status warning level is not occurring. On: A receive frame error line status warning level is occurring. (Conditions) • This relay is enabled when the submaster function is used.	○	○
SB013F	PORT2 current error frame reception status of station No.0 (1)	Stores if a receive frame error line status caution level is currently occurring in the P2 side of the station No.0. Off: A receive frame error line status caution level is not occurring. On: A receive frame error line status caution level is occurring. (Conditions) • This relay is enabled when the submaster function is used.	○	○
SB0140	PORT1 error frame reception detection status (1)	Stores if a receive frame error line status caution level has occurred in the P1 side of each station from power-on until the present. Off: A receive frame error line status caution level has not yet occurred in any stations. On: A receive frame error line status caution level has occurred in one or more stations. If a receive frame error line status caution level has occurred, the status of each station can be checked with 'PORT1 error frame reception detection status (1)' (SW0140 to SW0147). Depending on the link refresh timing, the update of 'PORT1 error frame reception detection status (1)' (SW0140 to SW0147) may be offset by one sequence scan. (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○	○
SB0141	PORT1 error frame detection of master station	Stores whether the error frame was received at the P1 side of the master station (master operating station) from power-on to the present. Off: Not received On: Received (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○	○

No.	Name	Description	Availability	
			Master station (submaster station)	Local station
SB0148	PORT1 error frame reception detection status (2)	Stores if a receive frame error line status warning level has occurred in the P1 side of each station from power-on until the present. Off: A receive frame error line status warning level has not yet occurred in any stations. On: A receive frame error line status warning level has occurred in one or more stations. If a receive frame error line status warning level has occurred, the status of each station can be checked with 'PORT1 error frame reception detection status (2)' (SW0148 to SW014F). Depending on the link refresh timing, the update of 'PORT1 error frame reception detection status (2)' (SW0148 to SW014F) may be offset by one sequence scan. (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○	○
SB0149	PORT1 error frame reception detection status of station No.0 (2)	Stores if a receive frame error line status warning level has occurred in the P1 side of the station No.0 from power-on until the present. Off: A receive frame error line status warning level has not yet occurred. On: A receive frame error line status warning level has occurred at least once. (Conditions) • This relay is enabled when the submaster function is used.	○	○
SB014F	PORT1 error frame reception detection status of station No.0 (1)	Stores if a receive frame error line status caution level has occurred in the P1 side of the station No.0 from power-on until the present. Off: A receive frame error line status caution level has not yet occurred. On: A receive frame error line status caution level has occurred at least once. (Conditions) • This relay is enabled when the submaster function is used.	○	○
SB0150	PORT2 error frame reception detection status (1)	Stores if a receive frame error line status caution level has occurred in the P2 side of each station from power-on until the present. Off: A receive frame error line status caution level has not yet occurred in any stations. On: A receive frame error line status caution level has occurred in one or more stations. If a receive frame error line status caution level has occurred, the status of each station can be checked with 'PORT2 error frame reception detection status (1)' (SW0150 to SW0157). Depending on the link refresh timing, the update of 'PORT2 error frame reception detection status (1)' (SW0150 to SW0157) may be offset by one sequence scan. (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○	○
SB0151	PORT2 error frame detection of master station	Stores whether the error frame was received at the P2 side of the master station (master operating station) from power-on to the present. Off: Not received On: Received (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○	○

No.	Name	Description	Availability	
			Master station (submaster station)	Local station
SB0158	PORT2 error frame reception detection status (2)	Stores if a receive frame error line status warning level has occurred in the P2 side of each station from power-on until the present. Off: A receive frame error line status warning level has not yet occurred in any stations. On: A receive frame error line status warning level has occurred in one or more stations. If a receive frame error line status warning level has occurred, the status of each station can be checked with 'PORT2 error frame reception detection status (2)' (SW0158 to SW015F). Depending on the link refresh timing, the update of 'PORT2 error frame reception detection status (2)' (SW0158 to SW015F) may be offset by one sequence scan. (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○	○
SB0159	PORT2 error frame reception detection status of station No.0 (2)	Stores if a receive frame error line status warning level has occurred in the P2 side of the station No.0 from power-on until the present. Off: A receive frame error line status warning level has not yet occurred. On: A receive frame error line status warning level has occurred at least once. (Conditions) • This relay is enabled when the submaster function is used.	○	○
SB015F	PORT2 error frame reception detection status of station No.0 (1)	Stores if a receive frame error line status caution level has occurred in the P2 side of the station No.0 from power-on until the present. Off: A receive frame error line status caution level has not yet occurred. On: A receive frame error line status caution level has occurred at least once. (Conditions) • This relay is enabled when the submaster function is used.	○	○
SB0170	Parameter error status of each station	Stores the parameter error status of each station. Off: All stations normal On: Faulty station exists When this relay is turned on, the status of each station can be checked with 'Parameter error status of each station' (SW0170 to SW0177). Depending on the link refresh timing, the update of 'Parameter error status of each station' (SW0170 to SW0177) may be offset by one sequence scan. (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held. • Reserved stations and stations higher than the maximum station number are ignored.	○	○
SB017F	Parameter error status of station No.0	Stores the parameter error status of the station No.0. Off: Normal On: Error (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held. • This relay is enabled when the submaster function is used.	○	○

No.	Name	Description	Availability	
			Master station (submaster station)	Local station
SB0180	Reserved station function disable status	Stores whether there is a station whose reserved station setting is temporarily canceled. Off: Not exist On: Exists When this relay is turned on, the status of each station can be checked with "Reserved station cancel setting status" (SW0180 to SW0187). Depending on the link refresh timing, the update of 'Reserved station cancel setting status' (SW0180 to SW0187) may be offset by one sequence scan. (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○	○
SB01B0	Redundant system data link error status of each station	Stores the data link status of each station when the own station is the redundant system. Off: All stations normal On: Faulty station exists or the own station is the standby system. When the own station is the control station and checks that the data link status of each station is normal in all stations the control system, 'Redundant system data link error status of each station' (SB01B0) is turned off (normal). (The data input from all stations is valid.) When this relay is turned on, the status of each station can be checked with 'Redundant system data link status of each station' (SW01B0 to SW01B7). Depending on the link refresh timing, the update of 'Redundant system data link status of each station' (SW01B0 to SW01B7) may be offset by one sequence scan. If the master station is powered on before device stations, data link may be reconfigured. During the reconfiguration (maximum three seconds), 'Redundant system data link error status of each station' (SB01B0) is turned on (error). Starting up the master station last can prevent data link from being reconnected and 'Redundant system data link error status of each station' (SB01B0) from being turned on (error). (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held. • Reserved stations and stations higher than the maximum station number are ignored.	○*2	○*2
SB01B1	Redundant system data link error status of master station	Stores the data link status of the master station (master operating station) when the own station is the redundant system. Off: Normal On: Error or the own station is the standby system. When the own station is the control system and checks that the data link status of the master station (master operating station) is normal, 'Redundant system data link error status of master station' (SB01B1) is turned off (normal). (The data input from the master station (master operating station) is valid.) (Conditions) • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○*2	○*2

No.	Name	Description	Availability	
			Master station (submaster station)	Local station
SB01BF	Redundant system data link error status of station No.0	Stores the data link status of station No.0 when the own station is the redundant system. Off: Normal On: Error or the own station is the standby system. When the own station is the control system and checks that the data link status of the station No.0 is normal, 'Redundant system data link error status of station No.0' (SB01BF) is turned off (normal). (The data input from the station No.0 is valid.) (Conditions) • This relay is enabled when the submaster function is used. • This relay is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.	○*2	○*2
SB01E1	Setting status of CC-Link IE Field Network synchronous communication function	Stores the setting status of the CC-Link IE Field Network synchronous communication function. Off: No setting On: Set	○ (Master station only)	×
SB01E9	Inter-module synchronization cycle over flag	Stores the cycle over occurrence status of the inter-module synchronization function. This relay is turned on if output preparation processing (link scan for network modules) is not completed within the inter-module synchronization cycle. Off: Processing time overflow has not occurred. On: Processing time overflow has occurred. Once this relay is turned on, it remains turned on even if the processing is operated within the specified inter-module synchronization cycle. The status is cleared by turning off and on the power supply or resetting the CPU module.	○	○
SB01EE	Redundant function information of own station	Stores the redundant system support information of the own station. Off: Redundant function not supported On: Redundant function supported	○*2	○*2

*1 This relay is enabled only for the RJ71EN71 or the RnENCPU (network part) when the CC-Link IE Field Network function is used.
*2 This relay is enabled only for the RJ71GF11-T2.

Appendix 5 List of SW

The link special register (SW) stores the information during data link as a numerical value. Error locations and causes can be checked by using or monitoring the link special register (SW) in programs.
By using SW, the status of CC-Link IE Field Network can be checked from HMI (Human Machine Interfaces) as well as the engineering tool.

Refresh

Set SWs in "Refresh Settings" under "Basic Settings" so that they are refreshed to the devices or labels of the CPU module. (☞ Page 148 Refresh Settings)

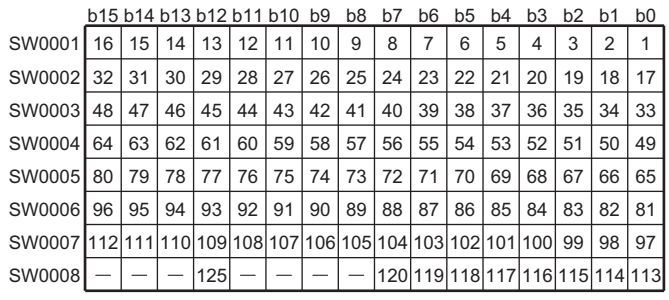
Ranges

This section describes list of SW when SWs are assigned from SW0000 to SW01FF.

- Stored by users: SW0000 to SW001F
- Stored by the system: SW0020 to SW01FF

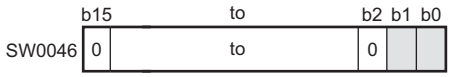
Point

Do not write any data to an area whose number is not on the following list or ranges where data are stored by the system. Doing so may cause malfunction of the programmable controller system.

No.	Name	Description	Availability	
			Master station (submaster station)	Local station
SW0000	Link startup/stop direction	Set the content of data link startup/stop directions. 00H: Own station 01H: All stations 02H: Specified stations 80H: Own station enforced (enabled only for data link startup) 81H: All stations enforced (enabled only for data link startup) 82H: Specified stations enforced (enabled only for data link startup) • Data link startup/stop is performed by 'System link startup' (SB0002) or 'System link stop' (SB0003). • When 02H (specified station) or 82H (specified station enforced) is selected, the own station is not included.	○ (Master operating station only)	×
SW0001 to SW0008	Link startup/stop station specification	Set the station number to start or stop data link when 02H or 82H is set in 'Link startup/stop direction' (SW0000). 0: Startup or stop not requested 1: Startup or stop requested  Each number in the table represents a station number. • To specify the master station operating as a submaster station (station number 0), turn on the bit of the station number 125. • While the submaster station is operating as a master operating station, setting of the submaster station number is ignored.	○ (Master operating station only)	×
SW0009	RIRD/RIWT instruction arrival monitoring time	Specify the monitoring time until the RIRD/RIWT instruction completion. If the instruction is not completed within the time, it will be resent for the number of times specified in 'RIRD/RIWT instruction resend count' (SW000B). 0: 10 seconds (default) 1 to 360: 1 to 360 seconds If a value other than the above is specified, 360 seconds will be applied.	○	○

	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	—	—	—	125	—	—	—	—	120	119	118	117	116	115	114	113

<table>
<tr><th rowspan="2">No.</th><th rowspan="2">Name</th><th rowspan="2">Description</th><th colspan="2">Availability</th></tr>
<tr><th>Master station (submaster station)</th><th>Local station</th></tr>
<tr><td>SW000B</td><td>RIRD/RIWT instruction resend count</td><td>Specify the number of times the instruction is to be resent when it is not completed within the monitoring time specified in 'RIRD/RIWT instruction arrival monitoring time' (SW0009).
0: Not resent (default)
1 to 7: 1 to 7 times
If a value other than the above is specified, 7 times will be applied.</td><td>○</td><td>○</td></tr>
<tr><td>SW0010 to SW0017</td><td>Reserved station function disable/ temporary error invalid station setting</td><td>Specify the device station for which the reserved station setting is to be temporary canceled/restored, or the temporary error invalid station setting is to be set/ canceled.
0: Not specified
1: Specified
<table><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><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></table>Each number in the table represents a station number.
(Conditions)
• For some stations, reserved station setting cannot be temporarily canceled/ restored or temporary error invalid station setting cannot be set/canceled. (☞ Page 297 Reserved Station Function Enable, Page 299 Enable/Disable Ignore Station Errors)
• When the submaster station number is specified, the setting is ignored.
• Stations higher than the maximum station number are ignored.</td><td>○ (Master operating station only)</td><td>×</td></tr>
<tr><td>SW001A</td><td>REMFR/REMTO instruction resend count</td><td>Set the number of resends for the REMFR/REMTO/REMFRD/REMTOD instruction.
0: Not resent (default)
Other than the above: Number of times that is set
(Conditions)
• This register is enabled when 'Baton pass status of own station' (SB0047) is off.
• When 'Baton pass status of own station' (SB0047) is turned on (error), data prior to error is held.</td><td>○ (Master operating station only)</td><td>×</td></tr>
<tr><td>SW001B</td><td>REMFR/REMTO instruction response wait timer time</td><td>Set the response wait time for the REMFR/REMTO/REMFRD/REMTOD instruction.
0: 10 seconds (default)
Other than the above: Number of seconds that is set
(Conditions)
• This register is enabled when 'Baton pass status of own station' (SB0047) is off.
• When 'Baton pass status of own station' (SB0047) is turned on (error), data prior to error is held.</td><td>○ (Master operating station only)</td><td>×</td></tr>
<tr><td>SW0030</td><td>Link dedicated instructions processing result CH1</td><td>Stores the processing results of the link dedicated instruction that used channel 1 of the own station.
0: Completed normally
1 or greater: Completed with an error (Error code is stored.)</td><td>○</td><td>○</td></tr>
<tr><td>SW0031</td><td>Link dedicated instructions processing result CH2</td><td>Stores the processing results of the link dedicated instruction that used channel 2 of the own station.
0: Completed normally
1 or greater: Completed with an error (Error code is stored.)</td><td>○</td><td>○</td></tr>
<tr><td>SW0040</td><td>Network number</td><td>Stores the network number of the own station.
Range: 1 to 239</td><td>○</td><td>○</td></tr>
<tr><td>SW0042</td><td>Station number</td><td>Stores the station number of the own station.
Range: 1 to 120, 125 (master station), 255 (station number not set)</td><td>○</td><td>○</td></tr>
</table>

No.	Name	Description	Availability	
			Master station (submaster station)	Local station
SW0043	Mode status of own station	Stores the module operation mode setting or communication mode of the own station. 0: Online mode, normal (local station: online mode) 1: Online mode, high speed 2: Offline mode 3: Online mode, high-speed remote net B: Module communication test mode	○	○
SW0044	Submaster station number	Stores the submaster station number that has been set using a parameter. 0: No submaster function setting 1 to 120: Station number of the submaster station	○	○
SW0046	Module type	Stores the hardware status of the own station.  Model type 00: Module 01: Board 10: HMI	○	○
SW0047	Baton pass status of own station	Stores the baton pass status (transient transmission availability) of the own station. 0: Data link in progress 2: Baton pass in progress 3: Baton pass being terminated 4: Test in progress 5: Offline	○	○
SW0048	Cause of baton pass interruption	Stores the cause of interruption in the communication (baton pass) of the own station. 00H: At normal communication or power-on 30H: Cable disconnection 33H: Disconnection or return in progress 40H: Offline mode 60H: Network topology setting error	○	○
SW0049	Cause of data link stop	Stores the cause which stopped the data link of the own station. 00H: At normal communication or power-on 01H: Stop direction 02H: Monitoring time timeout 05H: No device station (master station only) 10H: Parameter not received (local station only) 11H: Station number of the own station out of the range 12H: Reserved station setting of the own station 13H: Own station number duplication 14H: Master station duplication/submaster station duplication 16H: Station number not set 18H: Parameter error 19H: Parameter communication in progress 1AH: Station type mismatch 1BH: Parameter mismatch 1DH: Initial processing of CC-Link IE Field Network synchronous communication 20H: CPU module moderate error, major error 60H: Illegal ring connection (master station only)	○	○
SW004A	Data link stop request station	Stores the station number of the station that performed the data link stop request for the own station. Range: 1 to 120, 125 (master station) The data link stop request is performed by 'System link stop' (SB0003). (Conditions) • This register is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on (error), data prior to error is held.	○	○

No.	Name	Description	Availability	
			Master station (submaster station)	Local station
SW004B	CPU status of own station	Stores the status of the CPU module on the own station. 00H: No CPU module mounted 01H: STOP (normal) 02H: STOP (moderate/major error) 03H: STOP (minor error) 04H: RUN (normal) 05H: RUN (minor error) 07H: PAUSE 0EH: Reset in progress 0FH: Initial processing	○	○
SW004C	Parameter setting status	Stores the status of parameter settings. 0: Normal 1 or greater: Error definition (Error code is stored.) (Conditions) • This register is enabled when 'Received parameter error' (SB004D) is on.	○	○
SW0050	Link startup result of own station	Stores the results when data link is started by 'Link startup of own station' (SB0000). 0: Normal 1 or greater: Error definition (Error code is stored.) When 'Link startup of own station' (SB0000) is turned off, the stored error definition is cleared. (Conditions) • This register is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on (error), data prior to error is held.	○	○
SW0051	Link stop result of own station	Stores the results when data link is stopped by 'Link stop of own station' (SB0001). 0: Normal 1 or greater: Error definition (Error code is stored.) When 'Link stop of own station' (SB0001) is turned off, the stored error definition is cleared. (Conditions) • This register is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on (error), data prior to error is held.	○	○
SW0052	System link startup result	Stores the results when data link is started by 'System link startup' (SB0002). 0: Normal 1 or greater: Error definition in own station (Error code is stored.) When 'System link startup' (SB0002) is turned off, the stored error definition is cleared. (Conditions) • This register is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on (error), data prior to error is held.	○ (Master operating station only)	×
SW0053	System link stop result	Stores the results when data link is stopped by 'System link stop' (SB0003). 0: Normal 1 or greater: Error definition in own station (Error code is stored.) When 'System link stop' (SB0003) is turned off, the stored error definition is cleared. (Conditions) • This register is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on (error), data prior to error is held.	○ (Master operating station only)	×
SW0054	Temporary error invalid station setting result	Stores the results when executing the temporary error invalid station setting by 'Temporary error invalid station setting request' (SB0010). 0: Normal 1 or greater: Error definition (Error code is stored.) When 'Temporary error invalid station setting request' (SB0010) is turned off, the stored error definition is cleared.	○ (Master operating station only)	×
SW0055	Temporary error invalid station setting cancel result	Stores the results when canceling the temporary error invalid station setting by 'Temporary error invalid station setting cancel request' (SB0011). 0: Normal 1 or greater: Error definition (Error code is stored.) When 'Temporary error invalid station setting cancel request' (SB0011) is turned off, the stored error definition is cleared.	○ (Master operating station only)	×

No.	Name	Description	Availability	
			Master station (submaster station)	Local station
SW0056	Result of reserved station function disable request	Stores the results when disabling the reserved station function by 'Reserved station function disable request' (SB0012). 0: Normal 1 or greater: Error definition (Error code is stored.) When 'Reserved station function disable request' (SB0012) is turned off, the stored error definition is cleared.	○ (Master operating station only)	×
SW0057	Result of reserved station function enable request	Stores the results when reserved station function disable is undone by 'Reserved station specification enable request' (SB0013). 0: Normal 1 or greater: Error definition (Error code is stored.) When 'Reserved station specification enable request' (SB0013) is turned off, the stored error definition is cleared.	○ (Master operating station only)	×
SW0058	Total number of device stations setting value	Stores the total number of device stations that are set by the parameters. Range: 1 to 120	○	○
SW0059	Total number of device stations present value	Stores the total number of device stations that are actually connected by data link. Range: 1 to 120 (0 when own station is disconnected)	○	○
SW005A	Maximum baton pass station number	Stores the maximum station number of the stations where the baton pass is normally performed. Range: 1 to 120 (0 when own station is disconnected) (Conditions) • This register is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on (error), data prior to error is held.	○	○
SW005B	Maximum data link station number	Stores the maximum station number of the station where the data link is normally performed. Range: 1 to 120 (0 when own station is disconnected) (Conditions) • This register is enabled when 'Data link error status of own station' (SB0049) is off.	○	○
SW005C	Forced master switching command result	Stores the execution result of 'Forced master switching command' (SB0019). 0: Normal 1 or greater: Error definition (Error code is stored.)	○ (Submaster station only)	×
SW0060	Maximum link scan time	Stores the maximum value of the link scan time during cyclic transmission. (Unit: ms) (Conditions) • This register is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on (error), data prior to error is held.	○	○
SW0061	Minimum link scan time	Stores the minimum value of the link scan time during cyclic transmission. (Unit: ms) (Conditions) • This register is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on (error), data prior to error is held.	○	○
SW0062	Current link scan time	Stores the present value of the link scan time during cyclic transmission. (Unit: ms) The stored value contains a maximum error of 1ms. (Conditions) • This register is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on (error), data prior to error is held.	○	○
SW0063	Constant link scan time setting value	Stores the setting value of the constant link scan time that is set in "Supplementary Cyclic Settings" of "Application Settings". 0: No setting 1 to 200: Setting value of constant link scan time (Unit: ms) (Conditions) • This register is enabled when 'Data link error status of own station' (SB0049) is off.	○	○

No.	Name	Description	Availability	
			Master station (submaster station)	Local station
SW0064	Connection status of own station	Stores the connection status of the own station. 00H: Normal (communication in progress on P1 and P2) 01H: Normal (communication in progress on P1, cable disconnected on P2) 04H: Normal (loopback communication in progress on P1, cable disconnected on P2) 10H: Normal (cable disconnected on P1, communication in progress on P2) 11H: Disconnecting (cable disconnected on P1 and P2) 12H: Disconnecting (cable disconnected on P1, establishing line on P2) 21H: Disconnecting (establishing line on P1, cable disconnected on P2) 22H: Disconnecting (establishing line on P1 and P2) 40H: Normal (cable disconnected on P1, loopback communication in progress on P2)	○	○
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 receive error occurrence rate of own station (max.)	Stores the occurrence rate (maximum value) of received error frames at the P1 side of the own station. (Unit: %) When 'Clear communication error count' (SB0006) is turned on, the stored value for the occurrence rate is cleared.	○	○
SW0069	PORT1 receive error occurrence rate of own station (present)	Stores the occurrence rate (present value) of received error frames at the P1 side of the own station. (Unit: %) When 'Clear communication error count' (SB0006) is turned on, the stored value for the occurrence rate is cleared.	○	○
SW006A	PORT2 receive error occurrence rate of own station (max.)	Stores the occurrence rate (maximum value) of received error frames at the P2 side of the own station. (Unit: %) When 'Clear communication error count' (SB0006) is turned on, the stored value for the occurrence rate is cleared.	○	○
SW006B	PORT2 receive error occurrence rate of own station (present)	Stores the occurrence rate (present value) of received error frames at the P2 side of the own station. (Unit: %) When 'Clear communication error count' (SB0006) is turned on, the stored value for the occurrence rate is cleared.	○	○
SW006D	Master operating station number	Stores the station number of a master operating station. 0: No submaster function setting 1 to 120: Station number of the submaster station (master operating station) 125: Master station (master operating station) (Conditions) • This register is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on (error), data prior to error is held.	○	○
SW006E	Submaster operating station number	Stores the station number of a submaster operating station. 0: No submaster function setting 1 to 120: Station number of the submaster station (submaster operating station) 125: Master station (submaster operating station) (Conditions) • This register is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on (error), data prior to error is held.	○	○
SW0070	Loopback station number 1	Stores the number of the station where loopback is being performed. 0: No loopback stations 1 to 120: Station number of the device station or submaster station carrying out loopback 125: Master station carrying out loopback 255: Station with no station number set carrying out loopback If loopback occurs at a station whose station number is duplicated, the station number is stored in this register. (Conditions) • This register is enabled when 'Baton pass status of own station' (SB0047) is off and 'Network configuration mismatch occurrence status' (SB0098) is off. • When 'Baton pass status of own station' (SB0047) is turned on (error), data prior to error is held. The number 125 may be stored while the loopback is being cleared.	○ (Master operating station only)	×
SW0071	Loopback station number 2			

No.	Name	Description	Availability	
			Master station (submaster station)	Local station
SW0073	Remote device forced output request result	Stores the request result of 'Remote device forced output request' (SB0016). 0: Completed 1 or greater: Not completed (Error code is stored.) When 'Remote device forced output request' (SB0016) is turned off, the stored error code is cleared.	○ (Master operating station only)	×
SW0074	PORT1 cable disconnection detection count	Stores the cumulative count that was detected for cable disconnections at the P1 side. When 'Clear communication error count' (SB0006) is turned on, the stored value for the number of errors is cleared. When FFFFH (maximum value 65535) is counted, the value returns to 0 and the module continues to count.	○	○
SW0075	PORT1 receive error detection count	Stores the cumulative count that error data was received at the P1 side. The count stores only error data that is not transmitted to all stations. When 'Clear communication error count' (SB0006) is turned on, the stored value for the number of errors is cleared. When FFFFH (maximum value 65535) is counted, counting stops.	○	○
SW0076	PORT1 total no. of received data (lower 1 word)	Stores the cumulative count that data was received at the P1 side. When 'Clear communication error count' (SB0006) is turned on, the stored value for the number of errors is cleared. When FFFFFFFFH (maximum value 4294967295) is counted, counting stops.	○	○
SW0077	PORT1 total no. of received data (upper 1 word)			
SW007C	PORT2 cable disconnection detection count	Stores the cumulative count that was detected for cable disconnections at the P2 side. When 'Clear communication error count' (SB0006) is turned on, the stored value for the number of errors is cleared. When FFFFH (maximum value 65535) 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 P2 side. The count stores only error data that is not transmitted to all stations. When 'Clear communication error count' (SB0006) is turned on, the stored value for the number of errors is cleared. When FFFFH (maximum value 65535) is counted, counting stops.	○	○
SW007E	PORT2 total no. of received data (lower 1 word)	Stores the cumulative count that data was received at the P2 side. When 'Clear communication error count' (SB0006) is turned on, the stored value for the number of errors is cleared. When FFFFFFFFH (maximum value 4294967295) is counted, counting stops.	○	○
SW007F	PORT2 total no. of received data (upper 1 word)			
SW0080 to SW009F	REMFR/REMTO instruction execution status	Stores the execution status of the REMFR/REMTO/REMFRD/REMTOD instruction for each channel. SW0080 to SW009F: Channel 1 to Channel 32 0: Completed normally 1 or greater: Completed with an error (Error code is stored.)	○	○

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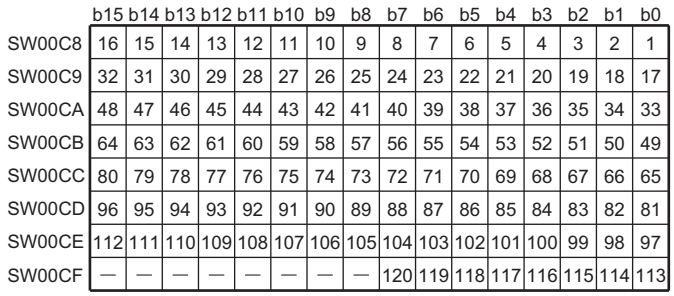
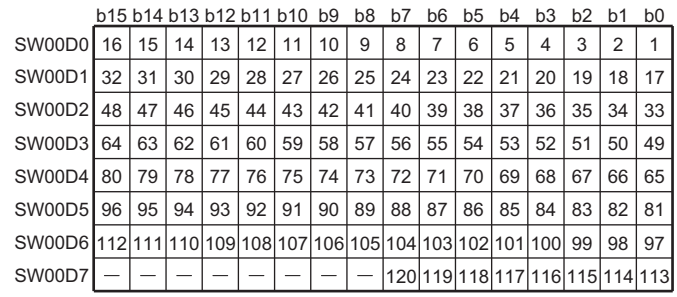
No.	Name	Description	Availability	
			Master station (submaster station)	Local station
SW00A0 to SW00A7	Baton pass status of each station	Stores the baton pass status of each station. 0: Baton pass normal station 1: Baton pass faulty station • If multiple stations change from faulty to normal, because 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 cables are connected/disconnected or the module is reset in line and ring topologies, the token may be lost or a reconstruction may occur, causing the baton pass status to detect an error in the first link scan. 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 Each number in the table represents a station number. — is fixed to 0. (Conditions) • This register is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on (error), data prior to error is held. • Reserved stations and stations higher than the maximum station number are ignored.	○	○
SW00B0 to SW00B7	Data link status of each station	Stores the data link status of each station. 0: Data link normal station 1: Data link faulty station • 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: Data link normal station" may vary by several seconds. • If no response is received for several link scans, the station is determined to be a data link faulty station. 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: — — — — — — — — 120 119 118 117 116 115 114 113 Each number in the table represents a station number. — is fixed to 0. (Conditions) • This register is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on (error), data prior to error is held. • Reserved stations and stations higher than the maximum station number are ignored.	○	○

No.	Name	Description	Availability	
			Master station (submaster station)	Local station
SW00B8 to SW00BF	Network connection status	Stores the network connection status. 0: Station not connected to network 1: Station connected to network b15 b14 b13 b12 b11 b10 b9 b8 b7 b6 b5 b4 b3 b2 b1 b0 SW00B8: 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 SW00B9: 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 SW00BA: 48 47 46 45 44 43 42 41 40 39 38 37 36 35 34 33 SW00BB: 64 63 62 61 60 59 58 57 56 55 54 53 52 51 50 49 SW00BC: 80 79 78 77 76 75 74 73 72 71 70 69 68 67 66 65 SW00BD: 96 95 94 93 92 91 90 89 88 87 86 85 84 83 82 81 SW00BE: 112 111 110 109 108 107 106 105 104 103 102 101 100 99 98 97 SW00BF: — — — — — — — — 120 119 118 117 116 115 114 113 Each number in the table represents a station number. — is fixed to 0. (Conditions) • This register is not affected by 'Baton pass status of each station' (SW00A0 to SW00A7), 'Data link error status of each station' (SB00B0), and 'Data link status of each station' (SW00B0 to SW00B7). • This register is enabled only for the station which has the same network number as a master operating station.	○	○
SW00C0 to SW00C7	Reserved station setting status	Stores the reserved station setting status of each station. 0: Station other than a reserved station (included reserved stations that have been temporarily canceled) 1: Reserved station 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: — — — — — — — — 120 119 118 117 116 115 114 113 Each number in the table represents a station number. — is fixed to 0. (Conditions) • This register is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on (error), data prior to error is held. • This register is enabled only for normally operating stations in 'Baton pass status of each station' (SW00A0 to SW00A7). • Stations higher than the maximum station number are ignored.	○	○

No.	Name	Description	Availability	
			Master station (submaster station)	Local station
SW00C8 to SW00CF	Parameter setting status	Stores the status of parameter settings. 0: Station not set in the parameter 1: Station set in the parameter  Each number in the table represents a station number. — is fixed to 0. (Conditions) • This register is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on (error), data prior to error is held. • Stations higher than the maximum station number are ignored.	○	○
SW00D0 to SW00D7	Error invalid station setting status	Stores the error invalid station setting status of each station. 0: Station other than an error invalid station 1: Error invalid station  Each number in the table represents a station number. — is fixed to 0. (Conditions) • This register is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held. • Stations higher than the maximum station number are ignored.	○	○

<table>
<tr><th>No.</th><th>Name</th><th>Description</th><th colspan="2">Availability</th></tr>
<tr><th></th><th></th><th></th><th>Master station (submaster station)</th><th>Local station</th></tr>
<tr><td>SW00D8 to SW00DF</td><td>Pairing setting status of each station</td><td>Stores the pairing setting status of each station (including the own station).
0: No pairing setting
1: Pairing-set
If pairing is set, the bit corresponding to the system B station is set to 1.
"0" is stored for a station other than a redundant system station.
<table><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><tr><td>SW00D8</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>SW00D9</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>SW00DA</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>SW00DB</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>SW00DC</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>SW00DD</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>SW00DE</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>SW00DF</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></table>(Conditions)
• This register is enabled when 'Baton pass status of own station' (SB0047) is off.
• When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.
• This register is enabled only for normally operating stations in 'Baton pass status of each station' (SW00A0 to SW00A7).
• Stations higher than the maximum station number are ignored.</td><td>○</td><td>○</td></tr>
<tr><td>SW00E0 to SW00E7</td><td>Temporary error invalid station setting status</td><td>Stores the temporary error invalid station setting status of each station.
0: Station other than a temporary error invalid station
1: Temporary error invalid station
<table><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><tr><td>SW00E0</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>SW00E1</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>SW00E2</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>SW00E3</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>SW00E4</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>SW00E5</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>SW00E6</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>SW00E7</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></table>Each number in the table represents a station number.
— is fixed to 0.
(Conditions)
• This register is enabled when 'Baton pass status of own station' (SB0047) is off.
• When 'Baton pass status of own station' (SB0047) is turned on (error), data prior to error is held.
• This register is enabled only for normally operating stations in 'Baton pass status of each station' (SW00A0 to SW00A7).
• Reserved stations and stations higher than the maximum station number are ignored.</td><td>○</td><td>○</td></tr>
</table>

A

No.	Name	Description	Availability	
			Master station (submaster station)	Local station
SW00E8 to SW00EF	Station type match status	Stores the match status between the station type set in the master station and that of the device station. 0: Station type match 1: Station type mismatch Each number in the table represents a station number. — is fixed to 0. (Conditions) • This register is enabled only for the station in which 'Network connection status' (SW00B8 to SW00BF) is on and is connected to the network.	○	○
SW00F0 to SW00F7	CPU operating status of each station	Stores the CPU operating status of each station. 0: RUN, STEP-RUN 1: STOP, PAUSE, or a moderate or serious error occurring Each number in the table represents a station number. — is fixed to 0. (Conditions) • This register is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on (error), data prior to error is held. • This register is enabled only for normally operating stations in 'Baton pass status of each station' (SW00A0 to SW00A7). • Reserved stations and stations higher than the maximum station number are ignored.	○	○

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
SW00E8	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
SW00E9	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
SW00EA	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
SW00EB	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49
SW00EC	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65
SW00ED	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81
SW00EE	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97
SW00EF	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
SW00F0	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
SW00F1	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
SW00F2	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
SW00F3	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49
SW00F4	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65
SW00F5	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81
SW00F6	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97
SW00F7	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113

No.	Name	Description	Availability	
			Master station (submaster station)	Local station
SW00F8 to SW00FF	Network number match status	Stores the match status between the network number of the master station and that of the device station. 0: Network number match 1: Network number mismatch b15 b14 b13 b12 b11 b10 b9 b8 b7 b6 b5 b4 b3 b2 b1 b0 SW00F8: 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 SW00F9: 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 SW00FA: 48 47 46 45 44 43 42 41 40 39 38 37 36 35 34 33 SW00FB: 64 63 62 61 60 59 58 57 56 55 54 53 52 51 50 49 SW00FC: 80 79 78 77 76 75 74 73 72 71 70 69 68 67 66 65 SW00FD: 96 95 94 93 92 91 90 89 88 87 86 85 84 83 82 81 SW00FE: 112 111 110 109 108 107 106 105 104 103 102 101 100 99 98 97 SW00FF: — — — — — — — — 120 119 118 117 116 115 114 113 Each number in the table represents a station number. — is fixed to 0. (Conditions) This register is enabled when 'Baton pass status of own station' (SB0047) is off.	○	○
SW0100 to SW0107	CPU moderate/major error status of each station	Stores the moderate/major error or stop error occurrence status of each station. When the target station is the master/local module, the occurrence status on the control CPU is stored. 0: No moderate/major error (stop error) 1: Moderate or serious error (stop error) occurring 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 Each number in the table represents a station number. — is fixed to 0. (Conditions) • This register is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on (error), data prior to error is held. • This register is enabled only for normally operating stations in 'Baton pass status of each station' (SW00A0 to SW00A7). • Reserved stations and stations higher than the maximum station number are ignored.	○	○

No.	Name	Description	Availability	
			Master station (submaster station)	Local station
SW0108 to SW010F	Station number duplication occurrence status	Stores the station number duplication occurrence status. 0: Station number not duplicated 1: Station number duplicated b15 b14 b13 b12 b11 b10 b9 b8 b7 b6 b5 b4 b3 b2 b1 b0 SW0108: 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 SW0109: 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 SW010A: 48 47 46 45 44 43 42 41 40 39 38 37 36 35 34 33 SW010B: 64 63 62 61 60 59 58 57 56 55 54 53 52 51 50 49 SW010C: 80 79 78 77 76 75 74 73 72 71 70 69 68 67 66 65 SW010D: 96 95 94 93 92 91 90 89 88 87 86 85 84 83 82 81 SW010E: 112 111 110 109 108 107 106 105 104 103 102 101 100 99 98 97 SW010F: — — — — — — — — 120 119 118 117 116 115 114 113 Each number in the table represents a station number. — is fixed to 0. (Conditions) This register is enabled when 'Baton pass status of own station' (SB0047) is off.	○	○
SW0110 to SW0117	CPU minor error status of each station	Stores the minor error or continuation error occurrence status of each station. When the target station is the master/local module, the occurrence status on the control CPU is stored. 0: Normal operation, or a moderate or serious error (stop error) occurring 1: Minor error (continuation error) occurring 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 Each number in the table represents a station number. — is fixed to 0. (Conditions) • This register is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on (error), data prior to error is held. • This register is enabled only for normally operating stations in 'Baton pass status of each station' (SW00A0 to SW00A7). • Reserved stations and stations higher than the maximum station number are ignored.	○	○

<table>
<tr><th rowspan="2">No.</th><th rowspan="2">Name</th><th rowspan="2">Description</th><th colspan="2">Availability</th></tr>
<tr><th>Master station (submaster station)</th><th>Local station</th></tr>
<tr><td>SW0118 to SW011F</td><td>Redundant CPU system status of each station</td><td>Stores the redundant CPU system status (control/standby system) of each station (including the own station).
0: Control system
1: Standby system
"0" is stored for a station other than a redundant system station.
<table><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><tr><td>SW0118</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>SW0119</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>SW011A</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>SW011B</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>SW011C</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>SW011D</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>SW011E</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>SW011F</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></table>(Conditions)
• This register is enabled when 'Baton pass status of own station' (SB0047) is off.
• When 'Baton pass status of own station' (SB0047) is turned on, data prior to error is held.
• This register is enabled only for normally operating stations in 'Baton pass status of each station' (SW00A0 to SW00A7).
• Reserved stations and stations higher than the maximum station number are ignored.</td><td>○</td><td>○</td></tr>
<tr><td>SW0120 to SW0127</td><td>PORT1 current error frame reception status of each station (1)</td><td>Stores the station number where a receive frame error line status caution level is currently occurring in the P1 side of each station.
0: A receive frame error line status caution level is not occurring.
1: A receive frame error line status caution level is occurring.
When 'Clear communication error count' (SB0006) is turned on, the stored status is cleared.
<table><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><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></table>Each number in the table represents a station number.
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<tr><th>No.</th><th>Name</th><th>Description</th><th colspan="2">Availability</th></tr>
<tr><th></th><th></th><th></th><th>Master station (submaster station)</th><th>Local station</th></tr>
<tr><td>SW0128 to SW012F</td><td>PORT1 current error frame reception status of each station (2)</td><td>Stores the station number where a receive frame error line status warning level is currently occurring in the P1 side of each station.
0: A receive frame error line status warning level is not occurring.
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• When 'Baton pass status of own station' (SB0047) is turned on (error), data prior to error is held.
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<tr><td>SW0130 to SW0137</td><td>PORT2 current error frame reception status of each station (1)</td><td>Stores the station number where a receive frame error line status caution level is currently occurring in the P2 side of each station.
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<table><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><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>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td></tr></table>Each number in the table represents a station number.
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<tr><td>SW0138 to SW013F</td><td>PORT2 current error frame reception status of each station (2)</td><td>Stores the station number where a receive frame error line status warning level is currently occurring in the P2 side of each station.
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<tr><td>SW0138</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>SW0139</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>
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<tr><td>SW0140 to SW0147</td><td>PORT1 error frame reception detection status (1)</td><td>Stores the station number where a receive frame error line status caution level has occurred in the P1 side of each station from power-on until the present.
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<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>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td></tr>
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<tr><td>SW0148 to SW014F</td><td>PORT1 error frame reception detection status (2)</td><td>Stores the station number where a receive frame error line status warning level has occurred in the P1 side of each station from power-on until the present.
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<tr><td>SW0150 to SW0157</td><td>PORT2 error frame reception detection status (1)</td><td>Stores the station number where a receive frame error line status caution level has occurred in the P2 side of each station from power-on until the present.
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1: A receive frame error line status caution level has occurred.
When 'Clear communication error count' (SB0006) is turned on, the stored status is cleared.
<table><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><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></table>Each number in the table represents a station number.
— is fixed to 0.
(Conditions)
• This register is enabled when 'Baton pass status of own station' (SB0047) is off.
• When 'Baton pass status of own station' (SB0047) is turned on (error), data prior to error is held.
• This register is enabled only for normally operating stations in 'Baton pass status of each station' (SW00A0 to SW00A7).</td><td>○</td><td>○</td></tr>
</table>

No.	Name	Description	Availability	
			Master station (submaster station)	Local station
SW0158 to SW015F	PORT2 error frame reception detection status (2)	Stores the station number where a receive frame error line status warning level has occurred in the P2 side of each station from power-on until the present. 0: A receive frame error line status warning level has not yet occurred. 1: A receive frame error line status warning level has occurred. When 'Clear communication error count' (SB0006) is turned on, the stored status is cleared. Each number in the table represents a station number. — is fixed to 0. (Conditions) • This register is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on (error), data prior to error is held. • This register is enabled only for normally operating stations in 'Baton pass status of each station' (SW00A0 to SW00A7).	○	○
SW0170 to SW0177	Parameter error status of each station	Stores the parameter error status of each station. 0: No error 1: Errors Each number in the table represents a station number. — is fixed to 0. (Conditions) • This register is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on (error), data prior to error is held. • This register is enabled only for normally operating stations in 'Baton pass status of each station' (SW00A0 to SW00A7). • Reserved stations and stations higher than the maximum station number are ignored.	○	○

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
SW0158	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
SW0159	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
SW015A	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
SW015B	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49
SW015C	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65
SW015D	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81
SW015E	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97
SW015F	—	—	—	—	—	—	—	—	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

<table>
<tr><th>No.</th><th>Name</th><th>Description</th><th>Availability</th><th></th></tr>
<tr><th></th><th></th><th></th><th>Master station (submaster station)</th><th>Local station</th></tr>
<tr><td>SW0180 to SW0187</td><td>Reserved station cancel setting status</td><td>Stores the reserved station cancel setting status of each station.
0: No temporary cancel of the reserved station setting
1: Temporary cancel of the reserved station setting
<table><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><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></table>Each number in the table represents a station number.
— is fixed to 0.
(Conditions)
• This register is enabled when 'Baton pass status of own station' (SB0047) is off.
• When 'Baton pass status of own station' (SB0047) is turned on (error), data prior to error is held.
• This register is enabled only for normally operating stations in 'Baton pass status of each station' (SW00A0 to SW00A7).
• Stations higher than the maximum station number are ignored.</td><td>○</td><td>○</td></tr>
<tr><td>SW0196</td><td>Instantaneous interruption station number 1</td><td rowspan="2">■When the communication path switch at an instantaneous interruption is enabled
The number of the station where loopback is being performed by this function is stored.
• 0: No loopback stations
• 1 to 120: Station number of the device station or submaster station carrying out loopback
• 125: Loopback at the master station
• 255: Loopback at a station whose station number has not been set
If loopback by communication path switch at an instantaneous interruption occurs at a station whose station number is duplicated, the duplicated station number is stored in this register.
■When the communication path switch at an instantaneous interruption is disabled
The number of the station where the first instantaneous interruption occurred after powering on the master station is stored.
• 0: No instantaneous interruption at any station
• 1 to 120: Number of the device station and submaster station where instantaneous interruptions have occurred
• 125: An instantaneous interruption at the master station
• 255: An instantaneous interruption at a station whose station number has not been set
If an instantaneous interruption occurs at a station whose station number is duplicated, the duplicated station number is stored in this register.
(Conditions)
• This register is enabled when 'Baton pass status of own station' (SB0047) is off. When 'Baton pass status of own station' (SB0047) is turned on (error), data from immediately before the error is held.
• This register is enabled when 'Network configuration mismatch occurrence status' (SB0098) is off. When 'Network configuration mismatch occurrence status' (SB0098) is turned on (mismatch), the stored value is not guaranteed.</td><td rowspan="2">○</td><td rowspan="2">×</td></tr>
<tr><td>SW0197</td><td>Instantaneous interruption station number 2</td></tr>
<tr><td>SW0198</td><td>Link dedicated instructions processing result CH3</td><td>Stores the processing results of the link dedicated instruction that used channel 3 of the own station.
0: Completed normally
1 or greater: Completed with an error (Error code is stored.)</td><td>○*1</td><td>○*1</td></tr>
<tr><td>SW0199</td><td>Link dedicated instructions processing result CH4</td><td>Stores the processing results of the link dedicated instruction that used channel 4 of the own station.
0: Completed normally
1 or greater: Completed with an error (Error code is stored.)</td><td>○*1</td><td>○*1</td></tr>
<tr><td>SW019A</td><td>Link dedicated instructions processing result CH5</td><td>Stores the processing results of the link dedicated instruction that used channel 5 of the own station.
0: Completed normally
1 or greater: Completed with an error (Error code is stored.)</td><td>○*1</td><td>○*1</td></tr>
</table>

<table>
<tr><th rowspan="2">No.</th><th rowspan="2">Name</th><th rowspan="2">Description</th><th colspan="2">Availability</th></tr>
<tr><th>Master station (submaster station)</th><th>Local station</th></tr>
<tr><td>SW019B</td><td>Link dedicated instructions processing result CH6</td><td>Stores the processing results of the link dedicated instruction that used channel 6 of the own station.
0: Completed normally
1 or greater: Completed with an error (Error code is stored.)</td><td>○*1</td><td>○*1</td></tr>
<tr><td>SW019C</td><td>Link dedicated instructions processing result CH7</td><td>Stores the processing results of the link dedicated instruction that used channel 7 of the own station.
0: Completed normally
1 or greater: Completed with an error (Error code is stored.)</td><td>○*1</td><td>○*1</td></tr>
<tr><td>SW019D</td><td>Link dedicated instructions processing result CH8</td><td>Stores the processing results of the link dedicated instruction that used channel 8 of the own station.
0: Completed normally
1 or greater: Completed with an error (Error code is stored.)</td><td>○*1</td><td>○*1</td></tr>
<tr><td>SW01B0 to SW01B7</td><td>Redundant system data link status of each station</td><td>Stores the data link status of each station when the own station is the redundant system.
0: Data link normal station
1: Data link faulty station or the own station is the standby system.
• When the own station is the control system and checks that the data link status of each station is normal, the corresponding bit status changes to "0: Data link normal station". (The data input from each station is valid.)
• 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: Data link normal station" may vary by several seconds.
• If no response is received for several link scans, the station is determined to be a data link faulty station.
<table><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><tr><td>SW01B0</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>SW01B1</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>SW01B2</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>SW01B3</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>SW01B4</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>SW01B5</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>SW01B6</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>SW01B7</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></table>Each number in the table represents a station number.
— is fixed to 0.
(Conditions)
• This register is enabled when 'Baton pass status of own station' (SB0047) is off.
• When 'Baton pass status of own station' (SB0047) is turned on (error), data prior to error is held.
• Reserved stations and stations higher than the maximum station number are ignored.</td><td>○*2</td><td>○*2</td></tr>
</table>

No.	Name	Description	Availability	
			Master station (submaster station)	Local station
SW01C0 to SW01C7	Information of CC-Link IE Field Network synchronous communication function of each station	Stores the information about support or non-support of CC-Link IE Field Network synchronous communication function for each station. 0: Not supported 1: Supported Each number in the table represents a station number. — is fixed to 0. (Conditions) • This register is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on (error), data prior to error is held. • This register is enabled only for normally operating stations in 'Baton pass status of each station' (SW00A0 to SW00A7). • Stations higher than the maximum station number are ignored.	○ (Master station only)	×
SW01C8 to SW01CF	Synchronous/ asynchronous operating status information of each station	Stores the information about operating status of CC-Link IE Field Network synchronous communication function for each station. 0: Asynchronous setting 1: Synchronous setting Stations which are not executing an inter-module synchronous interrupt program because the CPU operating status is currently a status such as STOP, that is unable to execute the program, are also treated as an asynchronous setting. Each number in the table represents a station number. — is fixed to 0. (Conditions) • This register is enabled when 'Baton pass status of own station' (SB0047) is off. • When 'Baton pass status of own station' (SB0047) is turned on (error), data prior to error is held. • This register is enabled only for normally operating stations in 'Baton pass status of each station' (SW00A0 to SW00A7). • Stations higher than the maximum station number are ignored.	○ (Master station only)	×
SW01E9	Inter-module synchronization cycle over count	Stores the cumulative count that a link scan could not complete an Inter-module synchronization cycle. The stored count is cleared by turning off and on the power supply or resetting the CPU module. • 0: Cycle over not occurred • 1 to 65535: Cumulative number of times	○	○
SW01EA to SW01EB	Inter-module synchronization cycle setting value	Stores the setting value in "Inter-module Synchronous Setting" in the [Inter-module Synchronous Setting] tab of the "System Parameter" window. (Unit: μs) 0 is stored when the inter-module synchronization function is not used.	○ (Master station only)	×

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
SW01C0	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
SW01C1	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
SW01C2	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
SW01C3	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49
SW01C4	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65
SW01C5	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81
SW01C6	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97
SW01C7	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
SW01C8	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
SW01C9	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
SW01CA	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
SW01CB	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49
SW01CC	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65
SW01CD	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81
SW01CE	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97
SW01CF	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113

*1 This register is enabled only for the RJ71EN71 or the RnENCPU (network part) when the CC-Link IE Field Network function is used.
*2 This relay is enabled only for the RJ71GF11-T2.

Appendix 6 Dedicated Instruction

This section describes dedicated instructions that can be used in the master/local modules and the transient transmission ranges.

Point

For details on dedicated instructions, refer to the following.

MELSEC iQ-R Programming Manual (Module Dedicated Instructions)

Precautions

■Data change

Do not change any data specified (such as control data) until execution of the dedicated instruction is completed.

■When the dedicated instruction is not completed

Check whether the module operation mode of the master/local module is online.

A dedicated instruction cannot be executed when the mode is offline or module communication test.

■When using the submaster function

Page 190 Programming for when the submaster function is used

■When using the safety program

Dedicated instructions cannot be used in safety programs.

■When using the REMFR, REMTO, REMFRD, REMTOD, SINFTYRD, or SINFSTRD instructions

When using the REMFR, REMTO, REMFRD, REMTOD, SINFTYRD, or SINFSTRD instructions, configure an interlock with the following module labels.

- 'Data link error status of own station' (SB0049)
- 'Data link status of each station' (SW00B0 to SW00B7) of the target station

Check that the data link status is normal. ('Data link error status of own station' (SB0049) and 'Data link status of each station' (SW00B0 to SW00B7) of the target station are off.)

■When using dedicated instructions in a redundant system

Page 394 Precautions for dedicated instructions (when used in a redundant system)

A

Link dedicated instructions

The following table lists the instructions 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. (Excluding the REMFR, REMTO, REMFRD, and REMTOD instructions)

Instruction	Description
READ	Reads data from the word device of another station.
SREAD	Reads data from the word device of another station. (with completion device)
WRITE	Writes data in the word device of another station.
SWRITE	Writes data in the word device of another station. (with completion device)
SEND	Sends data to another station.
RECV	Reads the receive data from another station. (for main program)
RECVS	Reads the receive data from another station. (for interrupt program)
REQ	Requests the remote RUN/STOP to the CPU module on another station.
	Reads/writes clock data from/to another station.*1
REMFR*2	Reads data from the buffer memory in the intelligent device station/remote device station. (In units of words, 16-bit address specification)
REMTO*2	Writes data to the buffer memory in the intelligent device station/remote device station. (In units of words, 16-bit address specification)
REMFRD*2	Reads data from the buffer memory in the intelligent device station/remote device station. (In units of words, 32-bit address specification)
REMTOD*2	Writes data to the buffer memory in the intelligent device station/remote device station. (In units of words, 32-bit address specification)

*1 Do not write clock data to the remote head module or head module (LJ72GF15-T2). Even when clock data is written, it will be overwritten by the clock data of the master station clock data via the network.

*2 The instruction cannot be executed on a local station. Execute it on the master station. When the submaster function is used, the instruction can be executed only on a master operating station. Configure an interlock using 'Master/submaster function operation status of own station' (SB004E) so that the instruction can be executed only on a master operating station. (Set SB004E to off.)

Transient transmission ranges

In a single network system, communication with all stations on the network is possible.

In multi-network system, communications can be made with stations up to eight networks apart.

Precautions

The following describes precautions when executing multiple link dedicated instructions simultaneously.

■Channel duplication

When executing multiple link dedicated instructions simultaneously, check that the channels for the instructions are not duplicated. Link dedicated instructions with a same channel number cannot be executed simultaneously. To use the same channel for multiple link dedicated instructions, configure an interlock so that an instruction is executed after completion of another.

■Number of link dedicated instructions that can be simultaneously executed

Even when channels are not duplicated, do not simultaneously execute link dedicated instructions exceeding the numbers listed below. If the number of instructions exceeds the following, execute the instructions one by one.

Link scan time	Number of link dedicated instructions that can be simultaneously executed	
	When master station is in "Normal" mode	When master station is in "High-Speed" or "High-Speed Remote Net" mode
7ms or less	34	34
8ms to 50ms	34	1
51ms to 200ms	5	1

Remote instructions

The dedicated instructions used for transient transmission with the intelligent device station (remote head module).

Instruction	Description
SINFTYRD*1	Reads the module model name information of the modules used for the intelligent device station.
SINFSTRD*1	Reads the status information of the modules used for the intelligent device station.

*1 When the submaster function is used, the instruction can be executed only on a master operating station. Configure an interlock using 'Master/submaster function operation status of own station' (SB004E) so that the instruction can be executed only on a master operating station. (Set SB004E to off.)

Restriction

The availability of the remote instruction depends on the firmware version of the master/local module. (☞ Page 440 Added and Enhanced Functions)

Transient transmission ranges

In a single network system, communication with an intelligent device station on the network is possible.
Communication is not available with stations in other networks.

CC-Link dedicated instructions

The following table lists the instructions used for transient transmission with CC-Link IE Field Network-compliant devices.

Instruction	Description
RIRD*1	Reads the specified points of data from the target station device.
RIWT*1	Writes the specified points of data to the target station device.

*1 The instruction cannot be executed to an intelligent device station from a local station. Execute it on the master station.

Transient transmission ranges

Communication with all stations in the same network is possible.
Communication is not available with stations in other networks.

SLMP communication instruction

The following table lists the dedicated instruction used to send an SLMP frame to an SLMP-compatible device in the same network.

Instruction	Description
SLMPREQ	Reads, writes, and operates data of the target station.

Other dedicated instructions

The following table lists the dedicated instructions used to set parameters for the master/local module of the own station.

Instruction	Description
CCPASET	Sets parameters for the master/local module.
CCPASETR	Sets parameters for the master/local module in a redundant system.
UINI	Sets a station number for a local station.

Transient transmission ranges

Only the master/local module of the own station can be accessed.

Precautions for dedicated instructions (when used in a redundant system)

■System switching during the instruction execution

When systems are switched during execution of a dedicated instruction, the dedicated instruction may not be completed. Execute the dedicated instruction again from the control system CPU module after system switching.

For the dedicated instruction after system switching, check the timeout period for the on state of the command to execute the instruction and the off state of the completion device. After the timeout period has elapsed, turn off and on the command to execute the instruction again. The timeout period can be calculated as follows.

- REMFR/REMTO instruction resend count (SW001A) × REMFR/REMTO instruction response wait timer time (SW001B)

■Specifying the target station CPU type

A dedicated instruction, in which the target station CPU type is specified as a control data, can access the control system CPU, standby system CPU, system A CPU, and system B CPU by specifying the type in it. (📖 MELSEC iQ-R Programming Manual (Module Dedicated Instructions))

■Processing at completion with an error

When the dedicated instruction is executed by specifying the access destination CPU module, it may be completed with an error if systems are switched in the target station. If the dedicated instruction was completed with an error, execute it again.

■When a redundant master station configuration is used

Check the programming of when the submaster function is used. (☞ Page 190 Programming for when the submaster function is used)

■SEND instruction

- When the target station is in a redundant system, the communication request source station must identify that the target station is the control system to execute the SEND instruction. When the target station is the standby system, the RECV instruction is not executed at the target station after data is sent by the SEND instruction, and the target station storage channel becomes occupied and unable to be used.
- When a redundant system exists in a network where broadcast communications are performed, the RECV instruction is not executed at the standby system, and the storage channel becomes occupied and unable to be used.

■RECV and RECVS instructions

- When the SEND instruction is executed for the control system, if the systems are switched before execution of the RECV instruction and interrupt program, the control system retains RECV instruction execution request area (SB0030 to SB0031) and the interrupt program interrupt factor (interrupt pointer). If system switching occurs again, and the standby system is switched to the control system, the RECV instruction and interrupt program will be executed by the data retained in RECV instruction execution request area (SB0030 to SB0031) and the retained interrupt program interrupt factor.
- When the SEND instruction is executed for the standby system, and the standby system receives data from the sending station, the standby system retains RECV instruction execution request area (SB0030 to SB0031) and the interrupt program interrupt factor (interrupt pointer). Therefore, when the standby system is switched to the control system due to system switching, the RECV instruction and interrupt program will be executed by the data retained in RECV instruction execution request area (SB0030 to SB0031) and the retained interrupt program interrupt factor.

■REQ instruction

When performing remote STOP or remote RUN on a redundant system, do as follows: Perform STOP on the standby system → STOP on the control system → RUN on the control system → RUN on the standby system.

■REMFR, REMTO, REMFRD, REMTOD, SINFTYRD, and SINFSTRD instructions

When using the REMFR, REMTO, REMFRD, REMTOD, SINFTYRD, or SINFSTRD instructions for the remote head modules in a redundant system configuration, specify the control system station number for the target station number.

■CCPASET instruction

The parameters cannot be set using the CCPASET instruction in a redundant system.

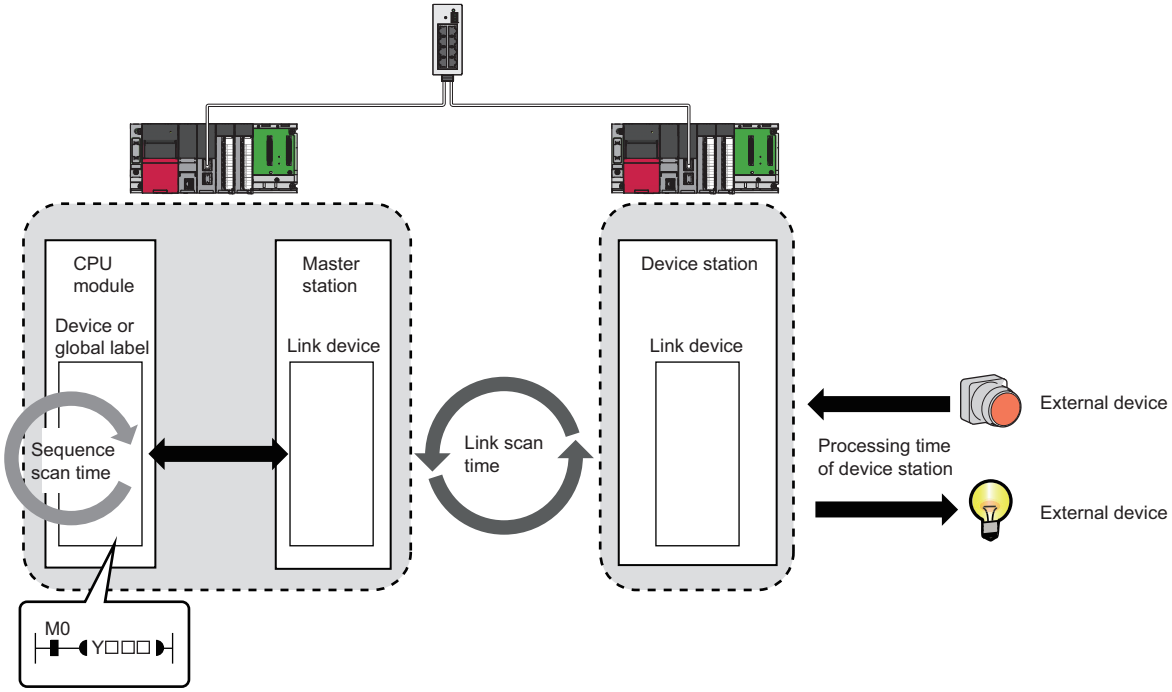
■UINI instruction

The station number cannot be set by the UINI instruction in a redundant system.

Appendix 7 Processing Time

The processing time of CC-Link IE Field Network consists of the time components below.

Sequence scan time + Link scan time + Master station switching time + Device station processing time = Transmission delay time



- Sequence scan time: MELSEC iQ-R CPU Module User's Manual (Application)
- Link scan time: Page 396 Link scan time
- Device station processing time: Manual for the device station used
- Transmission delay time: Page 401 Cyclic transmission delay time

A

Link scan time

The following is the formula to calculate the link scan time. (When "Link Scan Mode" under "Supplementary Cyclic Settings" in "Application Settings" is "Sequence Scan Asynchronous")

LS = (Np + (Ns × Ka) + Kb + Kc + Kd + Ke) ÷ 1000 + Ni × 0.02 + St [ms]

The values of each of the variables in the calculation formula are as follows.

Np

The following table lists the value of Np for each of the communication modes.

Communication mode		
Normal	**High-speed**	**High-speed remote net**[*1]
(a ÷ 4 + b × 4) × 0.08 a: Total number of points of "RX/RY Setting" set in "Network Configuration Settings" of "Basic Settings" b: Total number of points of "RWw/RWr Setting" set in "Network Configuration Settings" of "Basic Settings"		(a ÷ 4 + b × 4) × 0.03 a: Total number of points of "RX/RY Setting" set in "Network Configuration Settings" of "Basic Settings" b: Total number of points of "RWw/RWr Setting" set in "Network Configuration Settings" of "Basic Settings"

*1 When the total number of stations in the network is eight or less, use the calculation formula for when the communication mode is set to "High-Speed".

Ns

The following table lists the value of Ns for each of the communication modes.

Communication mode		
Normal	**High-speed**	**High-speed remote net**
Number of actually connected device stations		

Ka

The following table lists the value of Ka for each of the communication modes.

Communication mode		
Normal	**High-speed**	**High-speed remote net**[*1]
■When the master station is a system other than a redundant system 25.8 ■When the master station is a redundant system 58	■When the master station is a system other than a redundant system The value changes depending on whether "Data Link Error Station Setting" under "I/O Maintenance Settings" in "Application Settings" is "Clear" or "Hold". • When "Clear" is set: 18.5 • When "Hold" is set: 9.75 ■When the master station is a redundant system 56.1	The value changes depending on whether "Data Link Error Station Setting" under "I/O Maintenance Settings" in "Application Settings" is "Clear" or "Hold". • When "Clear" is set: 7.2 • When "Hold" is set: 3.8

*1 When the total number of stations in the network is eight or less, use the calculation formula for when the communication mode is set to "High-Speed".

Kb

The following table lists the value of Kb for each of the communication modes.

Communication mode		
Normal	**High-speed**	**High-speed remote net**[*1]
■Normal value 655 ■Maximum value 1100 Use the maximum value for the link scan time calculated by the following calculation formula. • Transmission delay time (maximum value) • Transmission delay time of safety communications (maximum value) • Transmission interval monitoring time set in the safety communication setting • Safety refresh monitoring time set in the safety communication setting	■Normal value 168 ■Maximum value 650 Use the maximum value for the link scan time calculated by the following calculation formula. • Transmission delay time (maximum value) • Transmission delay time of safety communications (maximum value) • Transmission interval monitoring time set in the safety communication setting • Safety refresh monitoring time set in the safety communication setting	■Normal value 250 ■Maximum value 336 Use the maximum value for the link scan time calculated by the following calculation formula. • Transmission delay time (maximum value)

*1 When the total number of stations in the network is eight or less, use the calculation formula for when the communication mode is set to "High-Speed".

Kc

The following table lists the value of Kc (maximum transient processing time) for each of the communication modes.

Communication mode		
Normal	**High-speed**	**High-speed remote net**
■When transient transmission is performed 160 + 60 × number of device stations set in "Network Configuration Settings" under "Basic Settings" ■When transient transmission is not performed 0	■When transient transmission is performed 80 ■When transient transmission is not performed 0	

Kd

The following table lists the value of Kd (maximum data link processing time when the station is disconnected from or returned to the network) for each of the communication modes.

Communication mode		
Normal	**High-speed**	**High-speed remote net**
■When the firmware version of the master station is "04" or earlier • When the switching hub is used: 9000 + Number of ports used in the switching hub × 3000 • When the switching hub is not used: 9000 ■When the firmware version of the master station is "05" or later Number of disconnected stations × 3500		

Ke

The following table lists the value of Ke (processing time factor of each module) for each of the communication modes in each system.

■When a system uses the Safety CPU

Communication mode		
Normal	**High-speed**	**High-speed remote net*1**
The processing time factor of the safety station is the sum of the processing time factors of all safety stations in the network. 0 when the safety communication function is not used. ■When the firmware version of the RJ71GF11-T2 is "69" or earlier • RJ71GF11-T2 (master station): (1.6 × Sa) + (5.4 × Sb) + 32 • RJ71GF11-T2 (local station): (1.7 × Sc) + 18 • Safety station other than the above: 0 ■When the firmware version of the RJ71GF11-T2 is "70" or later, and the safety protocol version is 1 • RJ71GF11-T2 (master station): (5.7 × Sa) + (8.6 × Sb) + 130 • RJ71GF11-T2 (local station): (1.7 × Sc) + 44 • Safety station other than the above: 0 ■When the firmware version of the RJ71GF11-T2 is "70" or later, and the safety protocol version is 2 • RJ71GF11-T2 (master station): (6.9 × Sa) + (16.5 × Sb) + 162 • RJ71GF11-T2 (local station): (2.6 × Sc) + 44 • Safety station other than the above: 0 Sa: Number of safety communication settings with local stations Sb: Number of safety communication settings with remote device stations and MR-J4-GF11 servo amplifier Sc: Number of safety communication settings with the master station and other local stations	The processing time factor of the safety station is the sum of the processing time factor of all safety stations in the network. 0 when the safety communication function is not used. ■When the firmware version of the RJ71GF11-T2 is "69" or earlier • RJ71GF11-T2 (master station): (0.8 × Sa) + (4.1 × Sb) + 23 • RJ71GF11-T2 (local station): (0.9 × Sc) + 9 • Safety station other than the above: 0 ■When the firmware version of the RJ71GF11-T2 is "70" or later, and the safety protocol version is 1 • RJ71GF11-T2 (master station): (4.9 × Sa) + (7.4 × Sb) + 67 • RJ71GF11-T2 (local station): (0.9 × Sc) + 22 • Safety station other than the above: 0 ■When the firmware version of the RJ71GF11-T2 is "70" or later, and the safety protocol version is 2 • RJ71GF11-T2 (master station): (5.6 × Sa) + (10.5 × Sb) + 67 • RJ71GF11-T2 (local station): (1.3 × Sc) + 22 • Safety station other than the above: 0 Sa: Number of safety communication settings with local stations Sb: Number of safety communication settings with remote device stations and MR-J4-GF11 servo amplifier Sc: Number of safety communication settings with the master station and other local stations	0

*1 When the total number of stations in the network is eight or less, use the calculation formula for when the communication mode is set to "High-Speed".

■When a system uses the SIL2 Process CPU

Communication mode		
Normal	**High-speed**	**High-speed remote net*1**
The sum of the processing time factors of all safety stations and the maximum value of the processing time of the safety communication relay of all RJ72GF15-T2 (safety stations) are calculated in the network. 0 when the safety communication function is not used. ■When the firmware version of the RJ72GF15-T2 is "13" or earlier • Processing time of the safety communication relay of the RJ72GF15-T2 (safety station): 74 × Se + 622 • Processing time factor of the RJ71GF11-T2 (safety station): 0.6 × Sf + 1.2 × Sg • Processing time factor of the RJ72GF15-T2 (safety station): 8.3 × Sh + 56.1 ■When the firmware version of the RJ72GF15-T2 is "14" or later, and the safety protocol version is 1 • Processing time of the safety communication relay of the RJ72GF15-T2 (safety station): 74 × Se + 622 • Processing time factor of the RJ71GF11-T2 (safety station): 0.6 × Sf + 1.2 × Sg • Processing time factor of the RJ72GF15-T2 (safety station): 10.2 × Sh + 92.0 ■When the firmware version of the RJ72GF15-T2 is "14" or later, and the safety protocol version is 2 • Processing time of the safety communication relay of the RJ72GF15-T2 (safety station): 96 × Se + 622 • Processing time factor of the RJ71GF11-T2 (safety station): 1.3 × Sf + 1.2 × Sg • Processing time factor of the RJ72GF15-T2 (safety station): 20.7 × Sh + 92.0 Se: Number of target modules for the safety communication relay Sf: Number of safety communication settings of the master station (safety station) Sg: Number of intelligent device stations (safety stations) Sh: Number of safety communication settings of the intelligent device station (safety station)	The sum of the processing time factors of all safety stations and the maximum value of the processing time of the safety communication relay of all RJ72GF15-T2 (safety stations) are calculated in the network. 0 when the safety communication function is not used. ■When the firmware version of the RJ72GF15-T2 is "13" or earlier • Processing time of the safety communication relay of the RJ72GF15-T2 (safety station): 74 × Se + 622 • Processing time factor of the RJ71GF11-T2 (safety station): 0.3 × Sf + 0.6 × Sg • Processing time factor of the RJ72GF15-T2 (safety station): 4.2 × Sh +28.1 ■When the firmware version of the RJ72GF15-T2 is "14" or later, and the safety protocol version is 1 • Processing time of the safety communication relay of the RJ72GF15-T2 (safety station): 74 × Se + 622 • Processing time factor of the RJ71GF11-T2 (safety station): 0.3 × Sf + 0.6 × Sg • Processing time factor of the RJ72GF15-T2 (safety station): 5.1 × Sh + 46.0 ■When the firmware version of the RJ72GF15-T2 is "14" or later, and the safety protocol version is 2 • Processing time of the safety communication relay of the RJ72GF15-T2 (safety station): 96 × Se + 622 • Processing time factor of the RJ71GF11-T2 (safety station): 0.7 × Sf + 0.6 × Sg • Processing time factor of the RJ72GF15-T2 (safety station): 10.4 × Sh + 46.0 Se: Number of target modules for the safety communication relay Sf: Number of safety communication settings of the master station (safety station) Sg: Number of intelligent device stations (safety stations) Sh: Number of safety communication settings of the intelligent device station (safety station)	0

*1 When the total number of stations in the network is eight or less, use the calculation formula for when the communication mode is set to "High-Speed".

Ni

The following table lists the value of Ni for each of the communication modes.

Communication mode		
Normal	**High-speed**	**High-speed remote net**
The number of "Interrupt Settings" in "Application Settings"		

A

St

The following table lists the value of St (processing time between a master station and a submaster station when the submaster function is used) for each of the communication modes.

Communication mode		
Normal	**High-speed**	**High-speed remote net**[*1]
■When the submaster function is used ((a ÷ 4 + b × 4) × 0.08 + 50) ÷ 1000 ■When the submaster function is not used 0 a: Total number of points of "RX/RY Setting" set for the master station (station No.0) in "Network Configuration Settings" of "Basic Settings" b: Total number of points of "RWw/RWr Setting" set for the master station (station No.0) in "Network Configuration Settings" of "Basic Settings"		0

*1 When the total number of stations in the network is eight or less, use the calculation formula for when the communication mode is set to "High-Speed".

Master station switching time

The following is the formula to calculate the switching time after the master station is disconnected until the submaster station starts operating as a master operating station (cyclic data transmission start) when the submaster function is used.

Master station switching time = 520 + Number of connected device stations × (1.2 + LS) [ms]

LS: Link scan time (value calculated by the link scan time formula with Np and St set to 0)

Cyclic transmission delay time

The following are the formulas to calculate cyclic transmission delay time.

Between the master station and an intelligent device station/remote device station

■Master station (RX, RWr) ← Intelligent device station/remote device station (input)

The following time is shown:

- The time between a signal input to the intelligent device station/remote 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/remote device station and the data being stored in the CPU module device of the master station

Calculation value	Station-based block data assurance		No station-based block data assurance	
	Asynchronous with sequence scan	Synchronous with sequence scan	Asynchronous with sequence scan	Synchronous with sequence scan
Normal value	(SM × 1) + (LS × n1) + Rio	(SM × 1) + (LS × 1) + Rio	(SM × 1) + (LS × 1) + Rio	(SM × 1) + (LS × 1) + Rio
Maximum value	(SM × 1) + (LS × (n1 + 1)) + Rio	(SM × 1) + (LS × 2) + Rio	(SM × 1) + (LS × 2) + Rio	(SM × 1) + (LS × 2) + Rio

SM: Master station sequence scan time

LS: Link scan time

n1: SM ÷ LS (Round up the calculated value to the nearest integer.)

Rio: Intelligent device station/remote device station processing time (📖 Manual for the intelligent device station/remote device station used)

■Master station (RY, RWw) → Intelligent device station/remote 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/remote 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/remote device station

Calculation value	Station-based block data assurance		No station-based block data assurance	
	Asynchronous with sequence scan	Synchronous with sequence scan	Asynchronous with sequence scan	Synchronous with sequence scan
Normal value	(SM × n2) + (LS × 1) + Rio	(SM × 1) + (LS × 1) + Rio	(SM × 1) + (LS × 1) + Rio	(SM × 1) + (LS × 1) + Rio
Maximum value	(SM × n2) + (LS × 2) + Rio	(SM × n2) + (LS × 1) + Rio	(SM × 2) + (LS × 2) + Rio	(SM × n2) + (LS × 1) + Rio

SM: Master station sequence scan time

LS: Link scan time

n2: LS ÷ SM (Round up the calculated value to the nearest integer.)

Rio: Intelligent device station/remote device station processing time (📖 Manual for the intelligent device station/remote device station used)

Master station and local stations

■Master station (RX) ← Local station (RY)

Shows the time after the local station CPU module device is turned on or off until the master station CPU module device is turned on or off.

(m = 1)

Calculation value	Station-based block data assurance		No station-based block data assurance	
	Asynchronous with sequence scan	Synchronous with sequence scan	Asynchronous with sequence scan	Synchronous with sequence scan
Normal value	(SM × 1) + (LS × k) + (SL × 1)	(SM × 1) + (LS × 1) + (SL × 1)	(SM × 1) + (LS × 1) + (SL × 1)	(SM × 1) + (LS × 1) + (SL × 1)
Maximum value	(SM × 1) + (LS × (k + n1)) + (SL × 1)	(SM × 1) + (LS × k) + (SL × 1)	(SM × 1) + (LS × 2) + (SL × 1)	(SM × 1) + (LS × k) + (SL × 1)

(m = 2 to 4)

Calculation value	Station-based block data assurance		No station-based block data assurance	
	Asynchronous with sequence scan	Synchronous with sequence scan	Asynchronous with sequence scan	Synchronous with sequence scan
Normal value	(SM × 1) + (LS × m × k) + (SL × n)	(SM × 1) + (LS × m) + (SL × n)	(SM × 1) + (LS × m) + (SL × n)	(SM × 1) + (LS × m) + (SL × n)
Maximum value	(SM × 1) + (LS × m × (k + n1)) + (SL × (n + 1))	(SM × 1) + (LS × m × 2) + (SL × (n + 1))	(SM × 1) + (LS × (n1 + 1)) + (SL × 2)	(SM × 1) + (LS × m × 2) + (SL × 2)

SM: Master station sequence scan time

LS: Link scan time

SL: Local station sequence scan time

n: (LS × m) ÷ SL (Round up the calculated value to the nearest integer.)

n1: SM ÷ LS (Round up the calculated value to the nearest integer.)

k: SL ÷ (LS × m) (Round up the calculated value to the nearest integer.)

m: Constant of "RWw/RWr Setting" set for the local station in "Network Configuration Settings" of "Basic 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)

Shows the time after the master station CPU module device is turned on or off until the local station CPU module device is turned on or off.

Calculation value	Station-based block data assurance		No station-based block data assurance	
	Asynchronous with sequence scan	Synchronous with sequence scan	Asynchronous with sequence scan	Synchronous with sequence scan
Normal value	(SM × 1) + (LS × n3) + (SL × 1)	(SM × 1) + (LS × 1) + (SL × 2)	(SM × 1) + (LS × 1) + (SL × 1)	(SM × 1) + (LS × 1) + (SL × 1)
Maximum value	(SM × 1) + (LS × (n3 + 1)) + (SL × 2)	(SM × 1) + (LS × 2) + (SL × 2)	(SM × 1) + (LS × 2) + (SL × 2)	(SM × 1) + (LS × 2) + (SL × 2)

SM: Master station sequence scan time

LS: Link scan time

SL: Local station sequence scan time

n3: SL ÷ LS (Round up the calculated value to the nearest integer.)

■Master station (RWr) ← Local station (RWw)

Shows the time after data is set in the local station CPU module device until the data is stored in the master station CPU module device.

(m = 1)

Calculation value	Station-based block data assurance		No station-based block data assurance	
	Asynchronous with sequence scan	Synchronous with sequence scan	Asynchronous with sequence scan	Synchronous with sequence scan
Normal value	(SM × 1) + (LS × k) + (SL × 1)	(SM × 1) + (LS × 1) + (SL × 1)	(SM × 1) + (LS × 1) + (SL × 1)	(SM × 1) + (LS × 1) + (SL × 1)
Maximum value	(SM × 2) + (LS × (k + n1)) + (SL × 1)	(SM × 2) + (LS × k) + (SL × 1)	(SM × 2) + (LS × 2) + (SL × 1)	(SM × 2) + (LS × k) + (SL × 1)

(m = 2 to 4)

Calculation value	Station-based block data assurance		No station-based block data assurance	
	Asynchronous with sequence scan	Synchronous with sequence scan	Asynchronous with sequence scan	Synchronous with sequence scan
Normal value	(SM × 1) + (LS × m × k) + (SL × n)	(SM × 1) + (LS × m) + (SL × n)	(SM × 1) + (LS × m) + (SL × n)	(SM × 1) + (LS × m) + (SL × n)
Maximum value	(SM × 2) + (LS × m × (k + n1)) + (SL × (n + 1))	(SM × 2) + (LS × m × 2) + (SL × (n + 1))	(SM × 2) + (LS × (n1 + 1)) + (SL × 2)	(SM × 2) + (LS × m × 2) + (SL × 2)

SM: Master station sequence scan time

LS: Link scan time

SL: Local station sequence scan time

n: (LS × m) ÷ SL (Round up the calculated value to the nearest integer.)

n1: SM ÷ LS (Round up the calculated value to the nearest integer.)

k: SL ÷ (LS × m) (Round up the calculated value to the nearest integer.)

m: Constant of "RWw/RWr Setting" set for the local station in "Network Configuration Settings" of "Basic 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)

Shows the time after data is set in the master station CPU module device until the data is stored in the local station CPU module device.

Calculation value	Station-based block data assurance		No station-based block data assurance	
	Asynchronous with sequence scan	Synchronous with sequence scan	Asynchronous with sequence scan	Synchronous with sequence scan
Normal value	(SM × 1) + (LS × n3) + (SL × 1)	(SM × 1) + (LS × 1) + (SL × 1)	(SM × 1) + (LS × 1) + (SL × 1)	(SM × 1) + (LS × 1) + (SL × 1)
Maximum value	(SM × 1) + (LS × (n3 + 1)) + (SL × 2)	(SM × 1) + (LS × 2) + (SL × 2)	(SM × 1) + (LS × 2) + (SL × 2)	(SM × 1) + (LS × 2) + (SL × 2)

SM: Master station sequence scan time

LS: Link scan time

SL: Local station sequence scan time

n3: SL ÷ LS (Round up the calculated value to the nearest integer.)

Interlink transmission time

The following is the formula to calculate the time required for interlink transmission. Interlink transmission does not affect the sequence scan time.

Interlink transmission time to completely transmit all set points

α_{DL} = KM4 × ((RX + RY) ÷ 16 + RWr + RWw) [ms]

α_{DL}: Interlink transmission time

RX: Total number of source "RX/LB" points set in "Interlink Transmission Settings" of "Application Settings".

RY: Total number of source "LB/RY" points set in "Interlink Transmission Settings" of "Application Settings".

RWr: Total number of source "RWr/LW" points set in "Interlink Transmission Settings" of "Application Settings".

RWw: Total number of source "LW/RWw" points set in "Interlink Transmission Settings" of "Application Settings".

- Constant (KM4)

Base unit to which the network module is mounted		KM4 ($\times 10^{-3}$)
Transfer source	Transfer destination	
Main base unit	Main base unit	0.470
Main base unit	Extension base unit	0.478
Extension base unit	Main base unit	0.483
Extension base unit	Extension base unit	0.489

Precautions

The interlink transmission time may become longer due to the following causes.

- Communication with the engineering tool (CC-Link IE Field Network diagnostics, module diagnostics, etc)
- Execution of a link dedicated instruction
- Link refresh
- Interlink transmission between other units

Transmission delay time of safety communications

The following are the formulas to calculate transmission delay time of safety communications.

Transmission delay time

■Master station (safety station) or local station (safety station) ↔ Local station (safety station)

The following table lists the time between a safety device of the Safety CPU on the sending station turning on or off and that on the receiving station turning on or off.

Calculation value	Formula
Normal value	SCsnd + LS + SCrcv + TMsnd
Maximum value	SCsnd + (LS × 2) + (SCrcv × 2) + TMsnd

SCsnd: Safety cycle time of the sending station (MELSEC iQ-R CPU Module User's Manual (Application))
LS: Link scan time (☞ Page 396 Link scan time)
SCrcv: Safety cycle time of the receiving station (MELSEC iQ-R CPU Module User's Manual (Application))
TMsnd: Transmission interval monitoring time of the sending station (☞ Page 406 Transmission interval monitoring time)

■Master station (safety station) ← Remote device station (safety station) (input)

The following table lists the time between a signal input to the remote device station (safety station) and a safety device of the Safety CPU on the master station (safety station) turning on or off.

Calculation value	Formula
Normal value	SCmst + LS + SRref + TMrmt + SRin
Maximum value	(SCmst × 2) + (LS × 2) + SRref + TMrmt + SRin

SCmst: Safety cycle time of the master station (safety station) (MELSEC iQ-R CPU Module User's Manual (Application))
LS: Link scan time (☞ Page 396 Link scan time)
SRref: Safety remote station refresh response processing time (Manual for the remote device station used)
TMrmt: Transmission interval monitoring time of the remote device station (safety station) (Manual for the remote device station used)
SRin: Safety remote station input response time (Manual for the remote device station used)

■Master station (safety station) → Remote device station (safety station) (output)

The following table lists the time between a safety device of the Safety CPU on the master station (safety station) turning on or off and the output of the remote device station (safety station) turning on or off.

Calculation value	Formula
Normal value	SCmst + LS + SRref + TMmst + SRout
Maximum value	SCmst + (LS × 2) + (SRref × 2) + TMmst + SRout

SCmst: Safety cycle time of the master station (safety station) (MELSEC iQ-R CPU Module User's Manual (Application))
LS: Link scan time (☞ Page 396 Link scan time)
SRref: Safety remote station refresh response processing time (Manual for the remote device station used)
TMmst: Transmission interval monitoring time of the master station (safety station) (☞ Page 406 Transmission interval monitoring time)
SRout: Safety remote station output response time (Manual for the remote device station used)

■Master station (safety station) ← Intelligent device station (safety station)

The following table lists the time between a signal input to the intelligent device station (safety station) and a safety device of the SIL2 Process CPU on the master station (safety station) turning on or off.

Calculation value	Formula
Normal value	SCmst + LS + SRin
Maximum value	(SCmst × 2) + (LS × 2) + SRin

SCmst: Safety cycle time of the master station (safety station) (MELSEC iQ-R CPU Module User's Manual (Application))
LS: Link scan time (☞ Page 396 Link scan time)
SRin: Input processing time of the intelligent device station (safety station) (MELSEC iQ-R CC-Link IE Field Network Remote Head Module User's Manual (Application))

■Master station (safety station) → Intelligent device station (safety station)

The following table lists the time between a safety device of the SIL2 Process CPU on the master station (safety station) turning on or off and the output of the intelligent device station (safety station) turning on or off.

Calculation value	Formula
Normal value	SCmst + TMmst + LS + SRout
Maximum value	SCmst + TMmst + (LS × 2) + SRout

SCmst: Safety cycle time of the master station (safety station) (📖 MELSEC iQ-R CPU Module User's Manual (Application))
TMmst: Transmission interval monitoring time of the master station (safety station) (☞ Page 406 Transmission interval monitoring time)
LS: Link scan time (☞ Page 396 Link scan time)
SRout: Output processing time of the intelligent device station (safety station) (📖 MELSEC iQ-R CC-Link IE Field Network Remote Head Module User's Manual (Application))

Safety response time

The safety response time is the maximum value of the time between a safety input of the remote device station (safety station) turning off and a safety output of the remote device station (safety station) turning off (including an error detection time).
For calculation method of the safety response time, refer to the following.
📖 Mitsubishi Safety Programmable Controller MELSEC iQ-R Series Machinery Directive (2006/42/EC) Compliance

Transmission interval monitoring time

The value of transmission interval monitoring time set in the master/local module must satisfy all of the following conditions.

Communication destination	Condition
Master station (safety station) or local station (safety station)	• TM ≥ SCown × 3 • TM ≥ SCoth × 2 + LS × 2
Remote device station (safety station)	• TM ≥ SCown × 3 • TM ≥ SRref × 2 +LS × 2
Intelligent device station (safety station)	■For line topology, star topology, or coexistence of star and line topologies • TM ≥ SCown × 3 • TM ≥ S2cyc × 2 + LS × 2 ■For ring topology • TM ≥ SCown × 3 • TM ≥ 24 + S2cyc × 2 + LS × 10

TM: Transmission interval monitoring time
SCown: Safety cycle time of the own station (📖 MELSEC iQ-R CPU Module User's Manual (Application))
SCoth: Safety cycle time of the communication destination (📖 MELSEC iQ-R CPU Module User's Manual (Application))
LS: Link scan time (☞ Page 396 Link scan time)
SRref: Safety remote station refresh response processing time of the communication destination (📖 Manual for the remote device station used)
S2cyc: Control cycle time of the module set to the SIL2 mode Main of the communication destination (📖 Manual for the module set to the SIL2 mode)

Point

- Calculate the link scan time used for calculation of the transmission interval monitoring time in accordance with the conditions of the system used. If disconnection and return of stations are not considered in a system using the Safety CPU, transmission interval monitoring time can be shortened by setting Kd (maximum data link processing time when the station is disconnected from or returned to the network) to 0. However, the Safety CPU may detect a safety communication timeout if the station is disconnected or returned. If the Safety CPU detects a safety communication timeout, change the transmission interval monitoring time to a greater value.
- Calculate the link scan time used for calculation of the transmission interval monitoring time in accordance with the conditions of the system used. For a system using the SIL2 Process CPU, set Kd (maximum data link processing time when the station is disconnected from or returned to the network), assuming that the station is disconnected or returned. If more number of stations than expected are disconnected or returned, the SIL2 Process CPU may detect a safety communication timeout. For the formula to calculate the link scan time, refer to the section explaining the link scan time in this manual. (☞ Page 396 Link scan time
- If the Safety CPU or the SIL2 Process CPU detects a safety communication timeout, check that the transmission interval monitoring time satisfies the above formula.
- When the transmission interval monitoring time has changed, the safety refresh monitoring time must also be changed to meet the conditions specified for the safety refresh monitoring time. (☞ Page 408 Safety refresh monitoring time)

Safety refresh monitoring time

■System using the Safety CPU

Set the safety refresh monitoring time at the Active side station.

Set a value that satisfies all of the following conditions.

Condition
• RM ≥ TMact + (TMpas ÷ 2) + (LS × 2) - a • RM ≥ (TMact ÷ 2) + TMpas + (LS × 2) - c • RM > TMact • RM > TMpas

RM: Safety refresh monitoring time

TMact: Transmission interval monitoring time of the Active side (☞ Page 406 Transmission interval monitoring time)

TMpas: Transmission interval monitoring time of the Passive side (☞ Page 406 Transmission interval monitoring time)

LS: Link scan time (☞ Page 396 Link scan time)

a: TMact - b (enables only when the RJ71GF11-T2 is Active side. Otherwise this value is 0.)

b: A smallest multiple of safety cycle time which is greater than TMact ÷ 2

c: TMpas-d (enabled when the station set for Passive is a MELSEC product. Otherwise this value is 0.)

d: The smallest multiple of safety cycle time which is greater than TMpas ÷ 2 (for products for which safety remote station refresh response processing time is defined, the smallest multiple of safety remote station refresh response processing time)

Ex.

Calculation example of b when the transmission interval monitoring time (TMact) is 24ms and the safety cycle time is 10ms.

24 ÷ 2 = 12

The value of b is 20, the smallest multiple of safety cycle time (10ms) which is greater than 12.

Point

- Calculate the link scan time used in the calculation of the safety refresh monitoring time in accordance with the conditions of the system used. If disconnection and return of stations are not considered in a system using the Safety CPU, safety refresh monitoring time and safety response time can be shortened by setting Kd (maximum data link processing time when the station is disconnected from or returned to the network) to 0. However, the Safety CPU may detect a safety communication timeout if the station is disconnected or returned. If the Safety CPU detects a safety communication timeout, change the safety refresh monitoring time to a greater value.
- The Safety CPU may detect a safety communication timeout if the safety communications are affected by noise. If required, add an integral multiple of ((TMact ÷ 2) + (TMpas ÷ 2)) to the safety refresh monitoring time.

■System using the SIL2 Process CPU

Set the safety refresh monitoring time at the Active side station.

Set a value that satisfies all of the following conditions.

Condition
■For a redundant master station • RM > 310 + (3 × LS) + Tc + SS + TMact • RM > 310 + (3 × LS) + Tc + SS + TMpas ■For a redundant line • RM > 5 + Tc + (3 × LS) + SS + TMact • RM > 5 + Tc + (3 × LS) + SS + TMpas

RM: Safety refresh monitoring time

TMact: Transmission interval monitoring time of the Active side (☞ Page 406 Transmission interval monitoring time)

TMpas: Transmission interval monitoring time of the Passive side (☞ Page 406 Transmission interval monitoring time)

LS: Link scan time (☞ Page 396 Link scan time)

Tc: System switching monitoring time setting value [ms]

SS: Sequence scan time of the SIL2 Process CPU [ms]

Point

- Calculate the link scan time used for calculation of the safety refresh monitoring time in accordance with the conditions of the system used. For a system using the SIL2 Process CPU, set Kd (maximum data link processing time when the station is disconnected from or returned to the network), assuming that the station is disconnected or returned. If more number of stations than expected are disconnected or returned, the SIL2 Process CPU may detect a safety communication timeout. For the formula to calculate the link scan time, refer to the section explaining the link scan time in this manual. (☞ Page 396 Link scan time)
- The Safety CPU may detect a safety communication timeout if the safety communications are affected by noise. If required, add an integral multiple of ((TMact ÷ 2) + (TMpas ÷ 2)) to the safety refresh monitoring time.

Cyclic data holding time when system switching occurs

This section describes cyclic data holding time when system switching occurs.

Redundant master station

The following are the formulas to calculate cyclic data holding time when system switching occurs in the redundant master station configuration.*1

Pattern No.	System switching cause		Condition	Cyclic data holding time (T_H) [ms]	Timing chart
1	• Failure of the control system power supply module*4 • Power-off of the control system • Failure of the control system Process CPU (redundant mode) • Failure of the control system base unit*5 • Failure of the control system redundant function module*5		Tjo < Msw	Delay time until detection of the system switching cause*2 + Tsw + Msw + SS	☞ Page 411 Pattern 1
2			Tjo > Msw	Delay time until detection of the system switching cause*2 + Tsw + Tjo + SS	☞ Page 412 Pattern 2
3	• Stop error of the control system Process CPU (redundant mode) • Execution of the system switching instruction • System switching request from the engineering tool • System switching request from another network module		Tjo < Msw	Delay time until detection of the system switching cause*2 + Tsw + Msw + SS	☞ Page 413 Pattern 3
4			Tjo > Msw	Delay time until detection of the system switching cause*2 + Tsw + Tjo + SS	☞ Page 414 Pattern 4
5	System switching request from the RJ71GF11-T2 (own station)	Own station data link error	Tjo < Msw	310 + (2.5 × Ns) + Tc + Tsw + Msw + (SS × 2)	☞ Page 415 Pattern 5
6			Tjo > Msw	310 + (2.5 × Ns) + Tc + Tsw + Tjo + (SS × 2)	☞ Page 416 Pattern 6
7		Communication error with the system switching monitoring target station	Tjo < Msw	210 + Tc + Tsw + Msw + (SS × 2)	☞ Page 417 Pattern 7
8			Tjo > Msw	210 + Tc + Tsw + Tjo + (SS × 2)	☞ Page 418 Pattern 8

*1 The meanings of the variables in the equation are as follows.

Variable	Meaning
Tsw	Process CPU (redundant mode) system switching time [ms] (📖 MELSEC iQ-R CPU Module User's Manual (Application))
Tjo	Delay time until initial output after system switching [ms] (📖 MELSEC iQ-R CPU Module User's Manual (Application))
Msw	Master station switching time [ms] • When the device station is the submaster station, local station, GOT*3, or the remote head module Msw = n1 + 340 + Ns × (1.2 + (LS × 2)) + Ns' × (10 + (LS × 5)) + (LS × 38) • When the device station is other than the above Msw = n1 + 40 + Ns × (1.2 + (LS × 2)) + (LS × 23)
SS	Process CPU (redundant mode) sequence scan time [ms] (📖 MELSEC iQ-R CPU Module User's Manual (Application))
Tc	System switching monitoring time setting value [ms] (☞ Page 154 Supplementary Cyclic Settings)
Ns	The number of device stations set in "Network Configuration Settings" under "Basic Settings" (☞ Page 141 Network Configuration Settings)
Ns'	The number of the device stations (submaster stations, local stations, GOTs*3, or remote head modules) set in "Network Configuration Settings" under "Basic Settings" (☞ Page 141 Network Configuration Settings)
LS	Link scan time [ms] (☞ Page 396 Link scan time)
n1	• For 20 ≥ LS n1 = 20 • For 20 < LS n1 = LS

*2 For delay time until detection of the system switching cause, refer to the following.
📖 MELSEC iQ-R CPU Module User's Manual (Application)

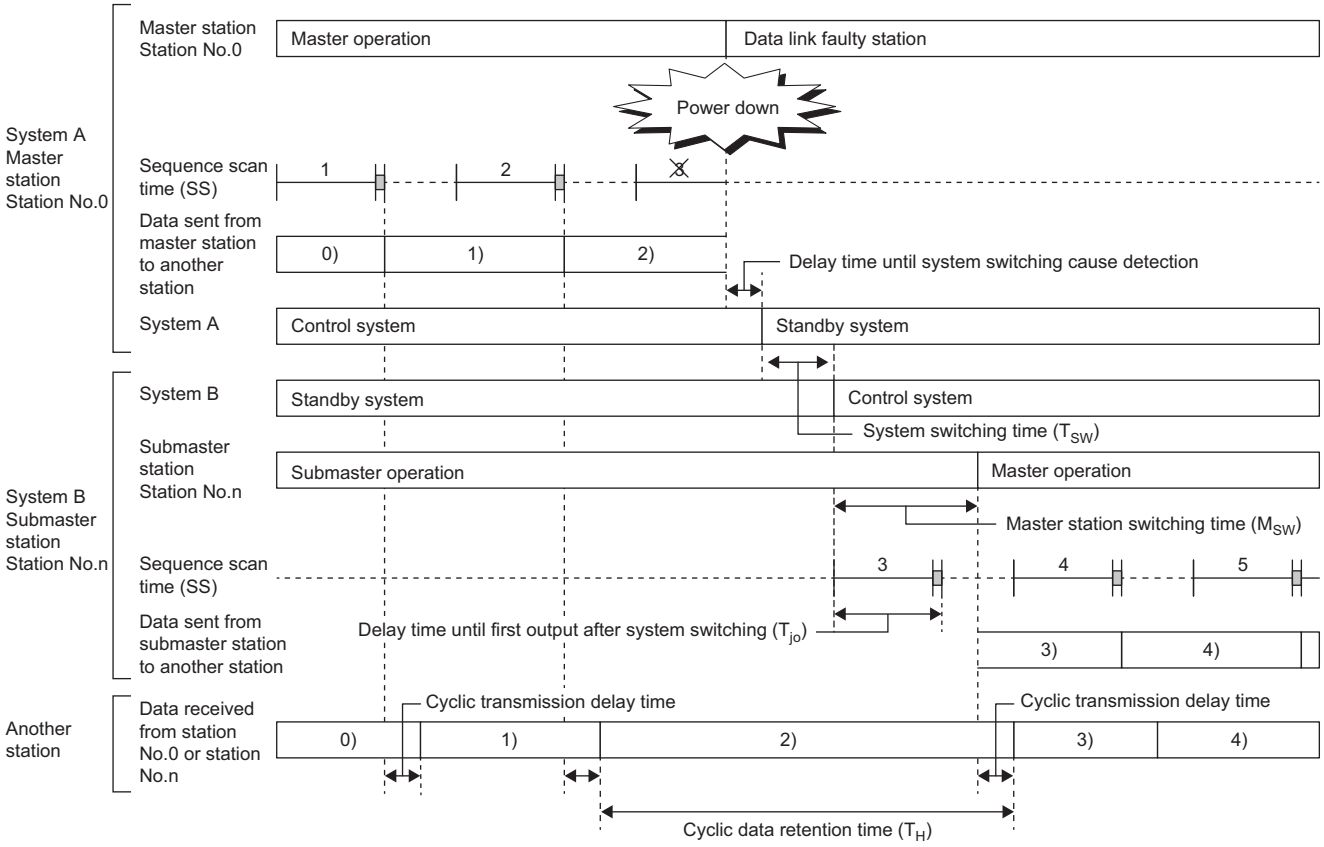
*3 For availability of GOT, refer to the manual for the GOT used.

*4 Depending on the failure status of the power supply module, the cyclic data holding time (T_H) is calculated by the following formula.
When Tjo < Msw: 500 + Tsw + Msw + SS
When Tjo > Msw: 500 + Tsw + Tjo + SS

*5 When the redundant function module is removed from the base unit, or depending on the failure status of the base unit, the calculation formula of the cyclic data holding time (T_H) may be as follows.
When Tjo < Msw: 2.5 + (2 × LS) + Tsw + Msw + SS
When Tjo > Msw: 2.5 + (2 × LS) + Tsw + Tjo + SS

■Pattern 1

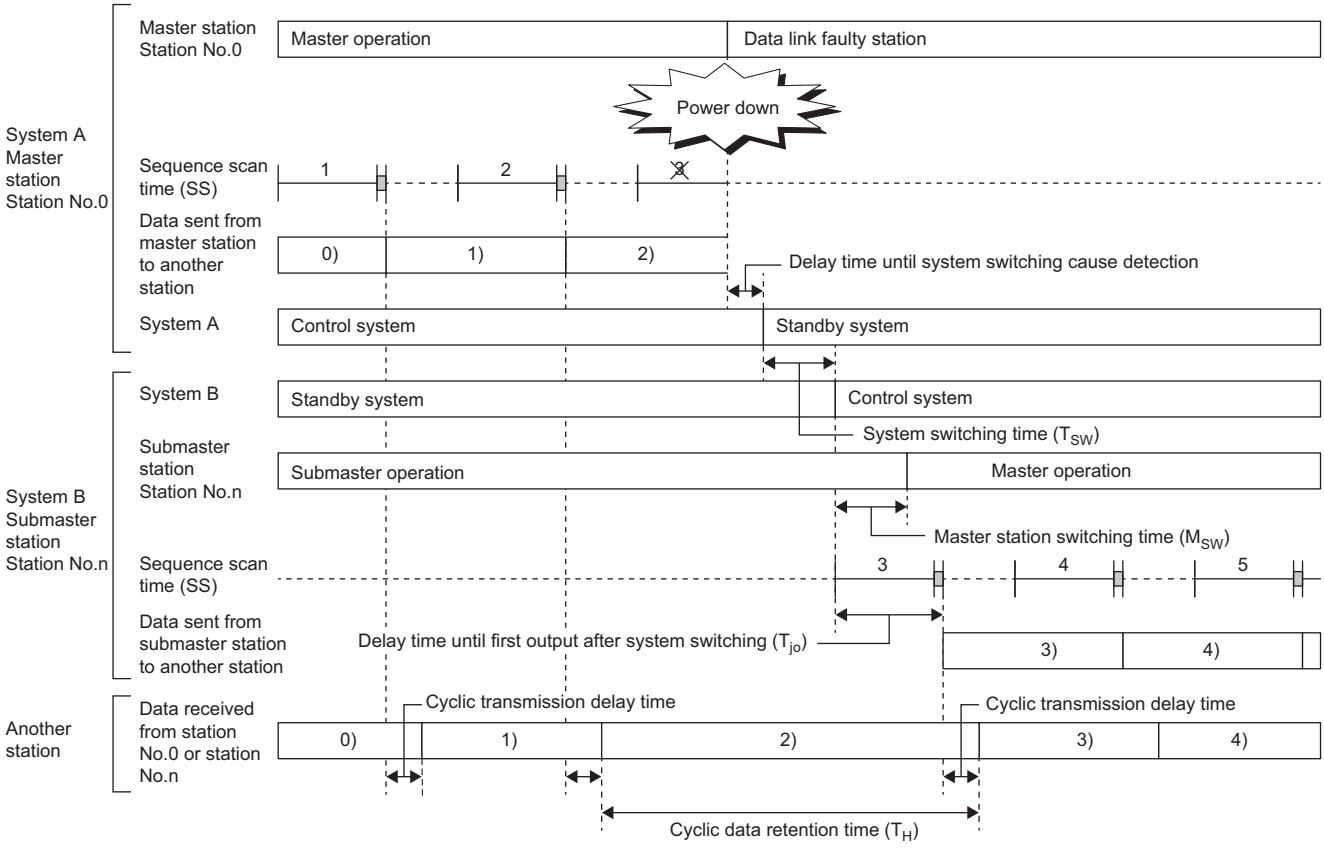
The following figure shows a timing chart for normal value.



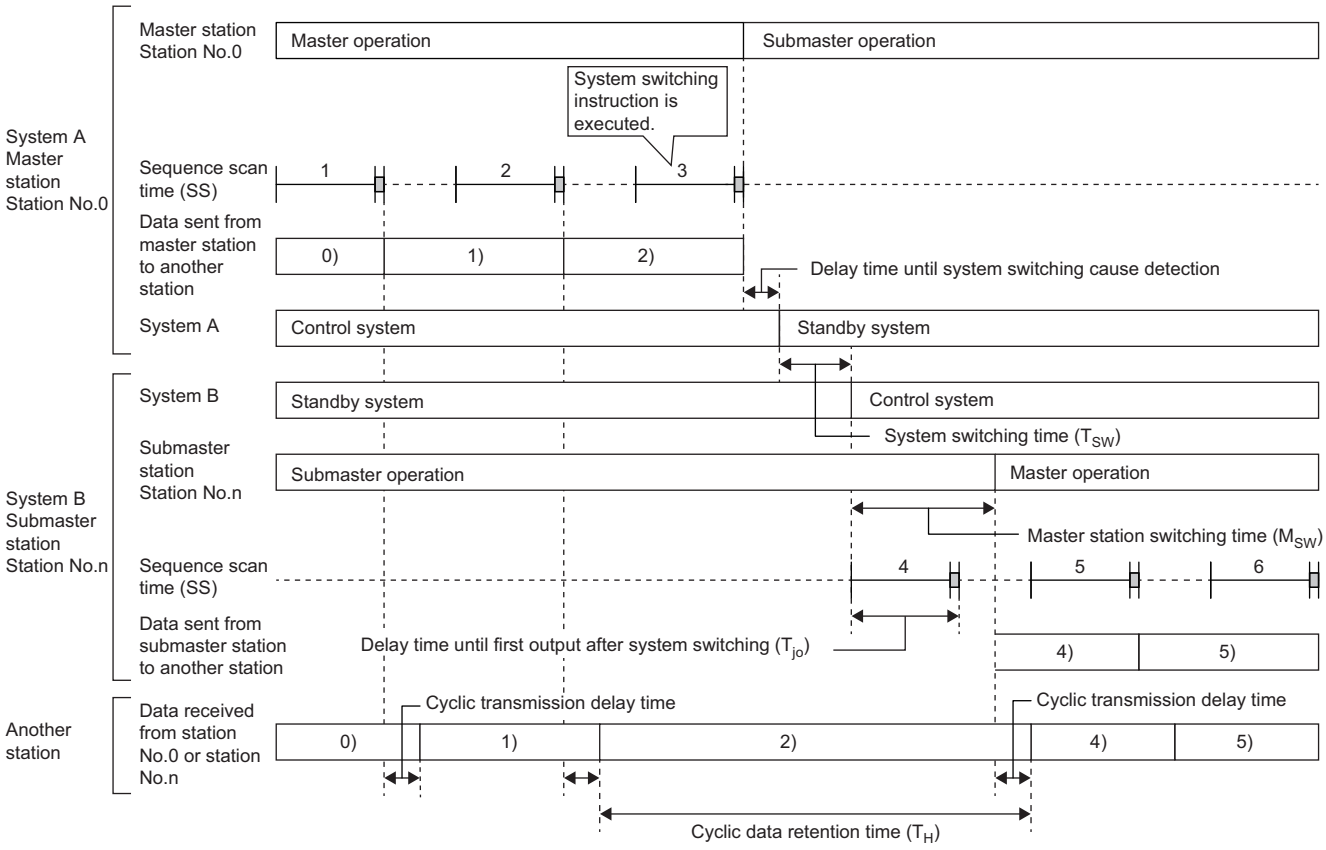
A

■Pattern 2

The following figure shows a timing chart for normal value.

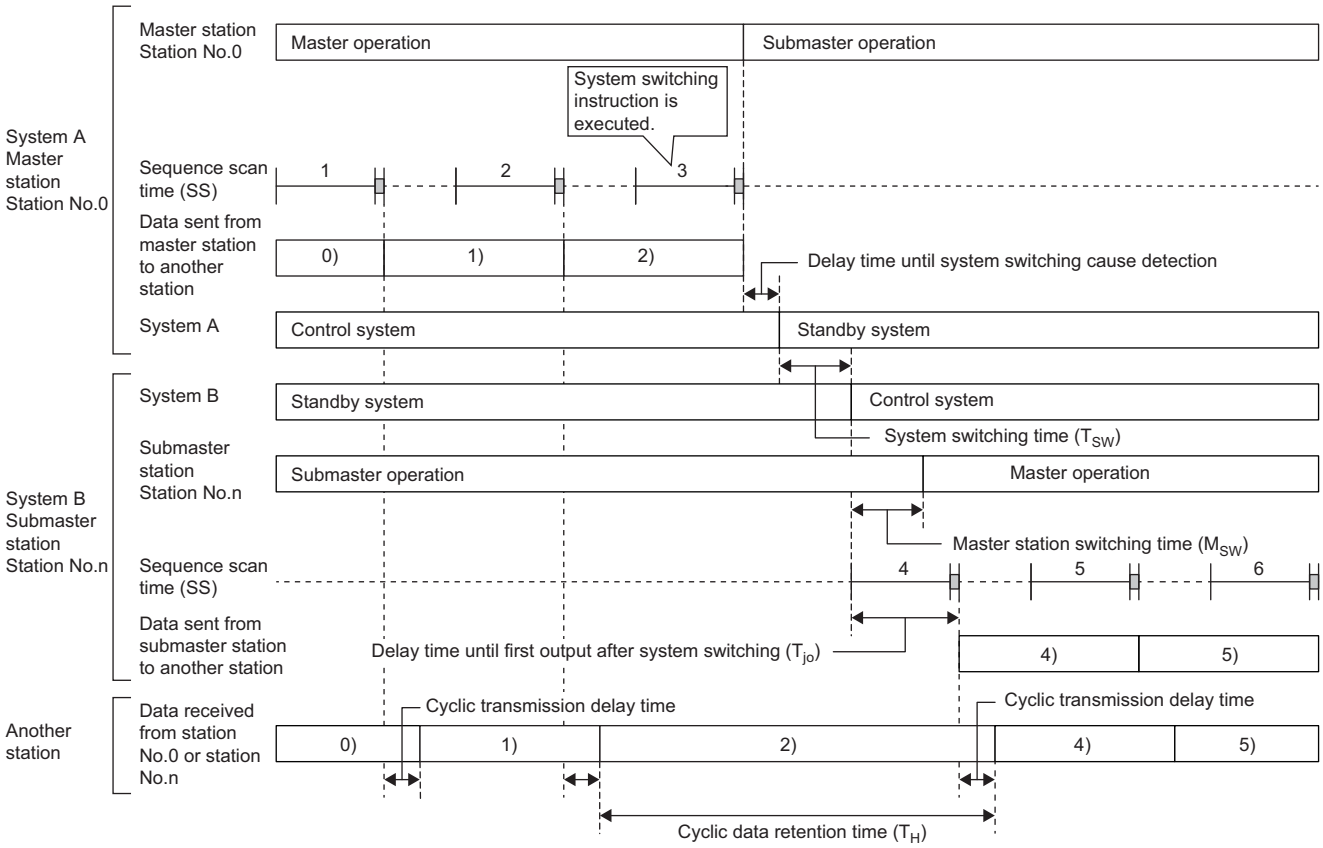


■Pattern 3

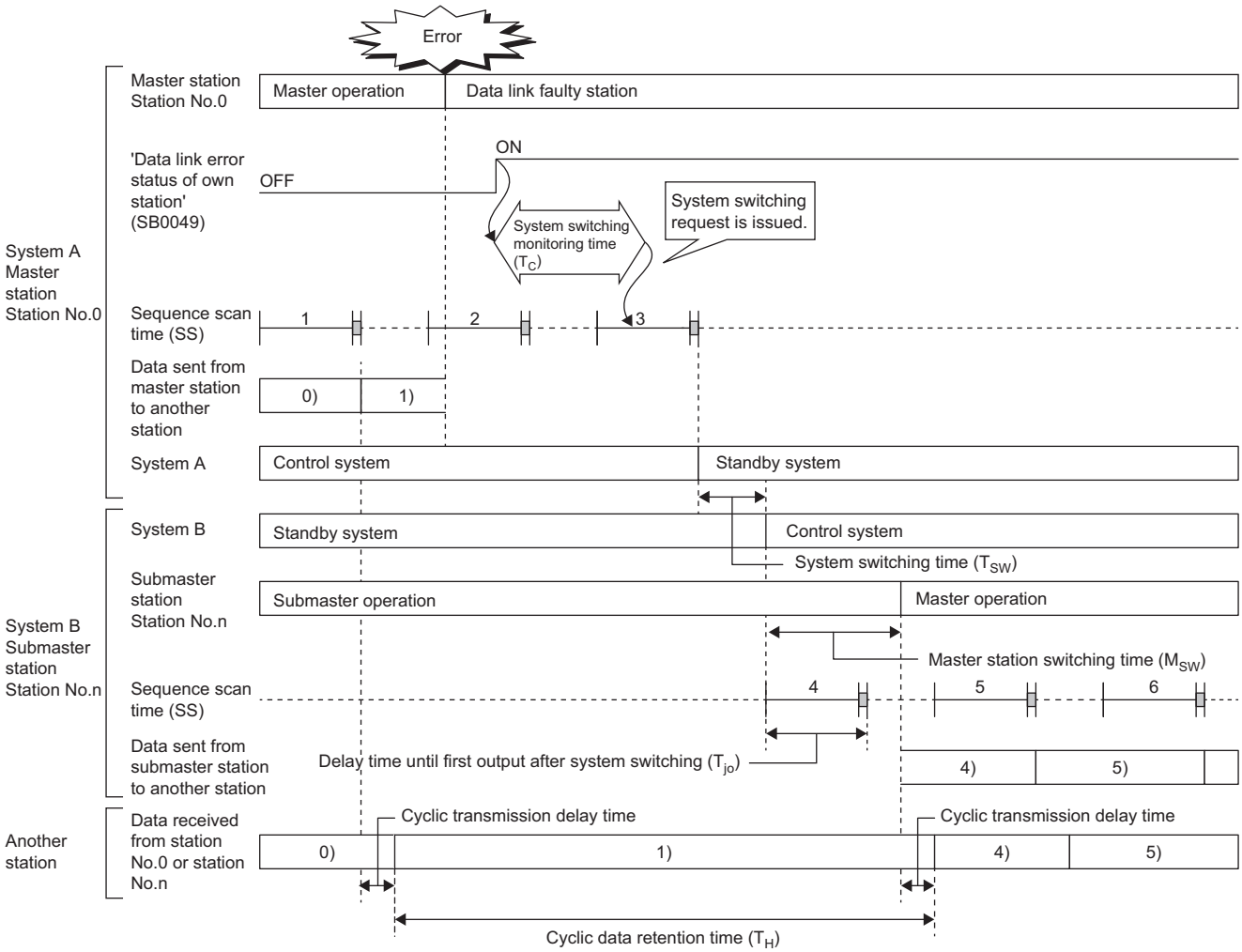

System A
Master station
Station No.0
Master station
Station No.0
Master operation
Submaster operation
System switching instruction is executed.
Sequence scan time (SS)
1
2
3
Data sent from master station to another station
0)
1)
2)
Delay time until system switching cause detection
System A
Control system
Standby system
System B
Submaster station
Station No.n
System B
Standby system
Control system
System switching time (T_{SW})
Submaster operation
Master operation
Master station switching time (M_{SW})
Sequence scan time (SS)
4
5
6
Data sent from submaster station to another station
Delay time until first output after system switching (T_{jo})
4)
5)
Another station
Data received from station No.0 or station No.n
Cyclic transmission delay time
Cyclic transmission delay time
0)
1)
2)
4)
5)
Cyclic data retention time (T_H)

A

■Pattern 4

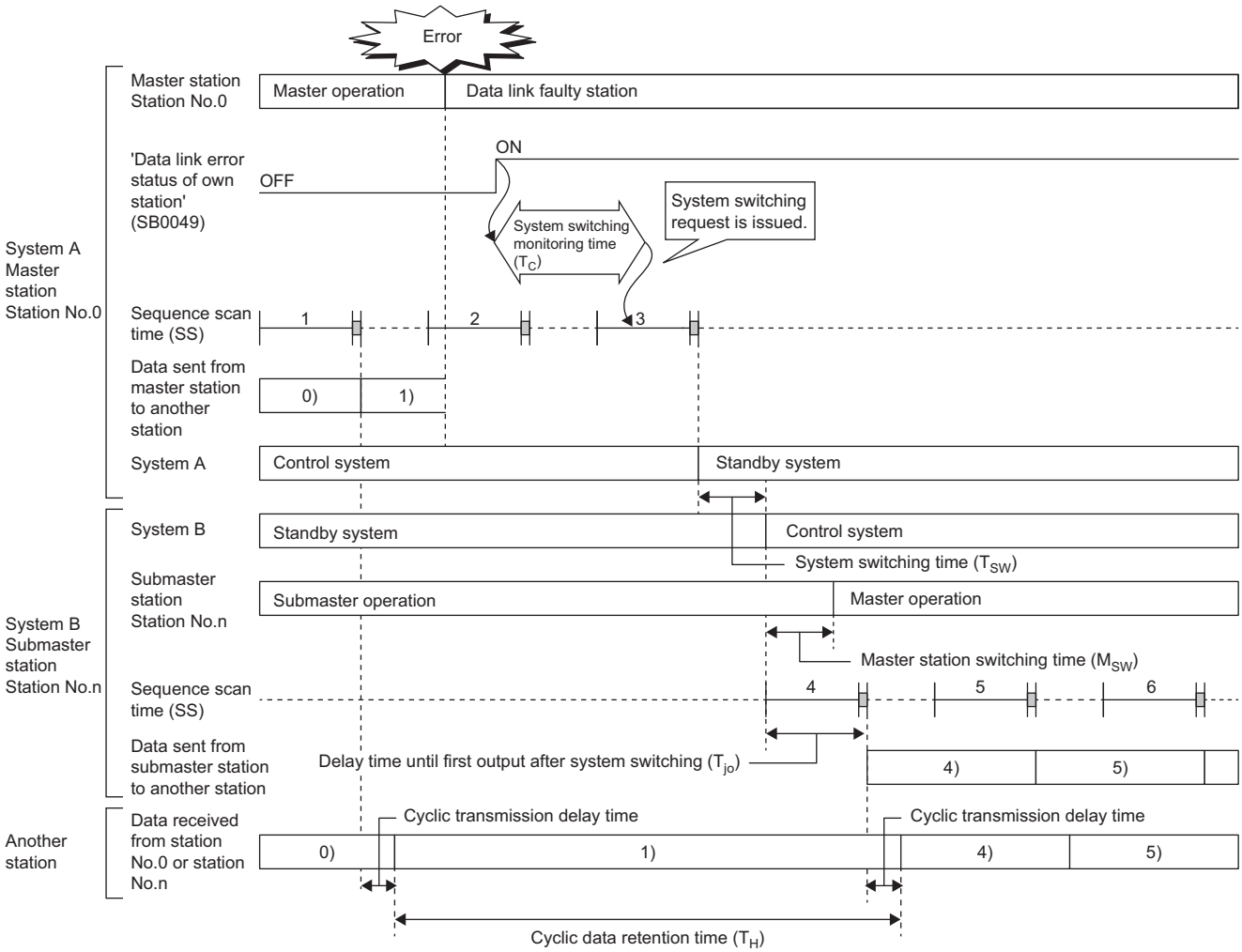

System A
Master station
Station No.0
Master station
Station No.0
Master operation
Submaster operation
System switching instruction is executed.
Sequence scan time (SS)
1
2
3
Data sent from master station to another station
0)
1)
2)
Delay time until system switching cause detection
System A
Control system
Standby system
System B
Submaster station
Station No.n
System B
Standby system
Control system
System switching time (T_{SW})
Submaster operation
Master operation
Master station switching time (M_{SW})
Sequence scan time (SS)
4
5
6
Data sent from submaster station to another station
Delay time until first output after system switching (T_{jo})
4)
5)
Another station
Data received from station No.0 or station No.n
Cyclic transmission delay time
Cyclic transmission delay time
0)
1)
2)
4)
5)
Cyclic data retention time (T_H)

■Pattern 5

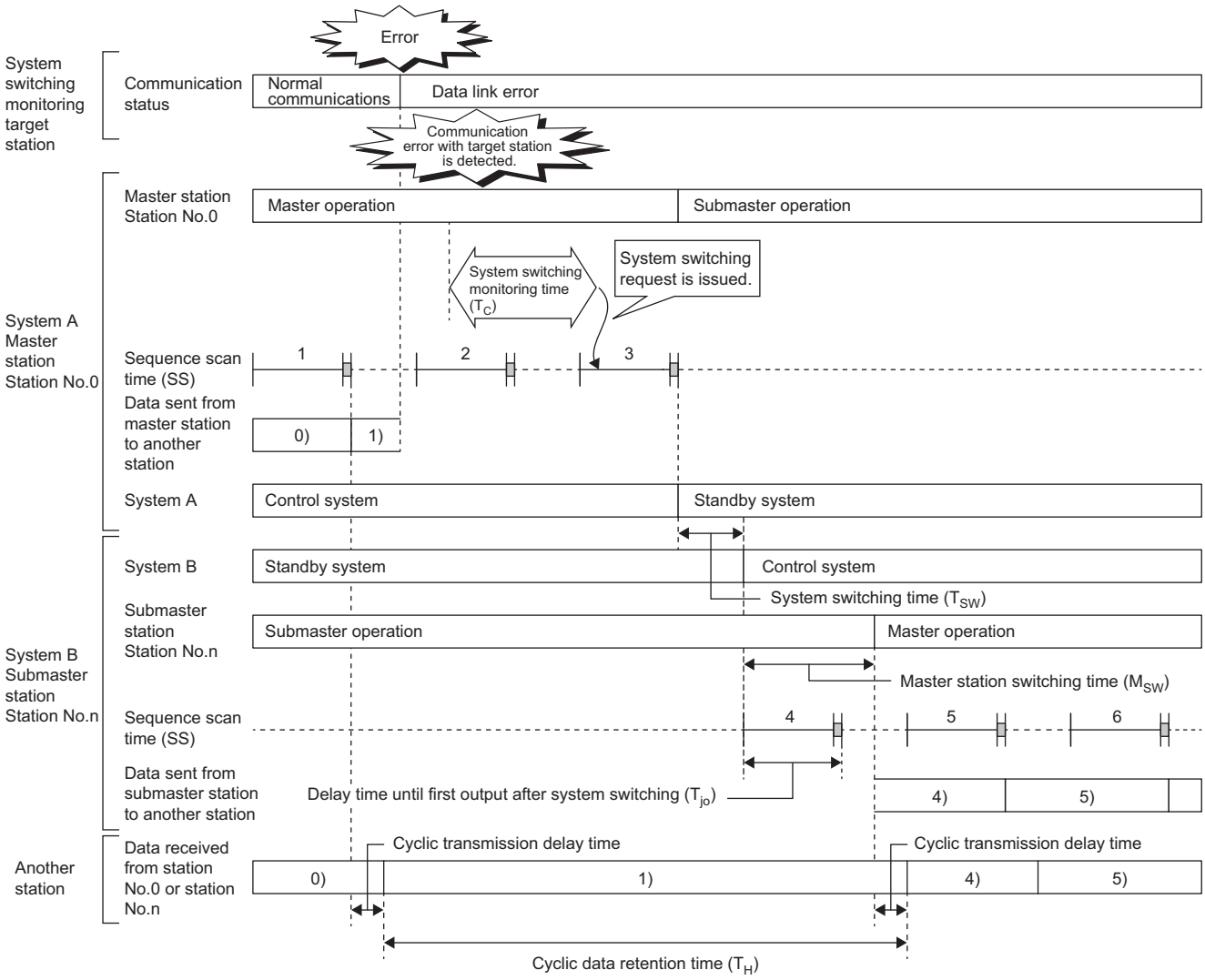

Error
Master station
Station No.0
Master operation
Data link faulty station
'Data link error status of own station' (SB0049)
ON
OFF
System switching monitoring time (T_C)
System switching request is issued.
System A
Master station
Station No.0
Sequence scan time (SS)
1
2
3
Data sent from master station to another station
0)
1)
System A
Control system
Standby system
System B
Standby system
Control system
System switching time (T_{SW})
Submaster station
Station No.n
Submaster operation
Master operation
Master station switching time (M_{SW})
System B
Submaster station
Station No.n
Sequence scan time (SS)
4
5
6
Data sent from submaster station to another station
Delay time until first output after system switching (T_{jo})
4)
5)
Another station
Data received from station No.0 or station No.n
Cyclic transmission delay time
Cyclic transmission delay time
0)
1)
4)
5)
Cyclic data retention time (T_H)

A

■Pattern 6

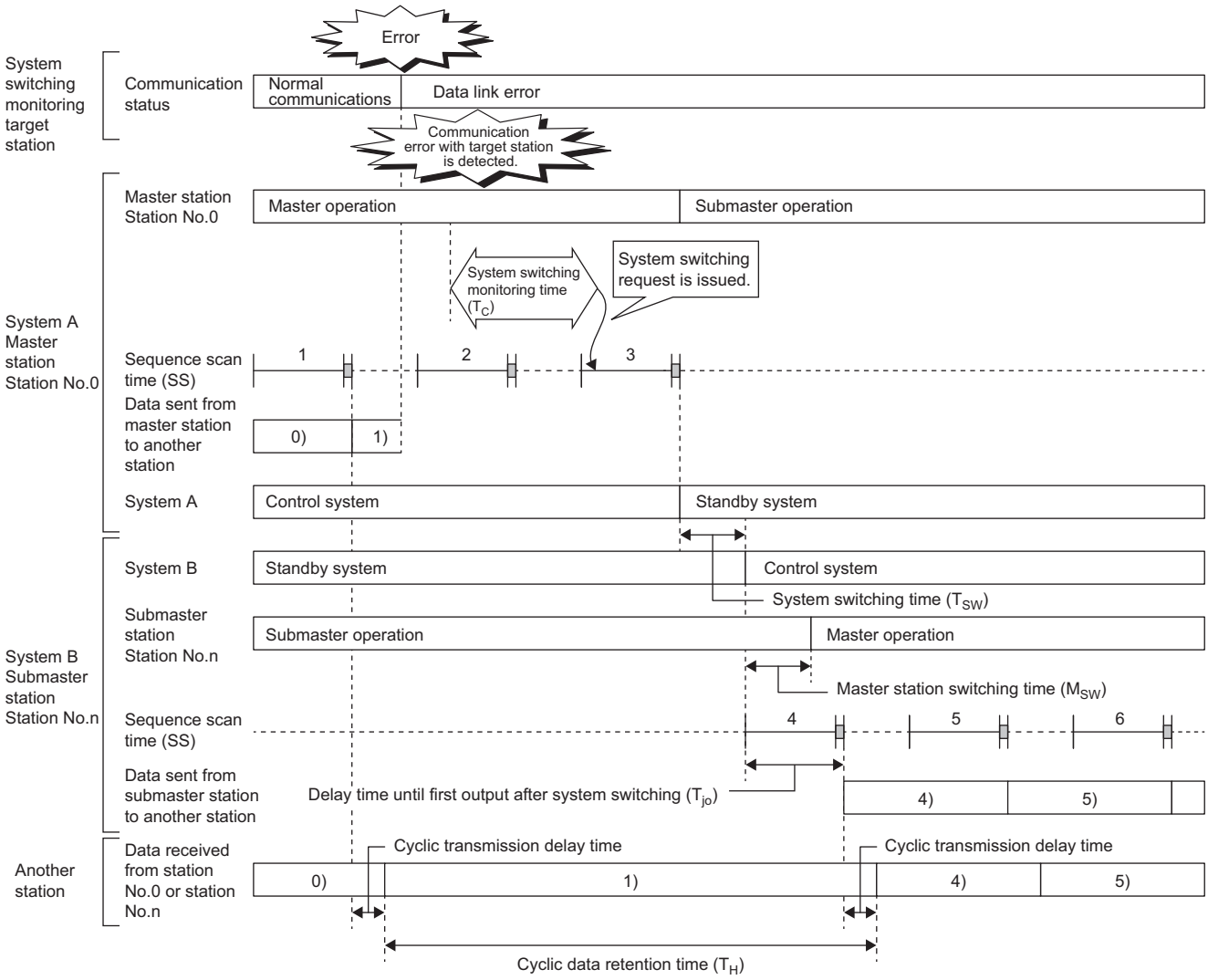

Error
Master station
Station No.0
Master operation
Data link faulty station
'Data link error status of own station' (SB0049)
ON
OFF
System switching monitoring time (T_C)
System switching request is issued.
System A
Master station
Station No.0
Sequence scan time (SS)
1
2
3
Data sent from master station to another station
0)
1)
System A
Control system
Standby system
System B
Standby system
Control system
System switching time (T_{SW})
Submaster station
Station No.n
Submaster operation
Master operation
System B
Submaster station
Station No.n
Master station switching time (M_{SW})
Sequence scan time (SS)
4
5
6
Data sent from submaster station to another station
Delay time until first output after system switching (T_{jo})
4)
5)
Another station
Data received from station No.0 or station No.n
Cyclic transmission delay time
Cyclic transmission delay time
0)
1)
4)
5)
Cyclic data retention time (T_H)

■Pattern 7


Error
System switching monitoring target station
Communication status
Normal communications
Data link error
Communication error with target station is detected.
Master station Station No.0
Master operation
Submaster operation
System switching monitoring time (T_C)
System switching request is issued.
System A Master station Station No.0
Sequence scan time (SS)
1
2
3
Data sent from master station to another station
0)
1)
System A
Control system
Standby system
System B
Standby system
Control system
System switching time (T_{SW})
Submaster station Station No.n
Submaster operation
Master operation
System B Submaster station Station No.n
Master station switching time (M_{SW})
Sequence scan time (SS)
4
5
6
Data sent from submaster station to another station
Delay time until first output after system switching (T_{jo})
4)
5)
Another station
Data received from station No.0 or station No.n
Cyclic transmission delay time
Cyclic transmission delay time
0)
1)
4)
5)
Cyclic data retention time (T_H)

A

■Pattern 8


Error
System switching monitoring target station
Communication status
Normal communications
Data link error
Communication error with target station is detected.
Master station Station No.0
Master operation
Submaster operation
System switching monitoring time (T_C)
System switching request is issued.
System A Master station Station No.0
Sequence scan time (SS)
1
2
3
Data sent from master station to another station
0)
1)
System A
Control system
Standby system
System B
Standby system
Control system
System switching time (T_{SW})
Submaster station Station No.n
Submaster operation
Master operation
System B Submaster station Station No.n
Master station switching time (M_{SW})
Sequence scan time (SS)
4
5
6
Data sent from submaster station to another station
Delay time until first output after system switching (T_{jo})
4)
5)
Another station
Data received from station No.0 or station No.n
Cyclic transmission delay time
Cyclic transmission delay time
0)
1)
4)
5)
Cyclic data retention time (T_H)

Redundant device station (redundant local station)

The following are the formulas to calculate cyclic data holding time when system switching occurs in the redundant local station configuration.*1

Pattern No.	System switching cause		Cyclic data holding time (T_H) [ms]	Timing chart
1	• Failure of the control system power supply module*3 • Power-off of the control system • Failure of the control system Process CPU (redundant mode) • Failure of the control system base unit*4 • Failure of the control system redundant function module*4		Delay time until detection of the system switching cause*2 + Tsw + Tjo + SS	☞ Page 420 Pattern 1
2	• Stop error of the control system Process CPU (redundant mode) • Execution of the system switching instruction • System switching request from the engineering tool • System switching request from another network module		Delay time until detection of the system switching cause*2 + Tsw + Tjo + SS	☞ Page 421 Pattern 2
3	System switching request from the RJ71GF11-T2 (own station)	Own station data link error	2100 + Tc + Tsw + Tjo + (SS × 2)	☞ Page 422 Pattern 3

*1 The meanings of the variables in the equation are as follows.

Variable	Meaning
Tsw	Process CPU (redundant mode) system switching time [ms] (MELSEC iQ-R CPU Module User's Manual (Application))
Tjo	Delay time until initial output after system switching [ms] (MELSEC iQ-R CPU Module User's Manual (Application))
SS	Process CPU (redundant mode) sequence scan time [ms] (MELSEC iQ-R CPU Module User's Manual (Application))
Tc	System switching monitoring time setting value [ms] (☞ Page 154 Supplementary Cyclic Settings)

*2 For delay time until detection of the system switching cause, refer to the following.
MELSEC iQ-R CPU Module User's Manual (Application)

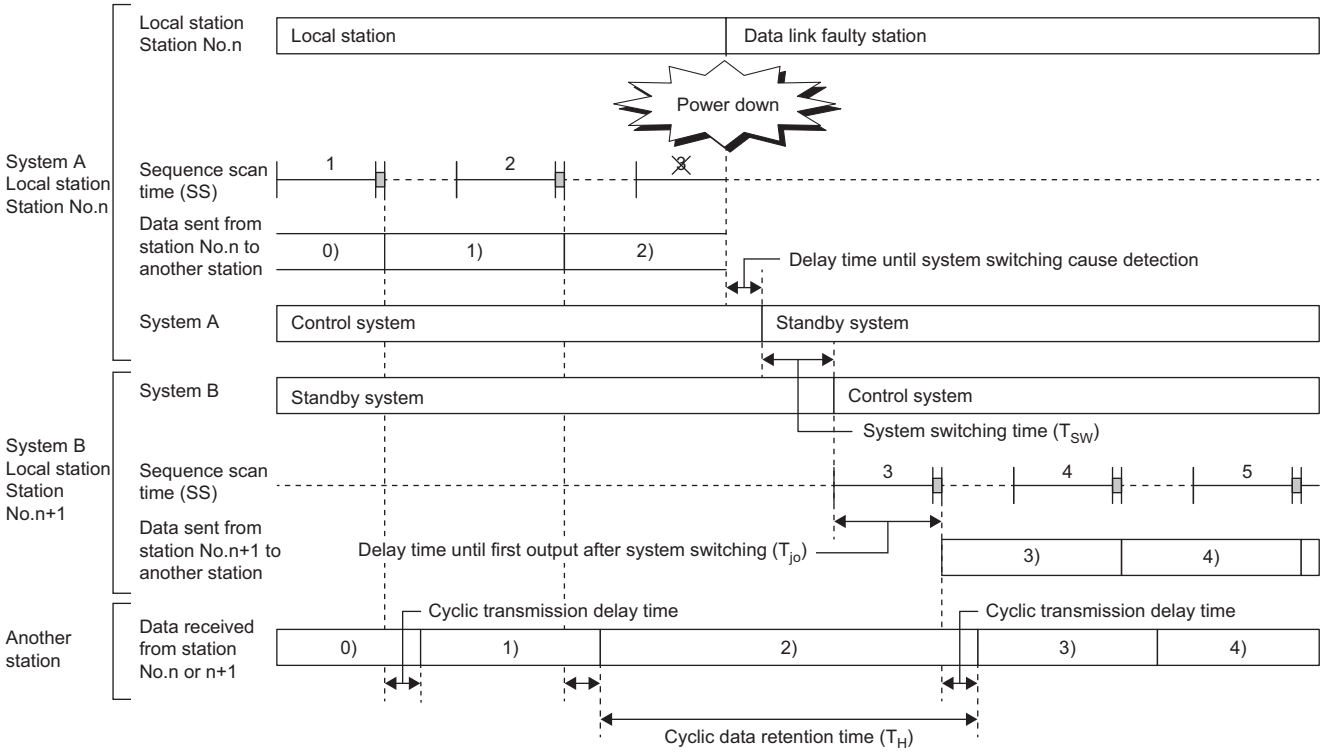
*3 Depending on the failure status of the power supply module, the cyclic data holding time (T_H) is calculated by the following formula.
100 + Tsw + Tjo + SS

*4 When the redundant function module is disconnected from the base unit or depending on the failure status of the base unit, the cyclic data holding time (T_H) is calculated by the following formula.
2.5 + (2 × LS) + Tsw + Tjo + SS

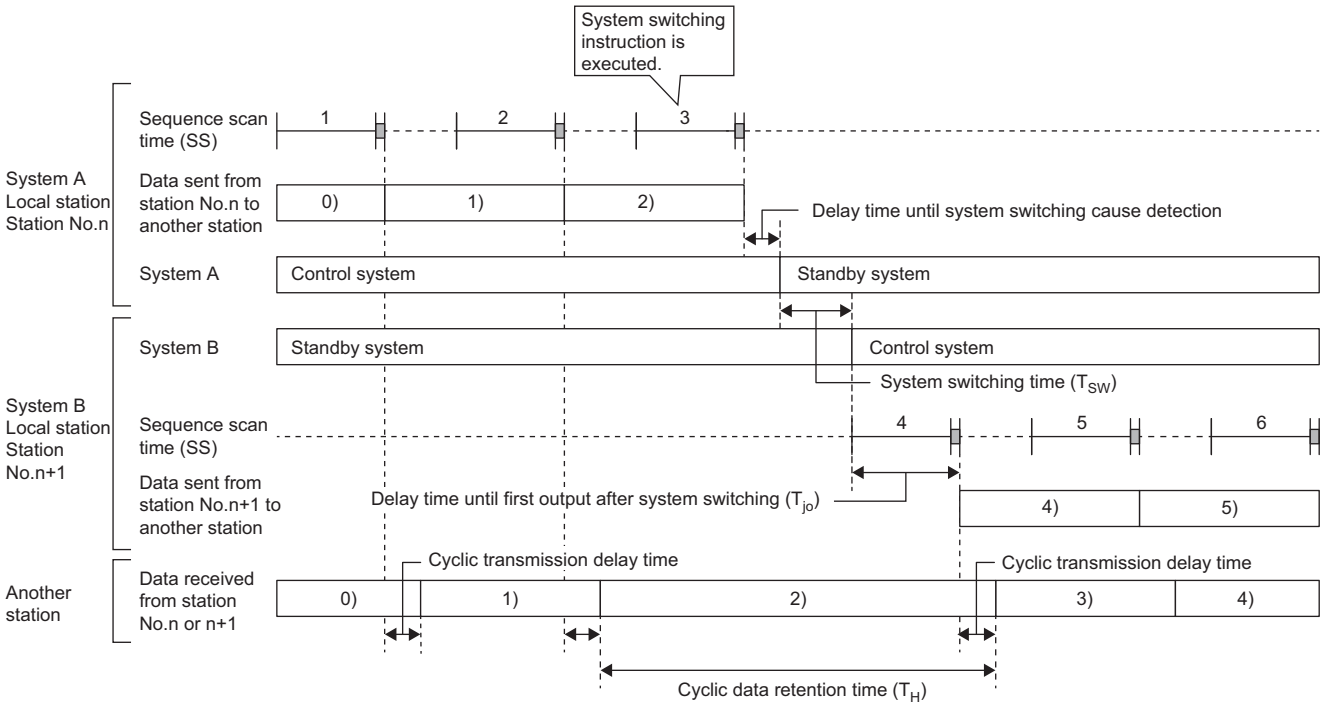
A

■Pattern 1

The following figure shows a timing chart for normal value.

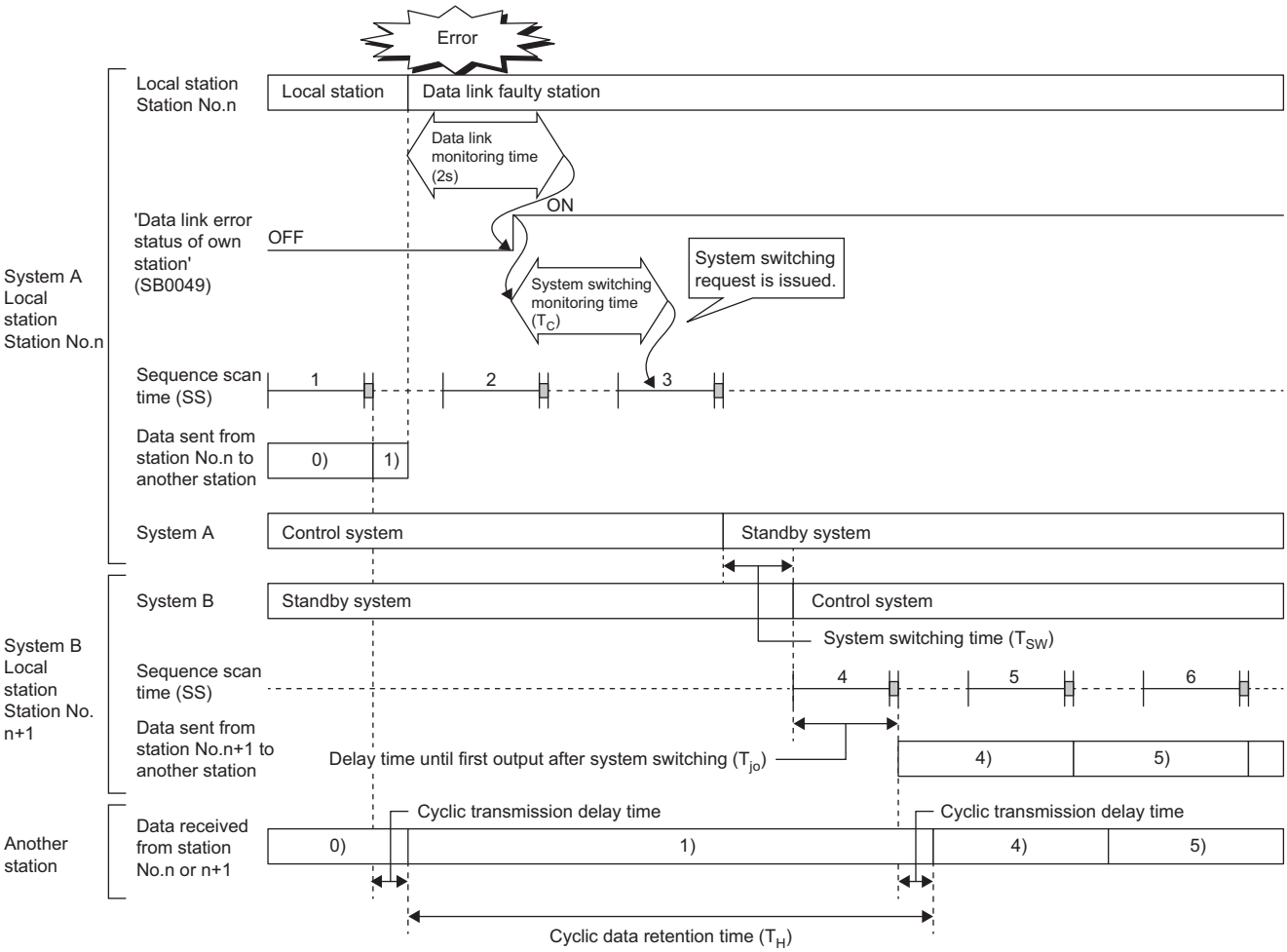


■Pattern 2


System switching instruction is executed.
Sequence scan time (SS)
1
2
3
System A Local station Station No.n
Data sent from station No.n to another station
0)
1)
2)
Delay time until system switching cause detection
System A
Control system
Standby system
System B
Standby system
Control system
System switching time (T_{SW})
System B Local station Station No.n+1
Sequence scan time (SS)
4
5
6
Data sent from station No.n+1 to another station
Delay time until first output after system switching (T_{jo})
4)
5)
Another station
Data received from station No.n or n+1
Cyclic transmission delay time
Cyclic transmission delay time
0)
1)
2)
3)
4)
Cyclic data retention time (T_H)

A

■Pattern 3


Error
Local station
Station No.n
Local station
Data link faulty station
Data link monitoring time (2s)
ON
'Data link error status of own station' (SB0049)
OFF
System switching monitoring time (T_C)
System switching request is issued.
System A Local station Station No.n
Sequence scan time (SS)
1
2
3
Data sent from station No.n to another station
0)
1)
System A
Control system
Standby system
System B
Standby system
Control system
System switching time (T_{SW})
System B Local station Station No. n+1
Sequence scan time (SS)
4
5
6
Data sent from station No.n+1 to another station
Delay time until first output after system switching (T_{jo})
4)
5)
Another station
Data received from station No.n or n+1
Cyclic transmission delay time
Cyclic transmission delay time
0)
1)
4)
5)
Cyclic data retention time (T_H)

Redundant line

The following are the formulas to calculate cyclic data holding time when system switching occurs in the redundant line configuration.*1

Pattern No.	System switching cause		Condition	Cyclic data holding time (T_H) [ms]	Timing chart
1	• Failure of the control system power supply module*3 • Power-off of the control system • Failure of the control system Process CPU (redundant mode) • Failure of the control system base unit*4 • Failure of the control system redundant function module*4		Tjo < Lsw	Delay time until detection of the system switching cause*2 + Tsw + Lsw + SS	☞ Page 424 Pattern 1
2			Tjo > Lsw	Delay time until detection of the system switching cause*2 + Tsw + Tjo + SS	☞ Page 425 Pattern 2
3	• Stop error of the control system Process CPU (redundant mode) • Execution of the system switching instruction • System switching request from the engineering tool • System switching request from another network module		Tjo < Lsw	Delay time until detection of the system switching cause*2 + Tsw + Lsw + SS	☞ Page 426 Pattern 3
4			Tjo > Lsw	Delay time until detection of the system switching cause*2 + Tsw + Tjo + SS	☞ Page 427 Pattern 4
5	System switching request from the RJ71GF11-T2 (own station)	• Own station data link error • Device station error	Tjo < Lsw	2.5 + Tc + (2 × LS) + Tsw + Lsw + (SS × 2)	☞ Page 428 Pattern 5
6			Tjo > Lsw	2.5 + Tc + (2 × LS) + Tsw + Tjo + (SS × 2)	☞ Page 429 Pattern 6

*1 The meanings of the variables in the equation are as follows.

Variable	Meaning
Tsw	Process CPU (redundant mode) system switching time [ms] (📖 MELSEC iQ-R CPU Module User's Manual (Application))
Tjo	Delay time until initial output after system switching [ms] (📖 MELSEC iQ-R CPU Module User's Manual (Application))
Lsw	Line switching time [ms] = 1 + (3 × LS) + Hsw + Rio Hsw: System switching time of the remote head module [ms] (📖 MELSEC iQ-R CC-Link IE Field Network Remote Head Module User's Manual (Application)) Rio: I/O response time of the remote head module [ms] (📖 MELSEC iQ-R CC-Link IE Field Network Remote Head Module User's Manual (Application))
SS	Process CPU (redundant mode) sequence scan time [ms] (📖 MELSEC iQ-R CPU Module User's Manual (Application))
Tc	System switching monitoring time setting value [ms] (☞ Page 154 Supplementary Cyclic Settings)
LS	Link scan time [ms] (☞ Page 396 Link scan time)

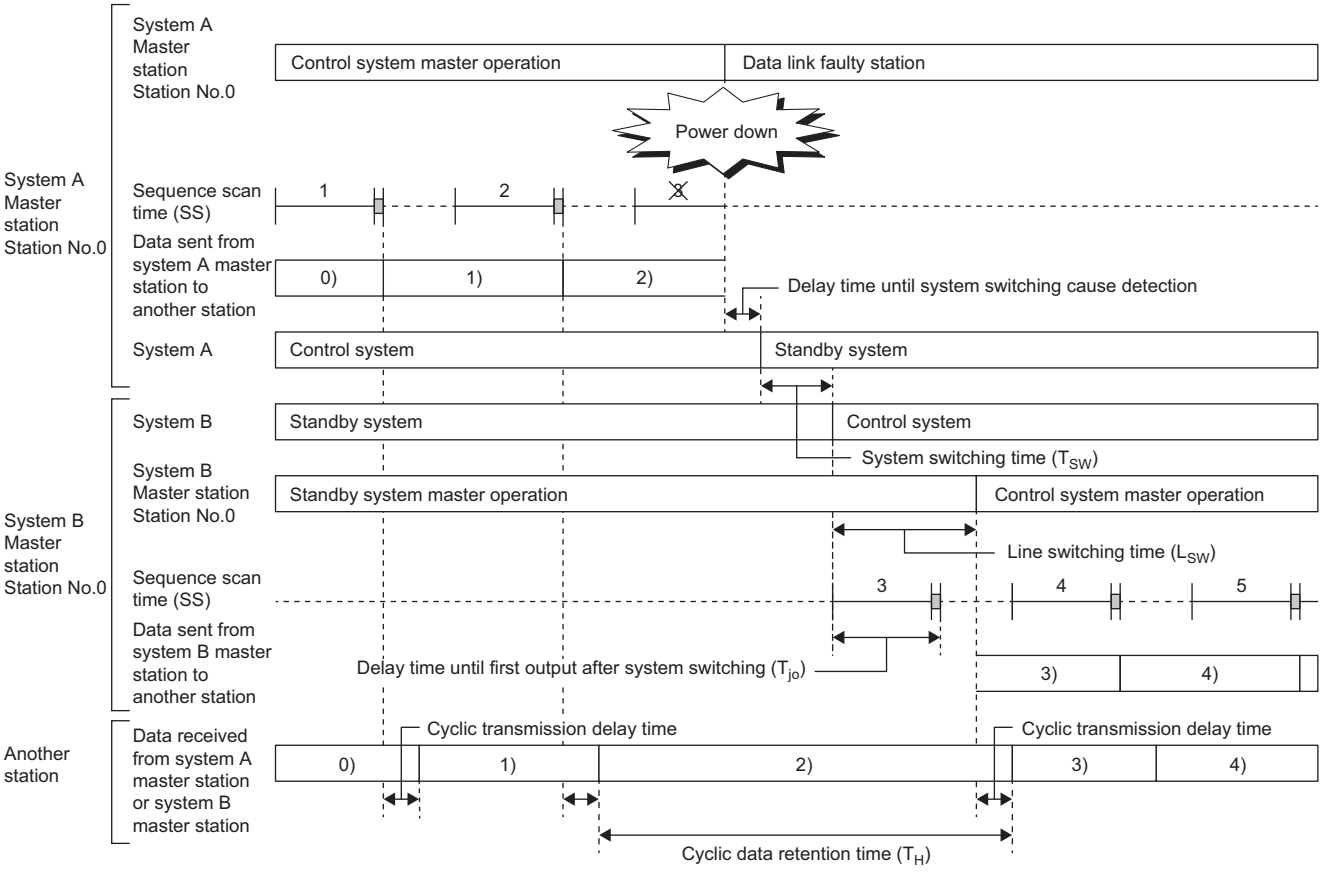
*2 For delay time until detection of the system switching cause, refer to the following.
📖 MELSEC iQ-R CPU Module User's Manual (Application)

*3 Depending on the failure status of the power supply module, the cyclic data holding time (T_H) is calculated by the following formula.
When Tjo < Lsw: 100 + (2 × LS) + Tsw + Lsw + SS
When Tjo > Lsw: 100 + (2 × LS) + Tsw + Tjo + SS

*4 When the redundant function module is removed from the base unit, or depending on the failure status of the base unit, the calculation formula of the cyclic data holding time (T_H) may be as follows.
When Tjo < Lsw: 2.5 + (4 × LS) + Tsw + Lsw + SS
When Tjo > Lsw: 2.5 + (4 × LS) + Tsw + Tjo + SS

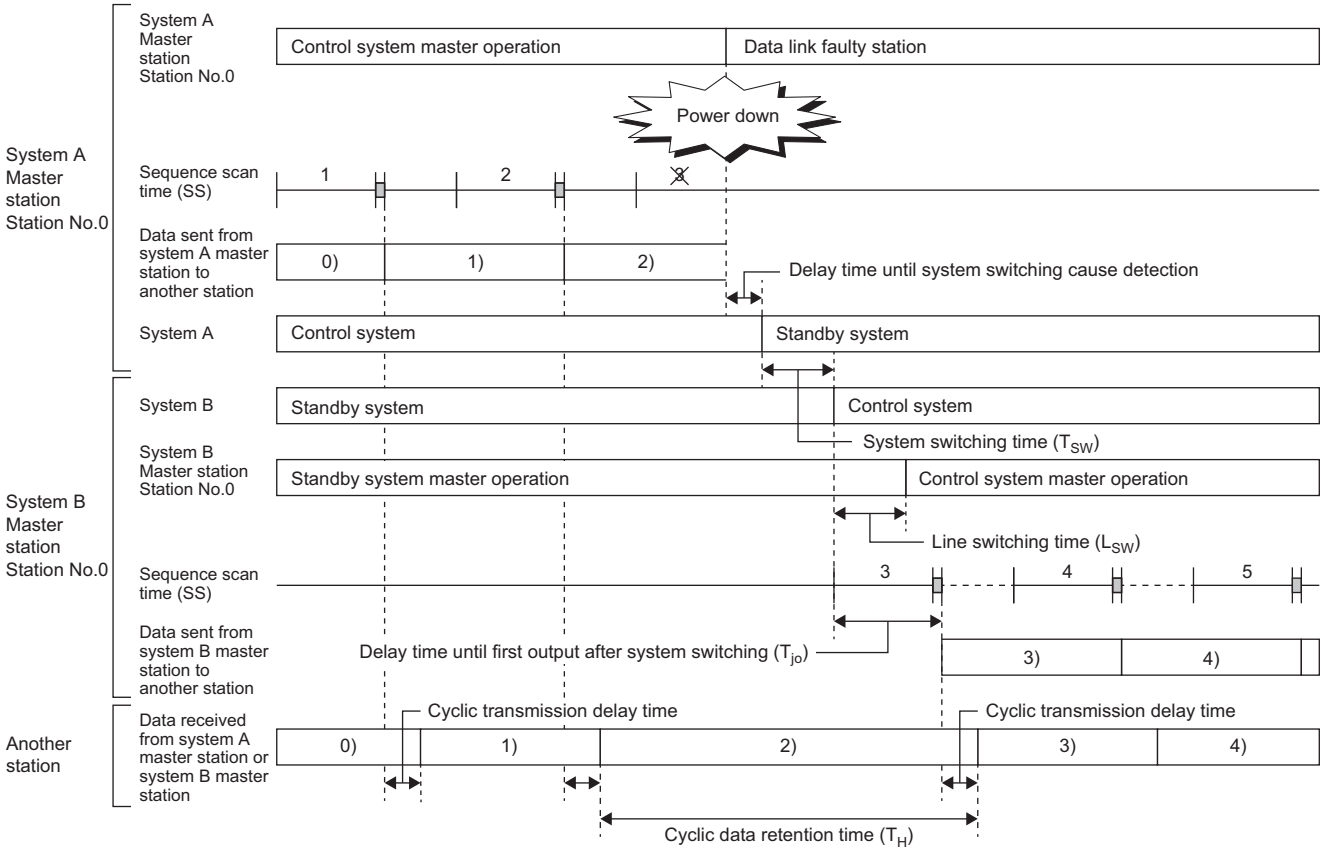
■Pattern 1

The following figure shows a timing chart for normal value.



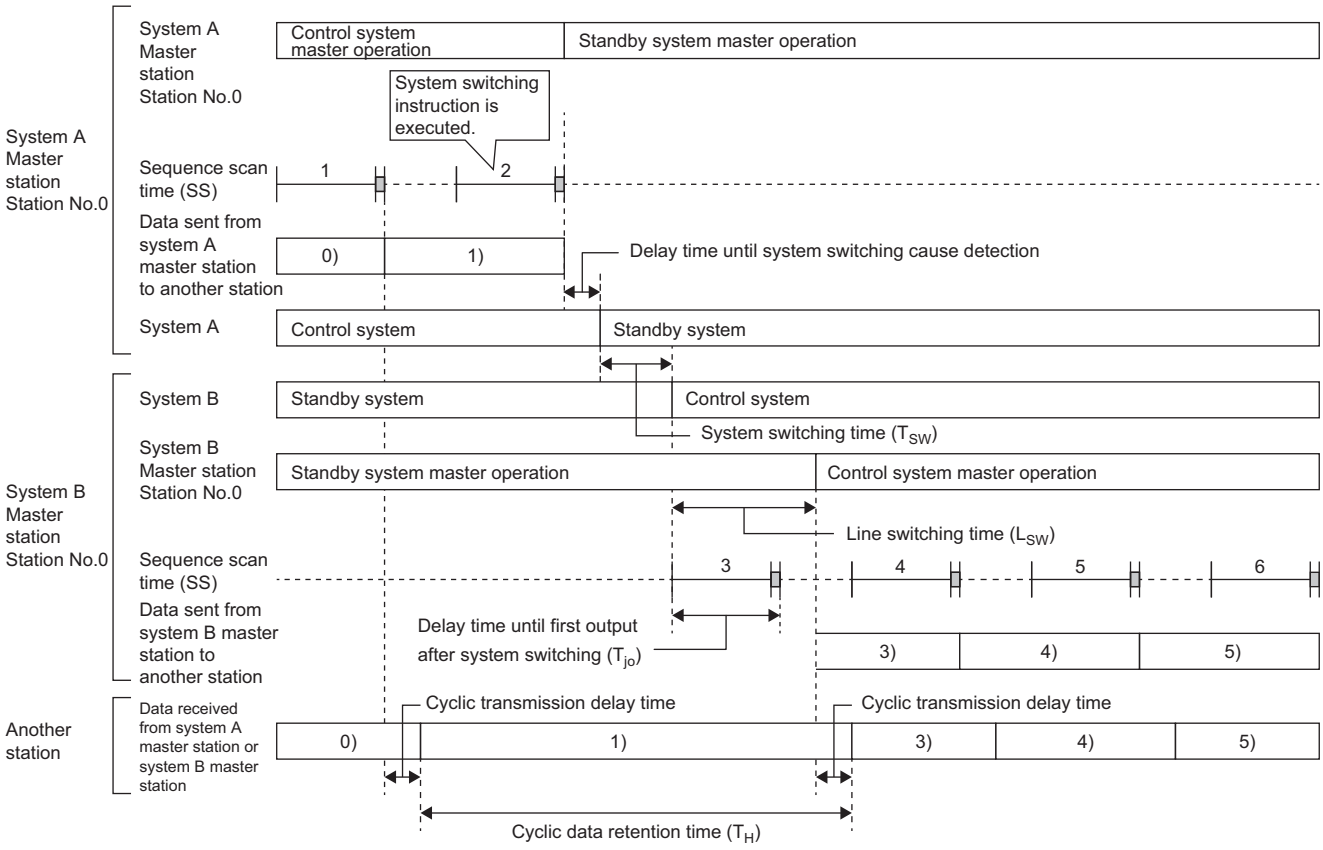
■Pattern 2

The following figure shows a timing chart for normal value.

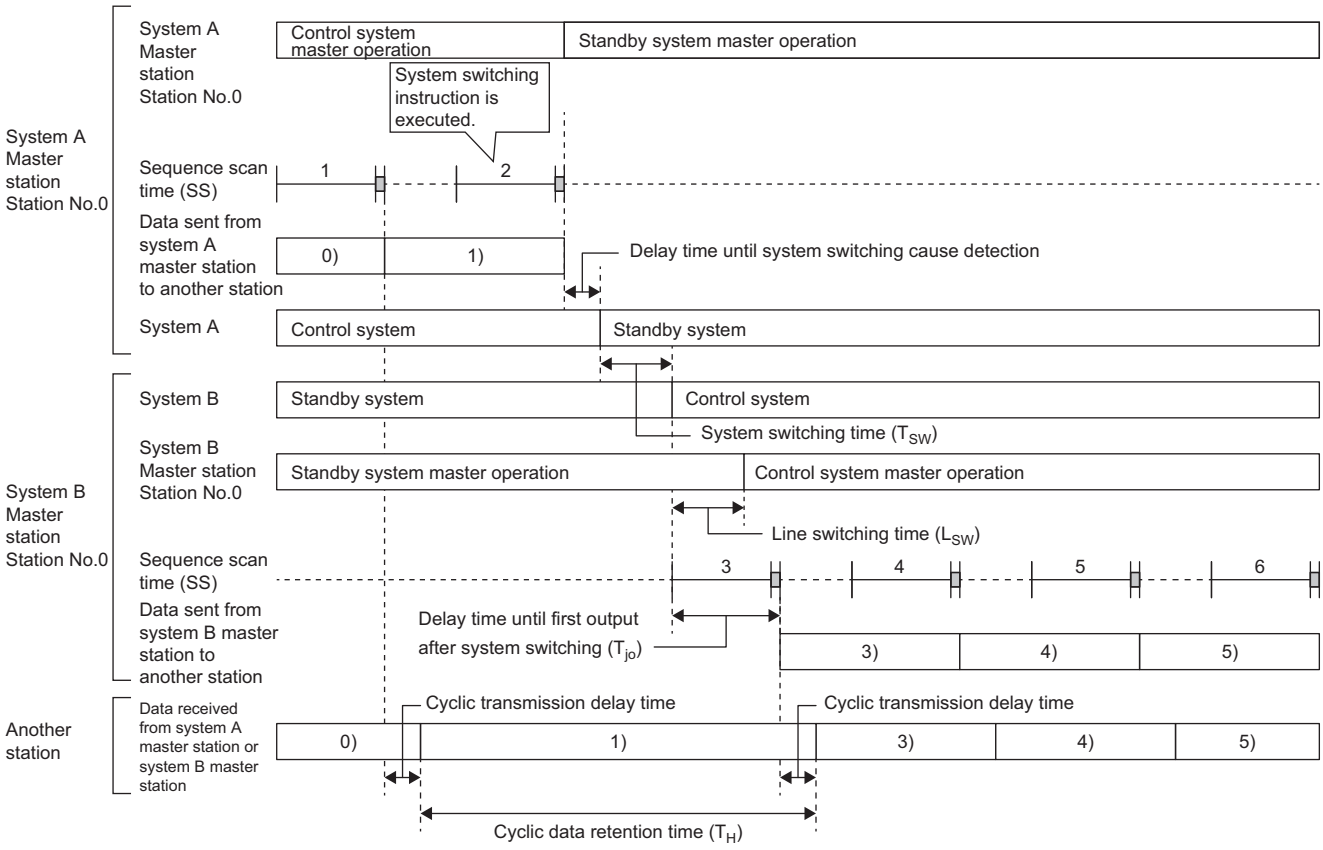


A

■Pattern 3

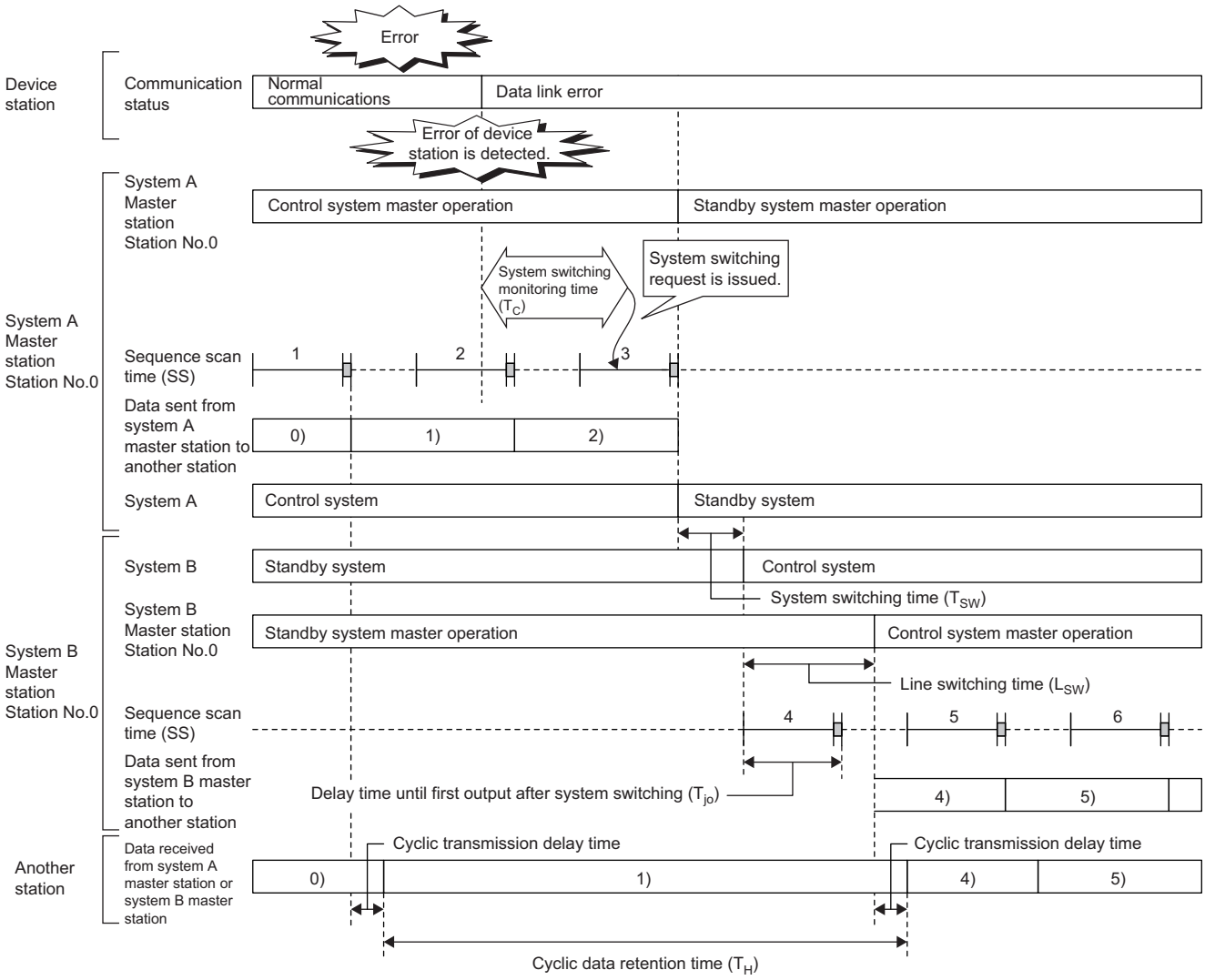

System A Master station Station No.0
System A Master station Station No.0
Control system master operation
Standby system master operation
System switching instruction is executed.
Sequence scan time (SS)
1
2
Data sent from system A master station to another station
0)
1)
Delay time until system switching cause detection
System A
Control system
Standby system
System B
Standby system
Control system
System switching time (T_{SW})
System B Master station Station No.0
Standby system master operation
Control system master operation
Line switching time (L_{SW})
System B Master station Station No.0
Sequence scan time (SS)
3
4
5
6
Data sent from system B master station to another station
Delay time until first output after system switching (T_{jo})
3)
4)
5)
Another station
Data received from system A master station or system B master station
Cyclic transmission delay time
Cyclic transmission delay time
0)
1)
3)
4)
5)
Cyclic data retention time (T_H)

■Pattern 4

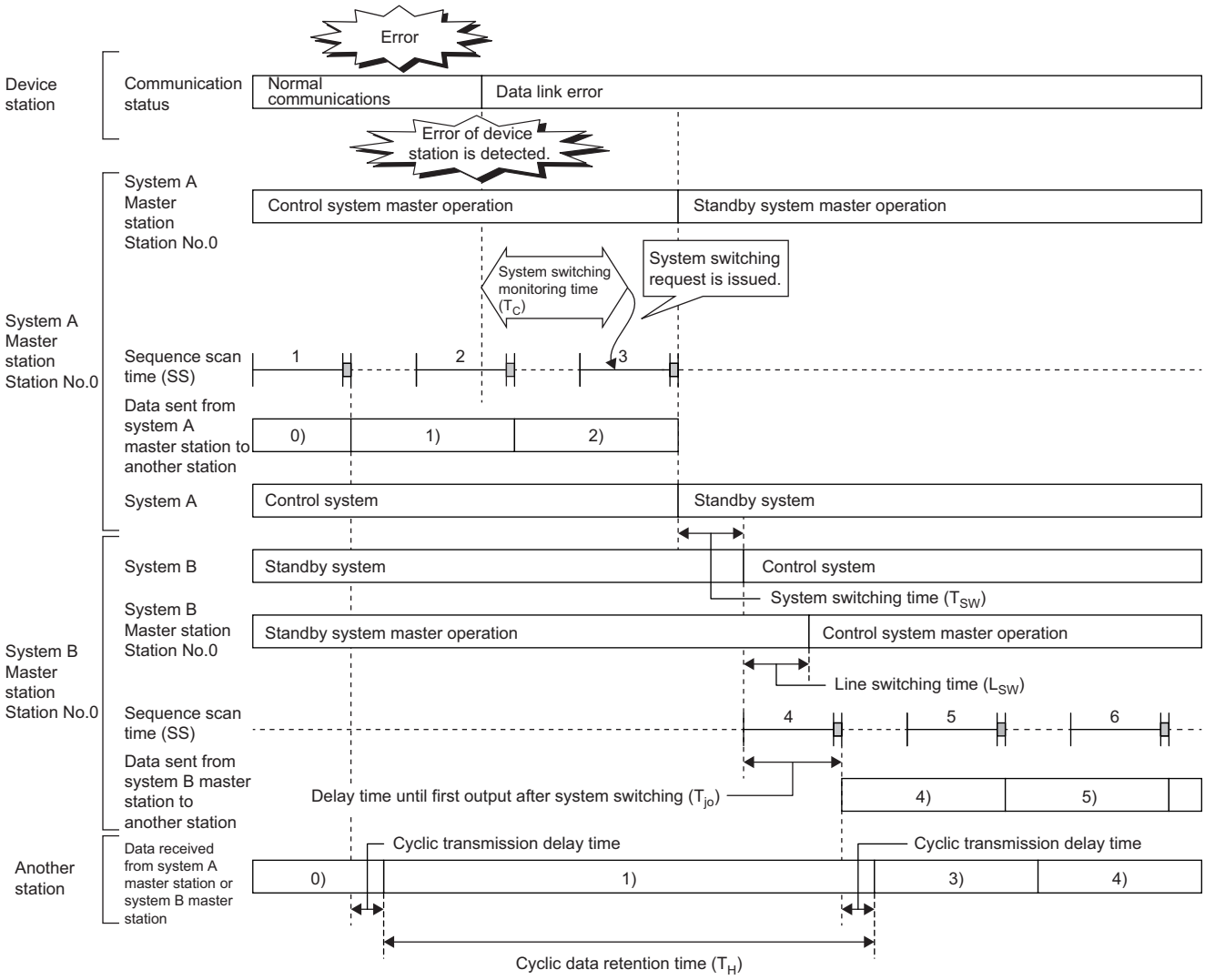

System A Master station Station No.0
System A Master station Station No.0
Control system master operation
Standby system master operation
System switching instruction is executed.
Sequence scan time (SS)
1
2
Data sent from system A master station to another station
0)
1)
Delay time until system switching cause detection
System A
Control system
Standby system
System B
Standby system
Control system
System switching time (T_{SW})
System B Master station Station No.0
Standby system master operation
Control system master operation
Line switching time (L_{SW})
System B Master station Station No.0
Sequence scan time (SS)
3
4
5
6
Data sent from system B master station to another station
Delay time until first output after system switching (T_{jo})
3)
4)
5)
Another station
Data received from system A master station or system B master station
Cyclic transmission delay time
Cyclic transmission delay time
0)
1)
3)
4)
5)
Cyclic data retention time (T_H)

A

■Pattern 5


Error
Device station
Communication status
Normal communications
Data link error
Error of device station is detected.
System A Master station Station No.0
Control system master operation
Standby system master operation
System switching monitoring time (T_C)
System switching request is issued.
System A Master station Station No.0
Sequence scan time (SS)
1
2
3
Data sent from system A master station to another station
0)
1)
2)
System A
Control system
Standby system
System B
Standby system
Control system
System switching time (T_{SW})
System B Master station Station No.0
Standby system master operation
Control system master operation
Line switching time (L_{SW})
System B Master station Station No.0
Sequence scan time (SS)
4
5
6
Data sent from system B master station to another station
Delay time until first output after system switching (T_{jo})
4)
5)
Another station
Data received from system A master station or system B master station
Cyclic transmission delay time
Cyclic transmission delay time
0)
1)
4)
5)
Cyclic data retention time (T_H)

■Pattern 6


Error
Device station
Communication status
Normal communications
Data link error
Error of device station is detected.
System A Master station Station No.0
Control system master operation
Standby system master operation
System switching monitoring time (T_C)
System switching request is issued.
System A Master station Station No.0
Sequence scan time (SS)
1
2
3
Data sent from system A master station to another station
0)
1)
2)
System A
Control system
Standby system
System B
Standby system
Control system
System switching time (T_{SW})
System B Master station Station No.0
Standby system master operation
Control system master operation
Line switching time (L_{SW})
System B Master station Station No.0
Sequence scan time (SS)
4
5
6
Data sent from system B master station to another station
Delay time until first output after system switching (T_{io})
4)
5)
Another station
Data received from system A master station or system B master station
Cyclic transmission delay time
Cyclic transmission delay time
0)
1)
3)
4)
Cyclic data retention time (T_H)

A

Safety data holding time when system switching occurs

This section describes safety data holding time when system switching occurs in a system using the SIL2 Process CPU.

Redundant master station

The following are the formulas to calculate safety data holding time when system switching occurs in the redundant master station configuration.*1

Pattern No.	System switching cause		Safety data holding time (S_H) [ms]	Timing chart
1	• Failure of the control system power supply module*3 • Power-off of the control system • Failure of the control system SIL2 Process CPU • Failure of the control system base unit*4 • Failure of the control system redundant function module*4		Delay time until detection of the system switching cause*2 + Tsw + Tso + TMmst	☞ Page 431 Pattern 1
2	• Stop error of the control system SIL2 Process CPU • Execution of the system switching instruction • System switching request from the engineering tool • System switching request from another network module		Delay time until detection of the system switching cause*2 + Tsw + Tso + TMmst	☞ Page 431 Pattern 2
3	System switching request from the RJ71GF11-T2 (own station)	Own station data link error	310 + (3 × Ls) + Tc + Tsw + Tso + TMmst + SS	☞ Page 432 Pattern 3
4		Communication error with the system switching monitoring target station	210 + Tc + Tsw + Tso + TMmst + SS	☞ Page 433 Pattern 4

*1 The variables in the equation have the following meaning.

Variable	Meaning
Tsw	SIL2 Process CPU system switching time [ms] (MELSEC iQ-R CPU Module User's Manual (Application))
Tso	Delay time until initial safety output after system switching (MELSEC iQ-R CPU Module User's Manual (Application))
TMmst	Transmission interval monitoring time of the master station (safety station) [ms] (☞ Page 406 Transmission interval monitoring time)
SS	SIL2 Process CPU sequence scan time [ms] (MELSEC iQ-R CPU Module User's Manual (Application))
Tc	System switching monitoring time setting value [ms] (☞ Page 154 Supplementary Cyclic Settings)
LS	Link scan time [ms] (☞ Page 396 Link scan time)

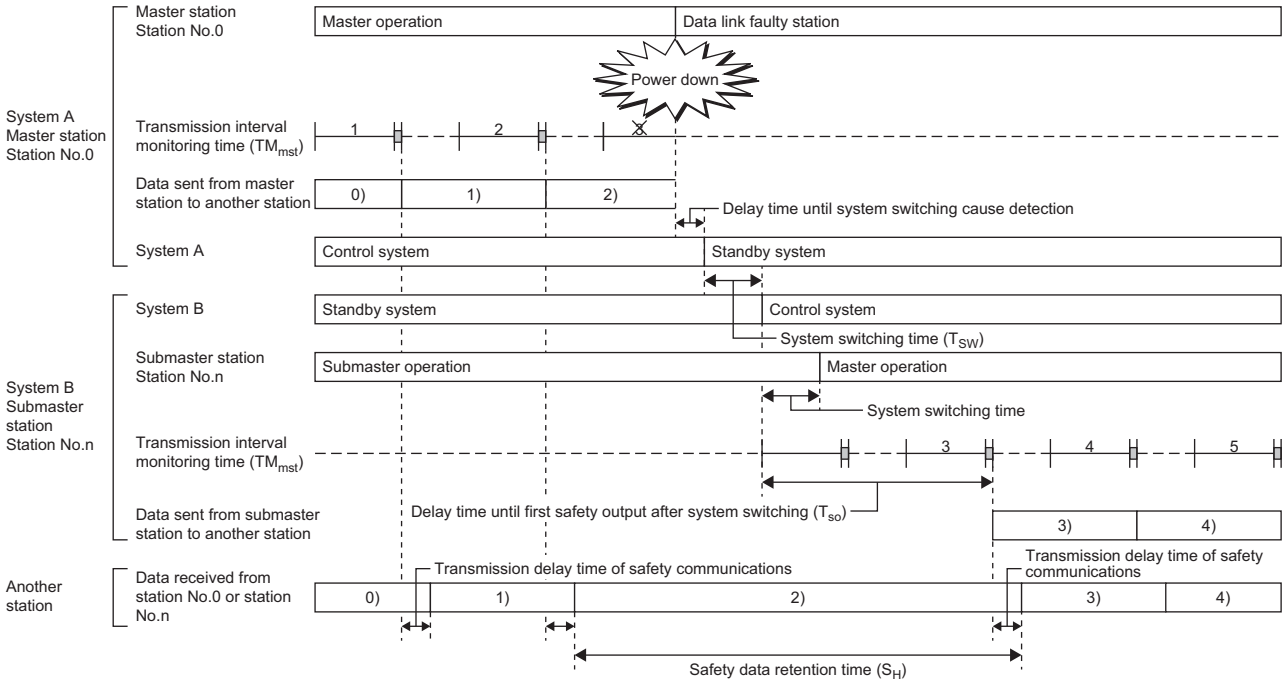
*2 For delay time until detection of the system switching cause, refer to the following.
MELSEC iQ-R CPU Module User's Manual (Application)

*3 Depending on the failure status of the power supply module, the calculation formula of the safety data holding time (SH) may be as follows.
500 + Tsw + Tso + TMmst

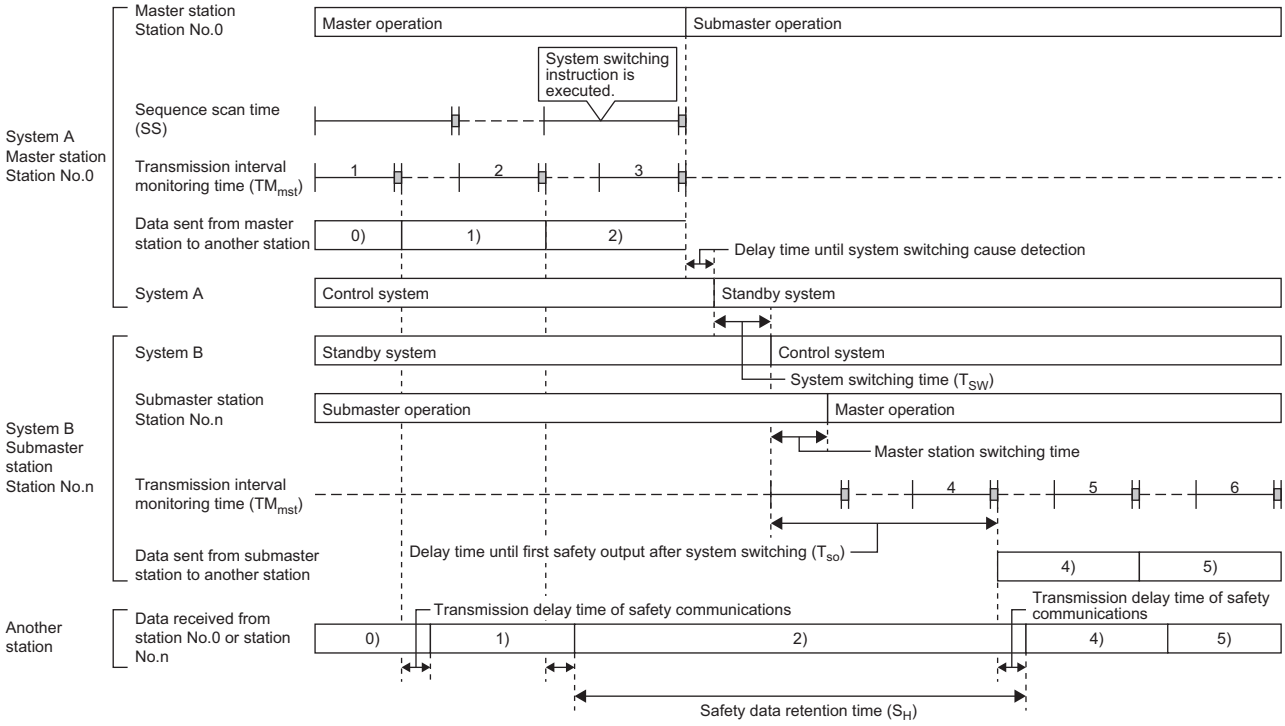
*4 When the redundant function module is disconnected from the base unit or depending on the failure status of the base unit, the safety data holding time (S_H) may be calculated by the following formula.
2.5 + (2 × LS) + Tsw + Tso + TMmst

■Pattern 1

The following figure shows a timing chart for normal value.

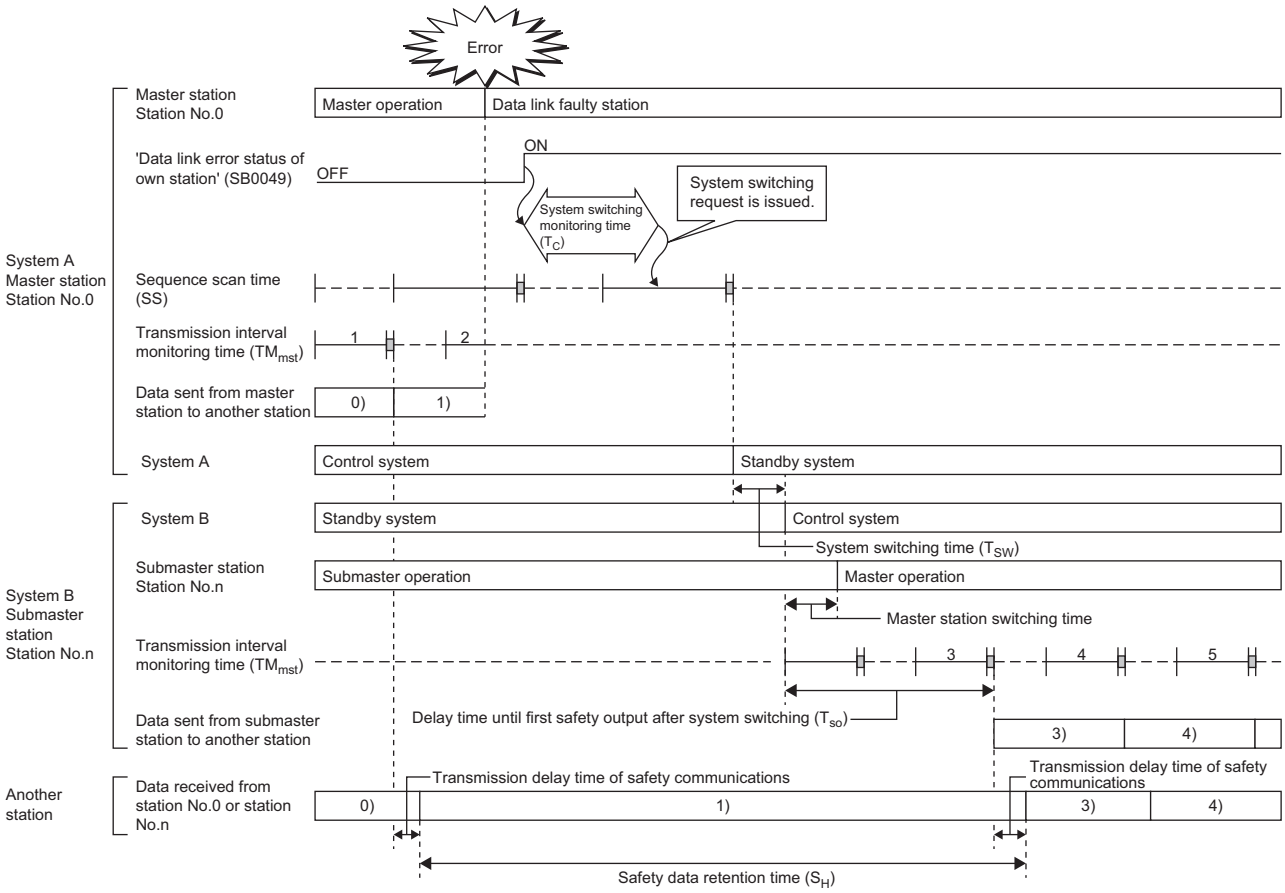


■Pattern 2

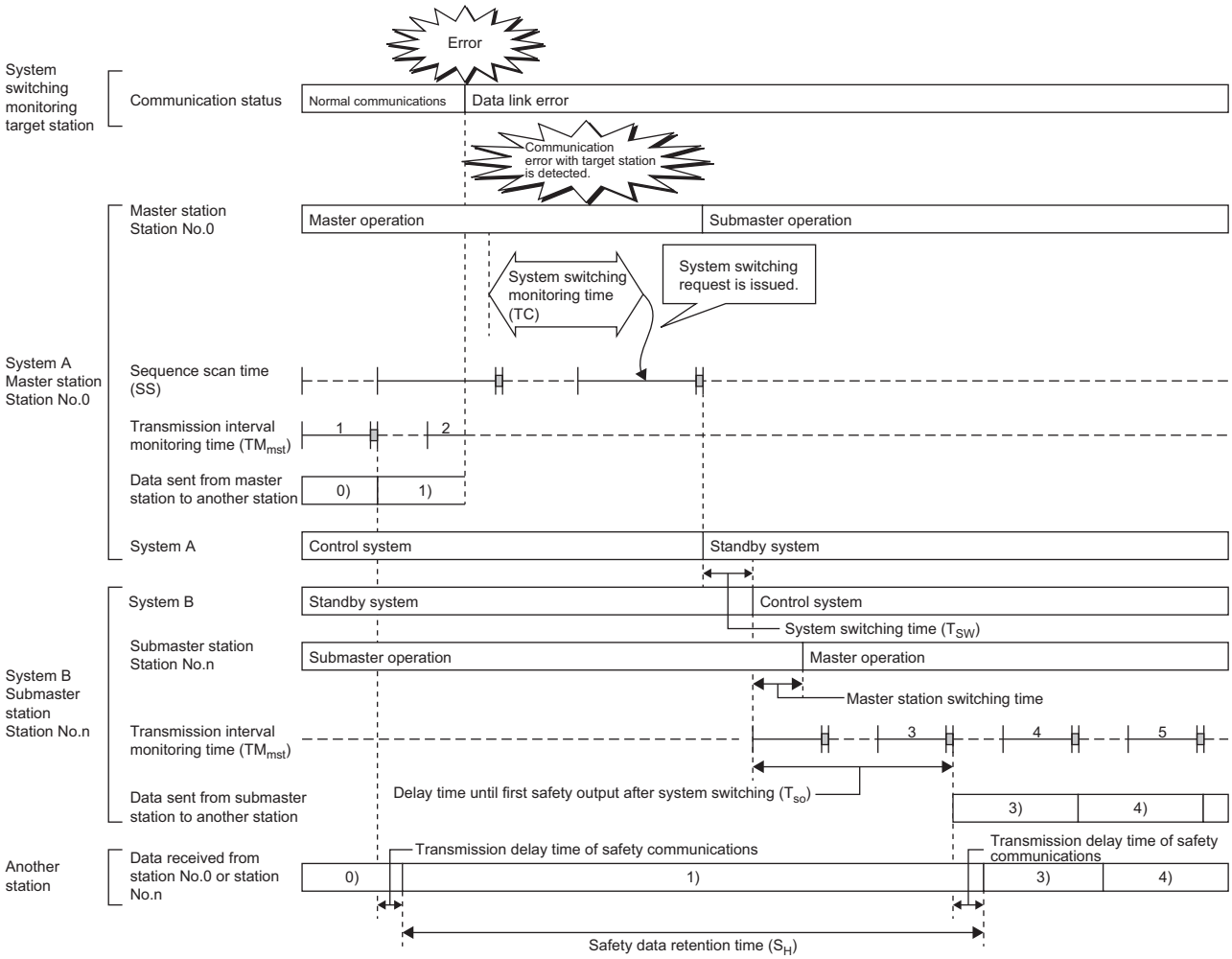


A

■Pattern 3


Error
Master station
Station No.0
Master operation
Data link faulty station
'Data link error status of own station' (SB0049)
ON
OFF
System switching monitoring time (T_C)
System switching request is issued.
System A
Master station
Station No.0
Sequence scan time (SS)
Transmission interval monitoring time (TM_{mst})
1
2
Data sent from master station to another station
0)
1)
System A
Control system
Standby system
System B
Standby system
Control system
System switching time (T_{SW})
Submaster station
Station No.n
Submaster operation
Master operation
Master station switching time
System B
Submaster station
Station No.n
Transmission interval monitoring time (TM_{mst})
3
4
5
Delay time until first safety output after system switching (T_{so})
Data sent from submaster station to another station
3)
4)
Another station
Data received from station No.0 or station No.n
Transmission delay time of safety communications
Transmission delay time of safety communications
0)
1)
3)
4)
Safety data retention time (S_H)

■Pattern 4


Error
System switching monitoring target station
Communication status
Normal communications
Data link error
Communication error with target station is detected.
Master station Station No.0
Master operation
Submaster operation
System switching monitoring time (TC)
System switching request is issued.
System A Master station Station No.0
Sequence scan time (SS)
Transmission interval monitoring time (TMmst)
1
2
Data sent from master station to another station
0)
1)
System A
Control system
Standby system
System B
Standby system
Control system
System switching time (TSW)
Submaster station Station No.n
Submaster operation
Master operation
Master station switching time
System B Submaster station Station No.n
Transmission interval monitoring time (TMmst)
3
4
5
Delay time until first safety output after system switching (Tso)
Data sent from submaster station to another station
3)
4)
Another station
Data received from station No.0 or station No.n
Transmission delay time of safety communications
Transmission delay time of safety communications
0)
1)
3)
4)
Safety data retention time (SH)

A

Redundant line

The following are the formulas to calculate safety data holding time when system switching occurs in the redundant line configuration.[*1]

Pattern No.	System switching cause	Safety data holding time (S_H) [ms]	Timing chart
1	• Failure of the control system power supply module[*3] • Power-off of the control system • Failure of the control system SIL2 process • Failure of the control system base unit[*4] • Failure of the control system redundant function module[*4]	Delay time until detection of the system switching cause[*2] + Tsw + Tso + TMmst	☞ Page 435 Pattern 1
2	• Stop error of the control system SIL2 process • Execution of the system switching instruction • System switching request from the engineering tool • System switching request from another network module	Delay time until detection of the system switching cause[*2] + Tsw + Tso + TMmst	☞ Page 435 Pattern 2
3	System switching request from the RJ71GF11-T2 (own station)	5 + Tc + (3 × LS) + Tsw + Tso + TMmst + SS	☞ Page 436 Pattern 3

*1 The variables in the equation have the following meaning.

Variable	Meaning
Tsw	SIL2 Process CPU system switching time [ms] (📖 MELSEC iQ-R CPU Module User's Manual (Application))
Tso	Delay time until initial safety output after system switching (📖 MELSEC iQ-R CPU Module User's Manual (Application))
TMmst	Transmission interval monitoring time of the master station (safety station) [ms] (☞ Page 406 Transmission interval monitoring time)
SS	SIL2 Process CPU sequence scan time [ms] (📖 MELSEC iQ-R CPU Module User's Manual (Application))
Tc	System switching monitoring time setting value [ms] (☞ Page 154 Supplementary Cyclic Settings)
LS	Link scan time [ms] (☞ Page 396 Link scan time)

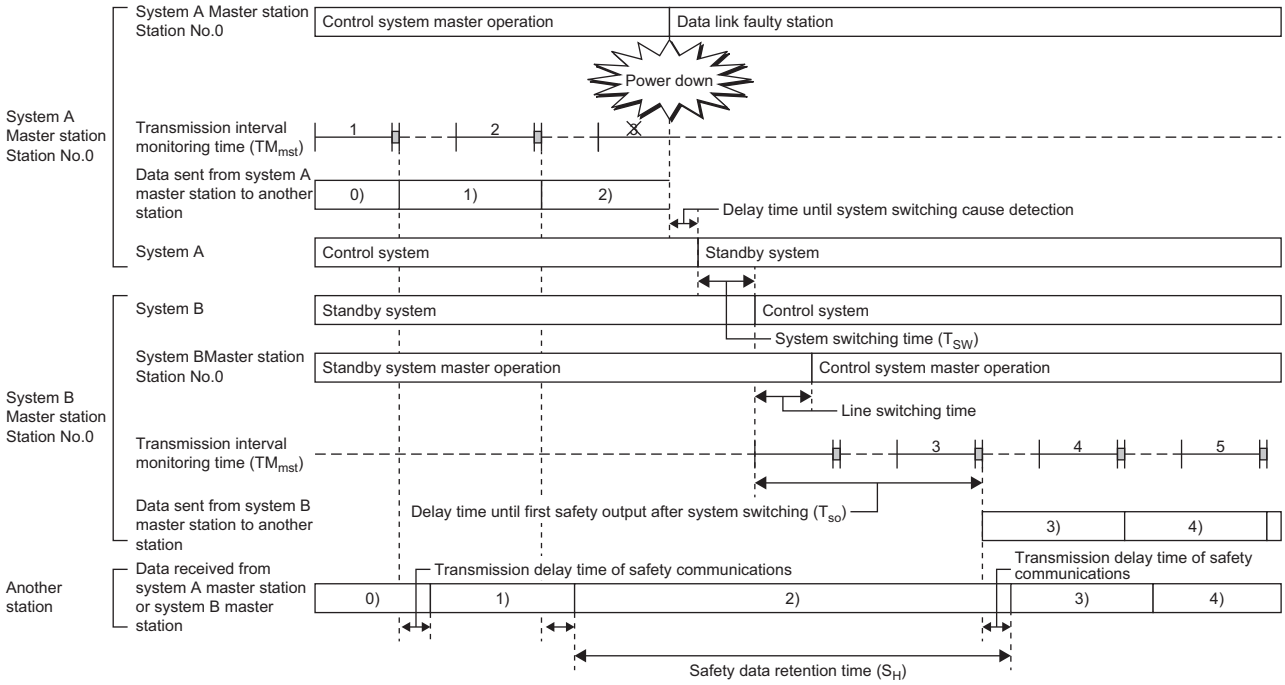
*2 For delay time until detection of the system switching cause, refer to the following.
📖 MELSEC iQ-R CPU Module User's Manual (Application)

*3 Depending on the failure status of the power supply module, the calculation formula of the safety data holding time (SH) may be as follows.
100 + (2 × LS) + Tsw + Tso + TMmst

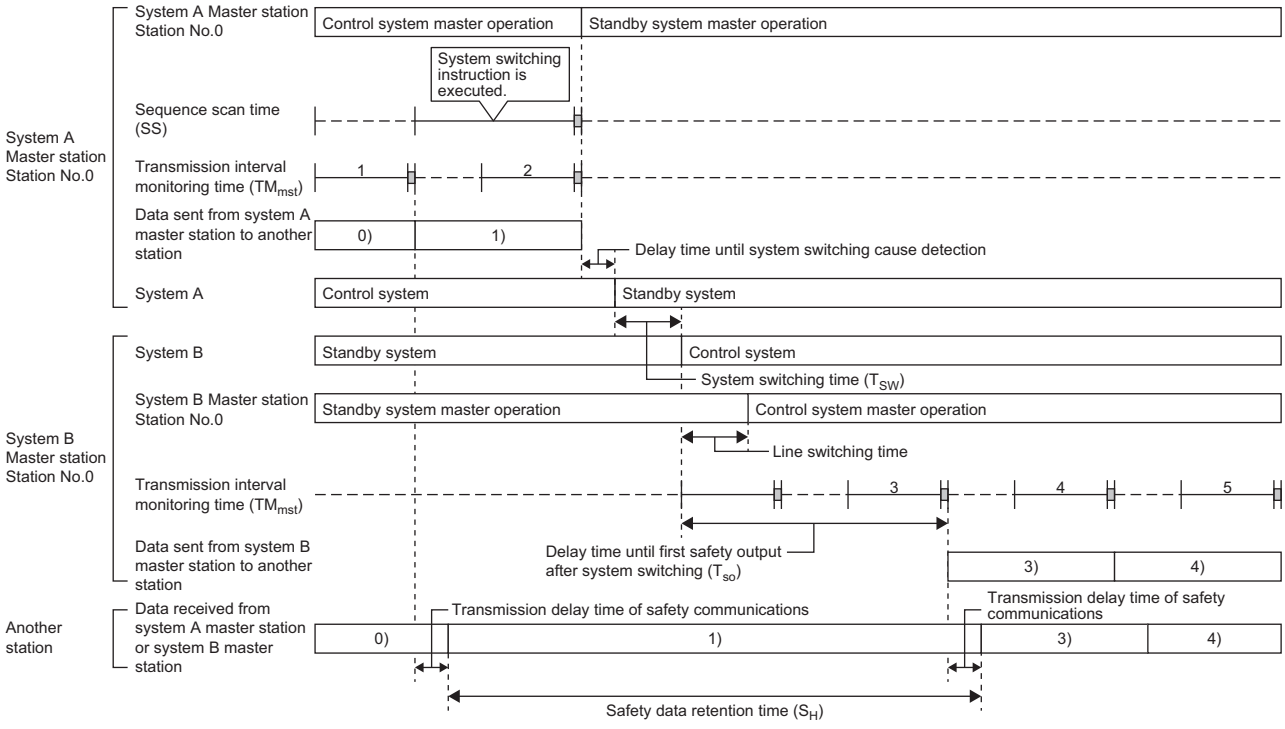
*4 When the redundant function module is disconnected from the base unit or depending on the failure status of the base unit, the safety data holding time (SH) may be calculated by the following formula.
2.5 + (4 × LS) + Tsw + Tso + TMmst

■Pattern 1

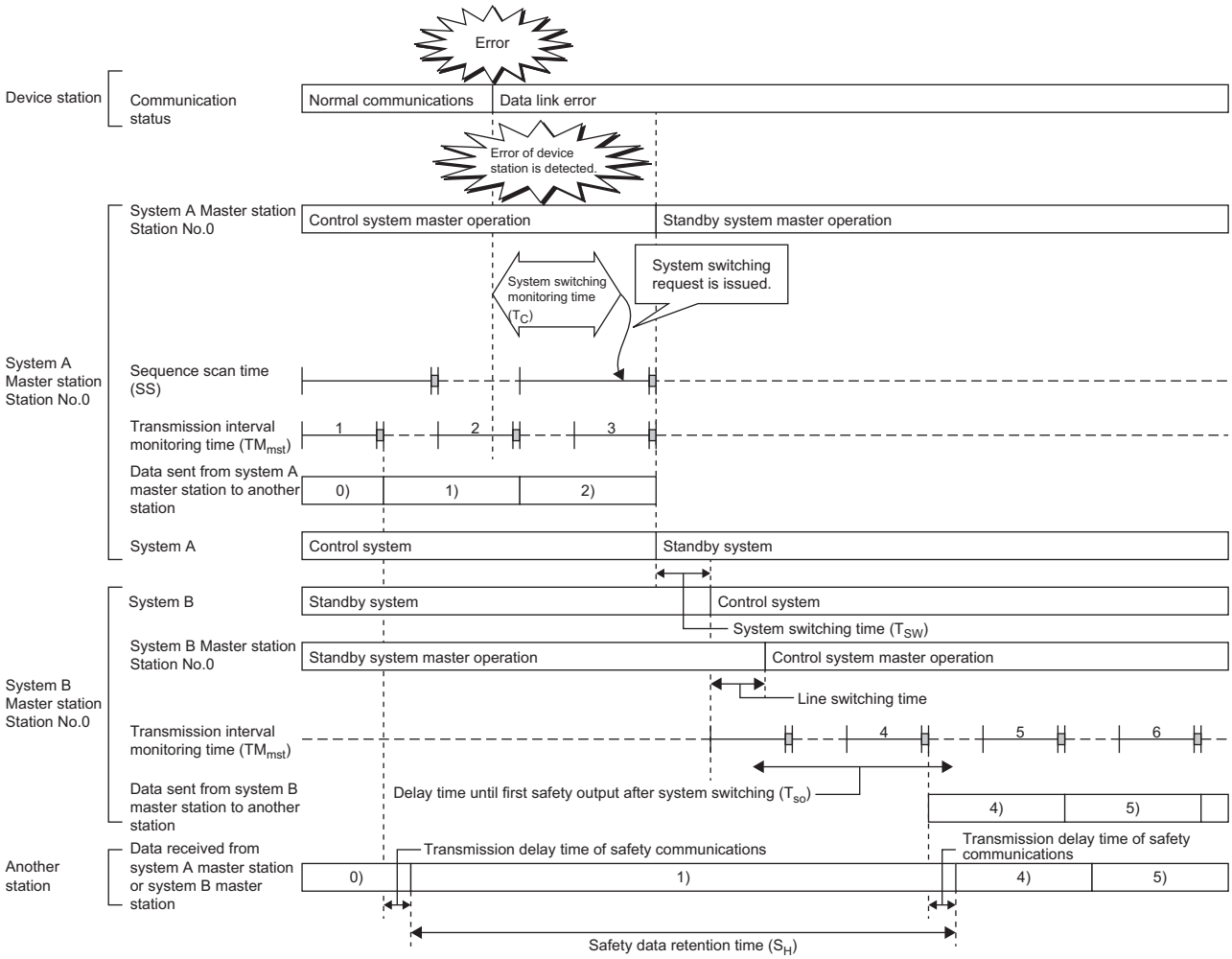
The following figure shows a timing chart for normal value.



■Pattern 2



■Pattern 3


Error
Device station
Communication status
Normal communications
Data link error
Error of device station is detected
System A Master station Station No.0
Control system master operation
Standby system master operation
System switching monitoring time (T_C)
System switching request is issued.
System A Master station Station No.0
Sequence scan time (SS)
Transmission interval monitoring time (TM_{mst})
1
2
3
Data sent from system A master station to another station
0)
1)
2)
System A
Control system
Standby system
System B
Standby system
Control system
System switching time (T_{SW})
System B Master station Station No.0
Standby system master operation
Control system master operation
Line switching time
System B Master station Station No.0
Transmission interval monitoring time (TM_{mst})
4
5
6
Data sent from system B master station to another station
Delay time until first safety output after system switching (T_{so})
4)
5)
Another station
Data received from system A master station or system B master station
Transmission delay time of safety communications
Transmission delay time of safety communications
0)
1)
4)
5)
Safety data retention time (S_H)

Data link stop time when changing parameters

Data link stop time when changing parameters with a dedicated instruction varies depending on the number of device stations and the total allocation points for cyclic transmission after changing parameters.
If all stations are configured with master/local modules, the following shows approximate data link stop time when changing parameters.

Number of device stations after changing parameters (including submaster station)	Data link stop time	
	Total allocation points for cyclic transmission (RX/RY: 1936 points and RWr/RWw: 484 points)	Total allocation points for cyclic transmission (RX/RY: 16384 points and RWr/RWw: 8192 points)
16	450ms	500ms
60	730ms	800ms
120	1350ms	1550ms

Precautions

Since data link stop time varies depending on the connected devices, check that the data link stop time does not affect the target system control at starting up the system.

Appendix 8 Differences in Cyclic Transmission Modes

This section describes the differences in "Communication Mode" for the master/local module. Refer to the information of each mode to select "Communication Mode".

Differences in performance specifications

Item	Normal	High-speed	High-speed remote net
Maximum number of RWw send points per master operating station and submaster operating station (when using the submaster function)	1024 points, 2048 bytes	256 points, 512 bytes	0 point (The submaster station and local station cannot be connected.)
Maximum number of RWw send points per local station			
Maximum number of transient transmissions per link scan	4 + device stations × 1.5	4	4

Differences in link scan time

The following table lists the link scan times for each communication mode when each station is assigned 128 points in "RX/RY Setting" and 64 points in "RWw/RWr Setting" in "Network Configuration Settings" of "Basic Settings", and when the number of connected stations increases.

Total number of stations	Link scan time					Remarks (Total number of points for link devices)
	Normal	High-speed (When "Clear" is set in "Data Link Error Station Setting")	High-speed (When "Hold" is set in "Data Link Error Station Setting")	High-speed remote net (When "Clear" is set in "Data Link Error Station Setting")	High-speed remote net (When "Hold" is set in "Data Link Error Station Setting")	
2	0.75ms	0.24ms	0.23ms	0.24ms*1	0.23ms*1	576 bytes
4	0.85ms	0.33ms	0.29ms	0.33ms*1	0.29ms*1	1152 bytes
8	1.05ms	0.49ms	0.42ms	0.49ms*1	0.42ms*1	2304 bytes
16	1.44ms	0.82ms	0.68ms	0.59ms	0.54ms	4608 bytes
32	2.22ms	1.49ms	1.21ms	0.84ms	0.73ms	9216 bytes
64	3.78ms	2.82ms	2.26ms	1.35ms	1.13ms	17280 bytes
120	6.52ms	5.14ms	4.09ms	2.24ms	1.83ms	34560 bytes

*1 When the total number of stations in the network is eight or less, the performance is equivalent to the one when "High-Speed" is selected.

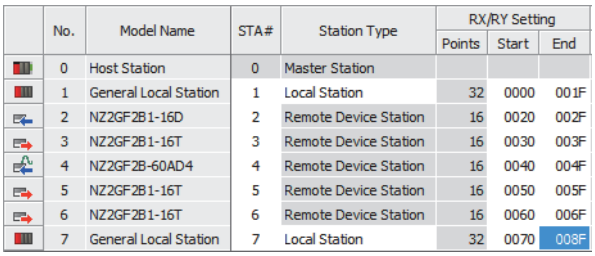
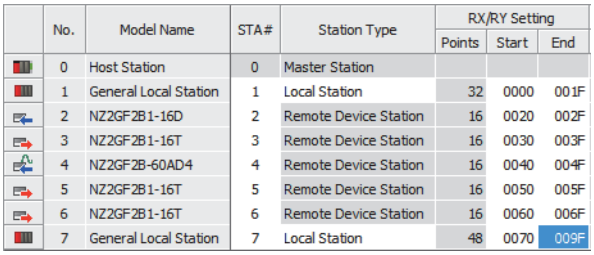
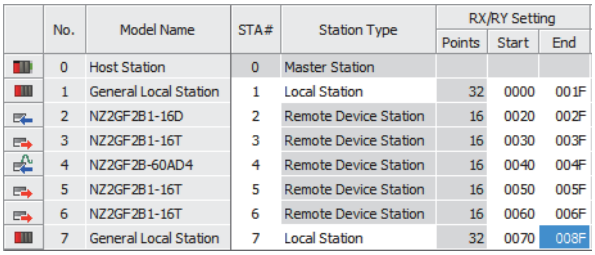
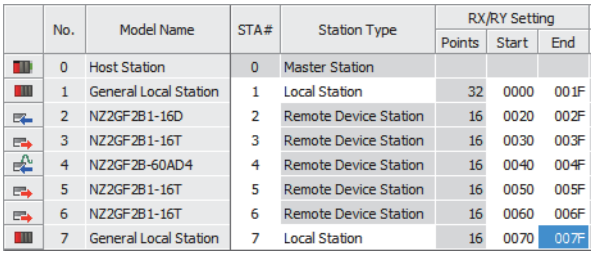
Appendix 9 Precautions for When Connecting the Module to the Conventional Product

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 other than MELSEC iQ-R series.

- Use any of the following modules for the master station.

Model name	First 5 digits of the serial number
QJ71GF11-T2	"16012" or later
LJ71GF11-T2	"16012" or later
Q81BD-J71GF11-T2	"16012" or later
QS0J71GF11-T2	"16022" or later

- If the first 5 digits of the serial number of the master station is smaller than the number shown above, set "RX/RY Setting" in "Network Configuration Settings" to any of the following.

Action	Example
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.	• Before change  • After change 
Reduce the largest end number in all stations to 7FH or less.	• Before change  • After change 

Appendix 10 Added and Enhanced Functions

The following table lists the added and enhanced functions in the master/local module.

○: Available (No version restriction), ×: Not available

Added and enhanced function	Firmware version		
	RJ71GF11-T2	RJ71EN71	RnENCPU[*1]
Automatic detection of connected devices	Refer to the following. 📖 iQ Sensor Solution Reference Manual		
Network map update in the CC-Link IE Field Network diagnostics	"05" or later	"05" or later	○
Change of the calculation method for maximum data link processing time when the station is disconnected from or returned to the network, which is used for the link scan time formula	"05" or later	"05" or later	○
Safety communication function in a system using the Safety CPU (support safety protocol version 1)[*2]	"06" or later	×	×
High-speed remote net mode setting of communication mode	"06" or later	"06" or later	○
The following functions can be performed in the CC-Link IE Field Network diagnostics. • Display of a receive frame error of the master station • Display of a receive frame error of the device station • Switch of display name of the device station • When all the stations are disconnected, the network configuration before disconnection is held in "Network Status" of the CC-Link IE Field Network diagnostic. • Display of the loopback station	"06" or later	"06" or later	○
iQ Sensor Solution data backup/restoration function[*4]	"09" or later	"09" or later	"09" or later
Cascade connections 20 levels of when CC-Link IE Field Network synchronous communication function is used	"11" or later	"11" or later	"11" or later
Redundant system function[*2]	"12" or later	×	×
Connection to CC-Link IE Field Network which contains a redundant system	"12" or later	"12" or later	"12" or later
Remote instructions (SINFTYRD/SINFSTRD)	"12" or later	"12" or later	"12" or later
Link dedicated instructions (REMFRD/REMTOD)[*3]	"12" or later	"12" or later	"12" or later
SLMP communication instruction (SLMPREQ)[*3]	"18" or later	"18" or later	"18" or later
Safety communication function in a system using the SIL2 Process CPU (supporting safety protocol version 1)[*2]	"25" or later	×	×
Remote device test	"33" or later	"33" or later	"33" or later
Setting to wait cyclic data receive after system switching[*2]	"35" or later	×	×
Communication path switch at an instantaneous interruption	"56" or later	"56" or later	"56" or later
Other dedicated instructions (CCPASETR)[*3]	"59" or later	×	×
Safety protocol version 2 in the safety communication function of a system using the Safety CPU[*5]	"70" or later	×	×
sSafety protocol version 2 in the safety communication function of a system using the SIL2 Process CPU[*5]	"80" or later	×	×

*1 Indicates the firmware version of the RnENCPU (network part).

*2 There are restrictions on the CPU module to be used. For details, refer to the following.
📖 MELSEC iQ-R CPU Module User's Manual (Application)

*3 There are restrictions on the CPU module to be used. For details, refer to the following.
📖 MELSEC iQ-R Programming Manual (Module Dedicated Instructions)

*4 There are restrictions on the CPU module to be used. For details, refer to the following.
📖 iQ Sensor Solution Reference Manual

*5 The supported safety protocol version differs depending on the firmware version of each module used. For details, refer to the following.
☞ Page 118 System using the Safety CPU
☞ Page 123 System using the SIL2 Process CPU

Appendix 11 Combination when the Safety Communication Function Is Used (For a System Using the Safety CPU)

This section describes the combination of the firmware version and safety protocol version set in the safety communication setting of GX Works3 of each module when the safety communication function in a system using the safety CPU is used.
For combinations listing "—" in the results, replace each module with a module supported by the safety protocol version 2 and change the parameters in GX Works3, so that the combination becomes "○".
If safety protocol version 1 is still to be used, the combination of the versions must be "△".
○: Available for safety communications with safety protocol version 2, △: Available for safety communications with safety protocol version 1, —: Not available for the safety communications

When the firmware version of the Safety CPU on the Passive side is "19" or earlier

Item				Open system: Passive	
				Firmware version of the Safety CPU: "19" or earlier	
				Firmware version of the RJ71GF11-T2: "6" or later	
				Safety protocol version set in the safety communication setting of GX Works3: 1	Safety protocol version set in the safety communication setting of GX Works3: 2
Open system	Firmware version of the Safety CPU	Firmware version of the RJ71GF11-T2	Safety protocol version set in the safety communication setting of GX Works3	—	
Active	"1" or later	"6" or later	1	△	△*1
	"19" or earlier	"6" or later	2	△*1	△*1
	"20" to "28"	"6" to "69"		—*2(1)	—*2 (1)
		"70" or later		—*2(2)	—*2 (2)
	"29" or later	"6" to "69"		—*2(3)	—*2 (3)
		"70" or later		—*2(4)	—*2 (4)

*1 Unlike the safety communication settings in GX Works3, the safety communications are performed using safety protocol version 1.
*2 The safety communications cannot be performed. For each module status, refer to the corresponding number in the table.
☞ Page 445 Each module status when the safety communications are not available

When the firmware version of the Safety CPU on the Passive side is "20" to "28"

Item				Open system: Passive		
				Firmware version of the Safety CPU: "20" to "28"		
				Firmware version of the RJ71GF11-T2: "6" or later	Firmware version of the RJ71GF11-T2: "6" to "69"	Firmware version of the RJ71GF11-T2: "70" or later
				Safety protocol version set in the safety communication setting of GX Works3: 1	Safety protocol version set in the safety communication setting of GX Works3: 2	
Open system	Firmware version of the Safety CPU	Firmware version of the RJ71GF11-T2	Safety protocol version set in the safety communication setting of GX Works3	—		
Active	"1" or later	"6" or later	1	△	—*2 (6)	—*2 (10)
	"19" or earlier	"6" or later	2	△*1	—*2 (6)	—*2 (10)
	"20" to "28"	"6" to "69"		—*2 (1)	—*2 (7)	—*2 (11)
		"70" or later		—*2 (5)	—*2 (8)	—*2 (12)
	"29" or later	"6" to "69"		—*2 (3)	—*2 (9)	—*2 (13)
		"70" or later		—*2 (5)	—*2 (6)	—*2 (12)

*1 Unlike the safety communication settings in GX Works3, the safety communications are performed using safety protocol version 1.

*2 The safety communications cannot be performed. For each module status, refer to the corresponding number in the table.
☞ Page 445 Each module status when the safety communications are not available

When the firmware version of the Safety CPU on the Passive side is "29" or later

Item				Open system: Passive		
				Firmware version of the Safety CPU: "29" or later		
				Firmware version of the RJ71GF11-T2: "6" or later	Firmware version of the RJ71GF11-T2: "6" to "69"	Firmware version of the RJ71GF11-T2: "70" or later
				Safety protocol version set in the safety communication setting of GX Works3: 1	Safety protocol version set in the safety communication setting of GX Works3: 2	
Open system	Firmware version of the Safety CPU	Firmware version of the RJ71GF11-T2	Safety protocol version set in the safety communication setting of GX Works3	—		
Active	"1" or later	"6" or later	1	△	—*2 (15)	—*2 (19)
	"19" or earlier	"6" or later	2	△*1	—*2 (15)	—*2 (19)
	"20" to "28"	"6" to "69"		—*2 (1)	—*2 (16)	—*2 (1)
		"70" or later		—*2 (14)	—*2 (17)	—*2 (12)
	"29" or later	"6" to "69"		—*2 (3)	—*2 (18)	—*2 (3)
		"70" or later		—*2 (14)	—*2 (15)	○

*1 Unlike the safety communication settings in GX Works3, the safety communications are performed using safety protocol version 1.

*2 The safety communications cannot be performed. For each module status, refer to the corresponding number in the table.
☞ Page 445 Each module status when the safety communications are not available

A

When the remote device station (safety station) is on the Passive side

The table below lists the behavior when the remote device station (safety station) of the communication destination is manufactured by Mitsubishi Electric. Therefore, if the remote device station (safety station) of the communication destination is not manufactured by Mitsubishi Electric, detected error codes may differ.

Item				Open system: Passive	
				Safety protocol version of the remote device station (safety station): 1	Safety protocol version of the remote device station (safety station): 2
Open system	Firmware version of the Safety CPU	Firmware version of the RJ71GF11-T2	Safety protocol version set in the safety communication setting of GX Works3	—	
Active	"1" or later	"6" or later	1	△	—*2 (23)
	"19" or earlier	"6" or later	2	△*1	—*2 (23)
	"20" to "28"	"6" to "69"		—*2(24)	—*2 (24)
		"70" or later		—*2 (20)	—*2 (25)
	"29" or later	"6" to "69"		—*2(21)	—*2 (21)
		"70" or later		—*2 (22)	○

*1 Unlike the safety communication settings in GX Works3, the safety communications are performed using safety protocol version 1.

*2 The safety communications cannot be performed. For each module status, refer to the corresponding number in the table.

☞ Page 445 Each module status when the safety communications are not available

Each module status when the safety communications are not available

The table below lists each module status (error code) when the safety communications are not available.

No.	Open system: Active		Open system: Passive		
	Safety CPU	RJ71GF11-T2	Safety CPU	RJ71GF11-T2	Remote device station (safety station)
(1)	2222H	1811H	No error	No error	—
(2)	No error	No error	1A40H	No error	—
(3)	3686H	1811H	No error	No error	—
(4)	1A53H	No error	1A40H	No error	—
(5)	1A40H, 1A62H	No error	1A62H	No error	—
(6)	No error	No error	2222H	1811H	—
(7)	2222H	1811H	2222H	1811H	—
(8)	No error	No error	2222H	1811H	—
(9)	3686H	1811H	2222H	1811H	—
(10)	1A40H, 1A62H	No error	1A62H	No error	—
(11)	2222H	1811H	No error	No error	—
(12)	1A60H	No error	1A60H	No error	—
(13)	3686H	1811H	No error	No error	—
(14)	1A40H, 1A62H	No error	1A53H, 1A62H	No error	—
(15)	No error	No error	3686H	1811H	—
(16)	2222H	1811H	3686H	1811H	—
(17)	No error	No error	3686H	1811H	—
(18)	3686H	1811H	3686H	1811H	—
(19)	1A40H	No error	1A53H	No error	—
(20)	No error	No error	—	—	8400H
(21)	3686H	1811H	—	—	No error
(22)	1A53H	No error	—	—	8400H
(23)	1A40H	No error	—	—	8400H
(24)	2222H	1811H	—	—	No error
(25)	1A60H	No error	—	—	8402H

Appendix 12 Combination when the Safety Communication Function Is Used (For a System Using the SIL2 Process CPU)

This section describes the combination of the firmware version and safety protocol version set in the safety communication setting of GX Works3 of each module when the safety communication function in a system using the SIL2 Process CPU is used.

For combinations listing "—" in the results, replace each module with a module supported by the safety protocol version 2 and change the parameters in GX Works3, so that the combination becomes "○".

If safety protocol version 1 is still to be used, the combination of the versions must be "△".

○: Available for safety communications with safety protocol version 2, △: Available for safety communications with safety protocol version 1, —: Not available for the safety communications

When the firmware version of SIL2 Process CPU in the control system is "13" or earlier

■When the firmware version of the RJ71GF11-T2 in the control system is "24" or earlier

Station type				Safety protocol version set in the safety communication setting of GX Works3	Communication status when starting up the system
Control system		Standby system			
Firmware version of the SIL2 Process CPU	Firmware version of the RJ71GF11-T2	Firmware version of the SIL2 Process CPU	Firmware version of the RJ71GF11-T2		
"13" or earlier	"24" or earlier	"13" or earlier	"24" or earlier	1	—*1(1)
				2	—*1(2)
			"25" to "79"	1	—*1(3)
				2	—*1(2)
			"80" or later	1	—*1(3)
				2	—*1(2)
		"14" or later	"24" or earlier	1	—*1(1)
				2	—*1(2)
			"25" to "79"	1	—*1(3)
				2	—*1(2)
			"80" or later	1	—*1(3)
				2	—*1(2)

*1 The safety communications cannot be performed. For each module status, refer to the corresponding number in the table.
☞ Page 450 Each module status when the safety communications are not available

■When the firmware version of the RJ71GF11-T2 in the control system is "25" to "79"

Station type				Safety protocol version set in the safety communication setting of GX Works3	Communication status when starting up the system
Control system		Standby system			
Firmware version of the SIL2 Process CPU	Firmware version of the RJ71GF11-T2	Firmware version of the SIL2 Process CPU	Firmware version of the RJ71GF11-T2		
"13" or earlier	"25" to "79"	"13" or earlier	"24" or earlier	1	—*1(4)
				2	—*1(2)
			"25" to "79"	1	△
				2	—*1(2)
			"80" or later	1	△
				2	—*1(2)
		"14" or later	"24" or earlier	1	—*1(4)
				2	—*1(2)
			"25" to "79"	1	△
				2	—*1(2)
			"80" or later	1	△
				2	—*1(2)

*1 The safety communications cannot be performed. For each module status, refer to the corresponding number in the table.
☞ Page 450 Each module status when the safety communications are not available

■When the firmware version of the RJ71GF11-T2 in the control system is "80" or later

Station type				Safety protocol version set in the safety communication setting of GX Works3	Communication status when starting up the system
Control system		Standby system			
Firmware version of the SIL2 Process CPU	Firmware version of the RJ71GF11-T2	Firmware version of the SIL2 Process CPU	Firmware version of the RJ71GF11-T2		
"13" or earlier	"80" or later	"13" or earlier	"24" or earlier	1	—*1(4)
				2	—*1(2)
			"25" to "79"	1	△
				2	—*1(2)
			"80" or later	1	△
				2	—*1(2)
		"14" or later	"24" or earlier	1	—*1(4)
				2	—*1(2)
			"25" to "79"	1	△
				2	—*1(2)
			"80" or later	1	△
				2	—*1(2)

*1 The safety communications cannot be performed. For each module status, refer to the corresponding number in the table.
☞ Page 450 Each module status when the safety communications are not available

When the firmware version of SIL2 Process CPU in the control system is "14" or later

■When the firmware version of the RJ71GF11-T2 in the control system is "24" or earlier

Station type				Safety protocol version set in the safety communication setting of GX Works3	Communication status when starting up the system
Control system		Standby system			
Firmware version of the SIL2 Process CPU	Firmware version of the RJ71GF11-T2	Firmware version of the SIL2 Process CPU	Firmware version of the RJ71GF11-T2		
"14" or later	"24" or earlier	"13" or earlier	"24" or earlier	1	—*1(1)
				2	—*1(2)
			"25" to "79"	1	—*1(3)
				2	—*1(2)
			"80" or later	1	—*1(3)
				2	—*1(2)
		"14" or later	"24" or earlier	1	—*1(1)
				2	—*1(1)
			"25" to "79"	1	—*1(3)
				2	—*1(9)
			"80" or later	1	—*1(3)
				2	—*1(3)

*1 The safety communications cannot be performed. For each module status, refer to the corresponding number in the table.
☞ Page 450 Each module status when the safety communications are not available

■When the firmware version of the RJ71GF11-T2 in the control system is "25" to "79"

Station type				Safety protocol version set in the safety communication setting of GX Works3	Communication status when starting up the system
Control system		Standby system			
Firmware version of the SIL2 Process CPU	Firmware version of the RJ71GF11-T2	Firmware version of the SIL2 Process CPU	Firmware version of the RJ71GF11-T2		
"14" or later	"25" to "79"	"13" or earlier	"24" or earlier	1	—*1(4)
				2	—*1(2)
			"25" to "79"	1	△
				2	—*1(2)
			"80" or later	1	△
				2	—*1(2)
		"14" or later	"24" or earlier	1	—*1(4)
				2	—*1(8)
			"25" to "79"	1	△
				2	—*1(5)
			"80" or later	1	△
				2	—*1(6)

*1 The safety communications cannot be performed. For each module status, refer to the corresponding number in the table.
☞ Page 450 Each module status when the safety communications are not available

■When the firmware version of the RJ71GF11-T2 in the control system is "80" or later

Station type				Safety protocol version set in the safety communication setting of GX Works3	Communication status when starting up the system
Control system		Standby system			
Firmware version of the SIL2 Process CPU	Firmware version of the RJ71GF11-T2	Firmware version of the SIL2 Process CPU	Firmware version of the RJ71GF11-T2		
"14" or later	"80" or later	"13" or earlier	"24" or earlier	1	—*1(4)
				2	—*1(2)
			"25" to "79"	1	△
				2	—*1(2)
			"80" or later	1	△
				2	—*1(2)
		"14" or later	"24" or earlier	1	—*1(4)
				2	—*1(4)
			"25" to "79"	1	△
				2	—*1(7)
			"80" or later	1	△
				2	○

*1 The safety communications cannot be performed. For each module status, refer to the corresponding number in the table.
☞ Page 450 Each module status when the safety communications are not available

Intelligent device station (safety station)

The table below lists the behavior when the intelligent device station (safety station) of the communication destination is manufactured by Mitsubishi Electric. Therefore, if the intelligent device station (safety station) of the communication destination is not manufactured by Mitsubishi Electric, detected error codes may differ.

Safety protocol version of the master station*1	Safety protocol version of the intelligent device station (safety station)*2	
	1	2
1	△	—*3(10)
2	—*3(11)	○

*1 The safety protocol version of the master station is determined when the system starts up. For details, refer to the combination tables below.
☞ Page 446 When the firmware version of SIL2 Process CPU in the control system is "13" or earlier
☞ Page 448 When the firmware version of SIL2 Process CPU in the control system is "14" or later

*2 The safety protocol version of the intelligent device station (safety station) is determined by the module combined with the RJ72GF15-T2. For details, refer to the following.
📖 MELSEC iQ-R CC-Link IE Field Network Remote Head Module User's Manual (Application)

*3 The safety communications cannot be performed. For each module status, refer to the corresponding number in the table.
☞ Page 450 Each module status when the safety communications are not available

Each module status when the safety communications are not available

The table below lists each module status (error code) when the safety communications are not available.

No.	Control system		Standby system	
	SIL2 Process CPU	RJ71GF11-T2	SIL2 Process CPU	RJ71GF11-T2
(1)	3621H	1811H	3621H	1811H
(2)	CPU write error occurs in GX Works3	No error	CPU write error occurs in GX Works3	No error
(3)	3621H	1811H	No error	No error
(4)	1B61H	No error	3621H	1811H
(5)	3686H	1811H or 301FH	3686H	1811H or 301FH
(6)	3686H	1811H or 301FH	No error	No error
(7)	1B61H	No error	3686H	1811H or 301FH
(8)	3686H	No error, or 301FH	3621H	1811H
(9)	3621H	1811H	3686H	1811H or 301FH

No.	Master station		Intelligent device station (safety station)	
	SIL2 Process CPU	RJ71GF11-T2	RJ72GF15-T2	Module set to the SIL2 mode
(10)	1A62H*1	No error	1200H	3063H
(11)	1A53H*2	No error	No error	No error

*1 If the firmware version of the SIL2 Process CPU is "13" or earlier, 1A40H is detected together with 1A62H.

*2 If the firmware version of RJ72GF15-T2 is "13" or earlier and the safety connection with the module mounted on RJ72GF15-T2 is set to 13 or more connections, the corresponding error may not be detected.

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MEMO

REVISIONS

*The manual number is given on the bottom left of the back cover.

Revision date	*Manual number	Description
June 2014	SH(NA)-081259ENG-A	First edition
July 2014	SH(NA)-081259ENG-B	Error correction
November 2014	SH(NA)-081259ENG-C	■Added or modified parts INTRODUCTION, TERMS, Section 1.3, 4.1, 4.5, 4.7
February 2015	SH(NA)-081259ENG-D	■Added functions Automatic detection of connected devices Network map update in the CC-Link IE Field Network diagnostics ■Added or modified parts RELEVANT MANUALS, Section 2.3, 2.4, 4.5, 4.7, Appendix 5, 10
June 2015	SH(NA)-081259ENG-E	■Added or modified parts Appendix 7, 10
August 2015	SH(NA)-081259ENG-F	■Added models R04ENCPU, R08ENCPU, R16ENCPU, R32ENCPU, R120ENCPU ■Added function Safety communication function in a system using the Safety CPU High-speed remote net mode setting of communication mode Improvement of the CC-Link IE Field Network diagnostics ■Added or modified parts INTRODUCTION, TERMS, 1.1, 1.3, 1.5, 1.6, 1.7, 2.2, 2.3, 2.4, 3.1, 3.2, 3.3, 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, Appendix 1, 3, 4, 5, 6, 7, 8, 10
May 2016	SH(NA)-081259ENG-G	■Added functions iQ Sensor Solution data backup/restoration function Redundant system function Remote instructions (SINFTYRD/SINFSTRD) ■Added or modified parts TERMS, Section 1.2, 1.3, 1.8, 2.2, 2.3, 2.4, 3.1, 3.2, 3.3, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, Appendix 3, 4, 5, 6, 7, 10
April 2017	SH(NA)-081259ENG-I	■Added functions Improvements on CC-Link IE Field Network diagnostics ■Added or modified parts SAFETY PRECAUTIONS, RELEVANT MANUALS, TERMS, Section 2.3, 4.3, 4.5, Appendix 6, 10
December 2017	SH(NA)-081259ENG-J	■Added function Safety communication function in a system using the SIL2 Process CPU ■Added or modified parts SAFETY PRECAUTIONS, TERMS, Section 1.1, 1.2, 1.3, 1.6, 1.7, 1.8, 1.9, 1.10, 2.1, 2.2, 2.4, 3.1, 3.2, 3.3, 3.4, 3.5, 4.2, 4.3, 4.4, Appendix 4, 5, 6, 7, 10
October 2018	SH(NA)-081259ENG-K	■Added function Waiting for cyclic data reception after system switching setting ■Added or modified parts SAFETY PRECAUTIONS, Appendix 10
April 2019	SH(NA)-081259ENG-M	■Added function Remote device test ■Added or modified parts RELEVANT MANUAL, TERMS, GENERIC TERMS AND ABBREVIATIONS, Section 1.1, 1.7, 4.4, 4.5, 4.7, Appendix 4, 5, 7, 10
August 2019	SH(NA)-081259ENG-N	Error correction
December 2019	SH(NA)-081259ENG-O	■Added or modified parts RELEVANT MANUALS, TERMS, GENERIC TERMS AND ABBREVIATIONS, Section 4.1
October 2020	SH(NA)-081259ENG-P	■Added or modified parts SAFETY PRECAUTIONS, CONDITIONS OF USE FOR THE PRODUCT, RELEVANT MANUALS, Section 1.1, 2.3
April 2021	SH(NA)-081259ENG-Q	■Added or modified parts Section 1.4, 4.4, 4.7, Appendix 4, 5, 10
October 2021	SH(NA)-081259ENG-R	■Added or modified parts Section 1.6, 2.2, 3.6, 4.4, Appendix 3, 4, 6, 7, 10

Revision date	*Manual number	Description
April 2022	SH(NA)-081259ENG-S	■Added or modified parts SAFETY PRECAUTIONS, Section 4.5, Appendix 1
May 2023	SH(NA)-081259ENG-T	■Added or modified parts SAFETY PRECAUTIONS, TERMS, Section 1.7, 2.3, 2.4, 3.3, 4.2, 4.4, 4.5, 4.6, Appendix 4, 5, 7, 10, 11
October 2023	SH(NA)-081259ENG-U	■Added or modified parts SAFETY PRECAUTIONS, TERMS, GENERIC TERMS AND ABBREVIATIONS, Section 1.1, 1.4, 1.5, 1.6, 1.8, 2.2, 2.3, 2.4, 3.2, 3.3, 3.4, 3.5, 3.6, 4.1, 4.3, 4.4, 4.5, 4.7, Appendix 4, 5, 7, 8, 10
April 2024	SH(NA)-081259ENG-V	■Added or modified part Appendix 7
March 2025	SH(NA)-081259ENG-W	■Added or modified part Section 4.4
October 2025	SH(NA)-081259ENG-X	■Added or modified parts SAFETY PRECAUTIONS, INTRODUCTION, TERMS, Section 1.1, 1.6, 1.7, 2.2, 2.3, 2.4, 3.1, 3.4, 3.5, 4.3, 4.4, 4.5, 4.6, 4.7, Appendix 6, 7, 10, 11, 12

Japanese manual number: SH-081255-W

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WARRANTY

Please confirm the following product warranty details before using this product.

1. Gratis Warranty Term and Gratis Warranty Range

If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi occurs during use of the product within the gratis warranty term, the product shall be repaired at no cost via the sales representative or Mitsubishi Service Company.

However, if repairs are required onsite at domestic or overseas location, expenses to send an engineer will be solely at the customer's discretion. Mitsubishi shall not be held responsible for any re-commissioning, maintenance, or testing on-site that involves replacement of the failed module.

[Gratis Warranty Term]

The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place. Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.

[Gratis Warranty Range]

(1) The range shall be limited to normal use within the usage state, usage methods and usage environment, etc., which follow the conditions and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.

(2) Even within the gratis warranty term, repairs shall be charged for in the following cases.

1. Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by the user's hardware or software design.
2. Failure caused by unapproved modifications, etc., to the product by the user.
3. When the Mitsubishi product is assembled into a user's device, Failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
4. Failure that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
5. Failure caused by external irresistible forces such as fires or abnormal voltages, and Failure caused by force majeure such as earthquakes, lightning, wind and water damage.
6. Failure caused by reasons unpredictable by scientific technology standards at time of shipment from Mitsubishi.
7. Any other failure found not to be the responsibility of Mitsubishi or that admitted not to be so by the user.

2. Onerous repair term after discontinuation of production

(1) Mitsubishi shall accept onerous product repairs for seven (7) years after production of the product is discontinued. Discontinuation of production shall be notified with Mitsubishi Technical Bulletins, etc.

(2) Product supply (including repair parts) is not available after production is discontinued.

3. Overseas service

Overseas, repairs shall be accepted by Mitsubishi's local overseas FA Center. Note that the repair conditions at each FA Center may differ.

4. Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation to:

(1) Damages caused by any cause found not to be the responsibility of Mitsubishi.

(2) Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products.

(3) Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products.

(4) Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

5. Changes in product specifications

The specifications given in the catalogs, manuals or technical documents are subject to change without prior notice.

INFORMATION AND SERVICES

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SH(NA)-081259ENG-X

TRANSLATION OF THE ORIGINAL INSTRUCTIONS

SH(NA)-081259ENG-X(2510)MEE
MODEL: R-CCIEF-U-OU-E

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